

It's your world of
Good Food

Cooking for health & happiness - Lessons 1-6



Cooking for taste & balance



Everybody enjoys eating. And do you know—a meal that is nutritious can be just as appealing and delicious as a meal that is empty of proper nutrients?

Among the highlights each day in any family's life is mealtime. Actually, it is the cornerstone of happy and healthy families. When Father, Mother, and the children gather around an appealing table with good food, relating to each other in a congenial atmosphere, sharing in the experiences of their day, a feeling of "togetherness" is built. In such families mealtime is anticipated, and planning and serving nutritious tasty meals becomes a challenge and a joy to the wife and mother.

Many families, however, have found that our contemporary way of life has altered the traditional pattern of all the members sitting down together for

full meals. It is more common for the family to be "eating on the run." They eat snacks. They eat convenience foods, foods that come in boxes or cans or frozen in trays. They eat take-out meals, drive-in meals, any kind of meal—just so it fills the stomach and stops the hunger pangs. This dramatic increase in the use of processed, ready-to-eat foods and snacks, a number of experts believe, is one of the reasons for the uncomfortable fact that poor diets are on the increase. This—in spite of the fact that we live in an affluent society with the largest food supply of any nation in the world.

What is a wife and mother to do? Keeping the family healthy calls for a basic understanding of food values and nutritional concepts so that meals can be adapted to the family's living pattern. In our changing life style, the family can



still be offered the possibility of good nutrition. The homemaker needs an easy-to-follow everyday guide. She is the family's "gate-keeper" to good nutrition. Her knowledge and leadership will influence their nutrition and their food habits even though three meals a day together are no longer the family pattern.

The science of nutrition brings into focus the close relationship which exists between food and health. Of course, other important factors contribute to health and well-being: the amount of exercise one takes, the relaxation and sleep he gets, and the stresses under which he lives. However, a person is not at his best unless he regularly eats enough of the right kinds of food.

Dr. George Mann, now of Vanderbilt University, and Dr. Frederick Stare of Harvard's School of Public Health have said, "In our opinion, nutrition is the most important single environmental factor affecting health."

An eminent authority in nutrition, Dr. H. C. Sherman of Columbia University, observed, "Lately, it is becoming increasingly clear that, however important the inherited constitution, there is yet a very great opportunity open to each of us to provide through sane daily living, and no-

tably through intelligent food habits, for such a favorable internal environment as shall permit our native endowments to develop and function to the best advantage. . . .

"For hitherto, while we included nutrition among environmental factors by definition, yet when we actually thought about environment it was chiefly to think about our surroundings. As we come to realize how significantly our daily choice and use of food influences that more important environment which we carry within our own bodies, we see that we ourselves have a much larger measure of ability to improve the life process than science has hitherto supposed to be possible."

Dr. Sherman and his associates demonstrated this nutritional improbability of life in a long-term animal study. They found that by modifying a diet which was already considered adequate enough to produce 88 generations of normal animals, they not only could prolong the life of the animals by about 10 percent, but they could postpone the onset of outward signs of old age. In other words, this extra 10 percent was an extension of the prime of life.

A past president of the American Medical Association, Dr. David Allman,

observed: "Good nutrition is not a proverbial fountain of youth, but it can help every American retain—for the longest time possible—many of the characteristics of youth. Good nutrition does not come overnight. And it is not a hit-or-miss proposition. Good nutrition is a result of a lifetime of daily good eating habits."

Because of this important relationship between diet and health, Ellen White, a wife and mother who wrote extensively on health subjects, comments that the art of properly preparing foods should be regarded as equal to all the other gifts which a woman may possess; "for its right use has much to do with keeping the human organism in health. Because so inseparably connected with life and health, it is the most valuable of all gifts."

Can you actually expect to feel better if you select your food properly and form good eating habits? Authorities say yes; but keep it in perspective and don't let diet become an obsession. Many people in America—perhaps more than in any other country—are excessively preoccupied with what to eat and what not to eat, how much to eat and when. At the other end of the spectrum is the sizable segment of our population which couldn't care less. A com-

nonsense approach to nutrition avoids either position.

Nutrition affects the whole person. Food is basic to life itself, but it does more than meet physiological needs. Nutrition affects and is affected by mental, social and spiritual forces within the person and in his environment; diet affects the personality, and personality affects the diet. Research has shown that vitamin or mineral deficiencies can produce severe mental and personality changes.

The lack of vitamin B₁ will lead to incoherence, irritability, depression, and uncooperativeness. A deficiency in niacin, another B vitamin, may also cause depression, irritability, and hallucinations. A vitamin B₁₂ deficiency will produce dullness, loss of self-control, and spinal cord degeneration. Insufficient iron results in lowered hemoglobin, reducing the capacity of the blood to carry oxygen to the brain. Too little iodine results in a lowered metabolic rate (the rate at which chemical and physical processes are going on in the body), and physical and mental sluggishness.

In one study, a group of women whose nutrition had not been quite adequate, were placed on good diets. One of the first changes noted was an improvement

in their mental outlook. Before, they had worried about everything. Housework bothered them. They were unhappy and slovenly in appearance. After only three weeks on the better diet, they were much neater in appearance, took an interest in their personal grooming, and were much more cheerful.

Even the skipping of a meal like breakfast can affect the attitude and mental performance. In a study of a group of high school boys, records show that the majority of the boys had better grades as well as improved attitudes when they had a good breakfast.

The influence of diet upon physical and mental health is well established. A healthy mind is dependent upon a healthy body.

The strength of the will, the decision-making area of the brain, is also related to eating habits. Learning self-control in eating will help develop self-control in other areas of life as well, and the mind will be more alert to separate right from wrong. On the other hand, a person who is accustomed to eating what he wants, whenever he wants it, whether or not it is best for him, is less likely to have firmness of will for making and carrying out right decisions in other areas.

Nutritional Safeguards

An understanding of the basic principles of nutrition is the best safeguard against being influenced by unscientific nutrition information. A sound diet is a reasonable and sensible program which avoids extremes.

"Those who understand the laws of health and who are governed by principle, will shun the extremes, both of indulgence and of restriction. Their diet is chosen, not for the mere gratification of appetite, but for the upbuilding of the body." *Life at Its Best*, page 93.

The wife and mother particularly needs to study the basic principles of good nutrition so that she will know how to use them to maintain her family's health. It is her challenge to provide favorable conditions which will promote their physical, mental, and spiritual development.

Functions of Food

Food nourishes the body in three ways:

1. It furnishes substances which are burned in the body and supply the energy for its work and activities.
2. It supplies the materials for the building and upkeep of all body tissues.
3. It provides the substances which regulate all body processes.



Any one food may serve all three or only one of these functions. In a balanced diet, however, there are enough foods serving all three functions to promote health and well-being.

Essential Nutrients

Any chemical substance found in foods that functions in one or more of the three ways described above is called a nutrient. There are six general classes of nutrients which are necessary for life.

1. *Carbohydrates* are either starches or sugars, made up of carbon, hydrogen, and oxygen, which furnish mainly fuel for energy and heat.

2. *Fats* are composed of the same elements as carbohydrates but in different relative amounts. They are commonly classified as fuel foods, but have other important functions.

3. *Proteins* consist of carbon, hydrogen, and oxygen, plus the element nitrogen. In the absence of sufficient carbohydrates and fats, proteins may be burned in the body to supply energy for work and heat. However, the major function of proteins is to build and repair body tissue. Proteins also serve regulatory functions.

4. *Minerals* are a group of essentials referred to in their elementary form such as calcium, phosphorus, and iron, although in the body they occur in highly complex compounds with varying functions.

5. *Vitamins* form a group of chemically unrelated substances which are needed, though in minute amounts, to help in regulating body processes.

6. Water is classified as an essential nutrient since it is the medium in which all

of the myriad chemical activities in the body take place. It thus serves as a regulating substance. Fiber or cellulose, although not a true nutrient, furnishes the bulk essential for normal action of the muscles of the lower digestive tract.

The complex intricacies of these nutrients and their functions in building up the body and keeping it fit have become an extensive field of study and investigation. Yet the knowledge and practice of two fundamental principles will be the best guarantee of good health:

1. CHOOSE A WIDE VARIETY OF WHOLESOME, UNREFINED FOODS.
2. MAINTAIN AN IDEAL BODY WEIGHT.

Guides for Meal Planning

There is no single pattern for meal planning which



must be followed in order to ensure good health. A good diet can be made up in many ways. Practical guides, however, have been developed which can give you the assurance that your meals contain all of the nutrients needed for buoyant health.

Basic Foods

All the essentials of good nutrition will be provided if the following Basic Four Food Groups are represented in adequate amounts each day:

1. *Fruits and Vegetables* — Practically all vegetables and fruits have a generous vitamin and mineral content that classifies them among the "protective" foods. The energy they provide comes mainly from carbohydrate sources. The protein content, although small in quantity, is of good quality and especially suited to

supplement that found in grains.

2. *Bread and Cereals* — Besides being low-cost energy foods, whole-grain products are important sources of the B vitamins, iron, phosphorus, and protein. It is a good nutritional practice to alternate or combine different kinds of grains used for cereal and bread. Choosing a variety not only adds interest to meals but definitely upgrades the nutritional quality of the diet. As far as possible, choose whole-grain products which still retain most of their nutrition.

3. *Protein Foods*—Legumes, cottage cheese, eggs (not more than 2-4 per week), soy cheese, prepared meat alternates (vegetable proteins), nuts, and nut butters supply important amounts of protein, minerals (espe-

cially iron), and some of the B vitamins. A variety is necessary to supply all the amino acids.

4. *Milk Group* — Milk, or satisfactory alternates, will provide important amounts of calcium, phosphorus, protein, and the vitamin riboflavin. Since 52 percent of the calories in milk come from fat, it is a good practice to include nonfat milk in the family's diet.

All the members of the family, from youngsters to oldsters, need the same basic foods, but in varying amounts. Growing children need more food for their size than grown-ups, and adolescents require more nutrition than they will at any other period in their lives. Adult requirements will vary, depending mainly upon the degree of activity. Meals should be custom tailored to suit the needs

of each family member, taking into consideration age, size, and activity.

Nutrition experts have recommended desirable levels for some of the basic nutrients. However, if the meal planner provides the following quantities of the basic food groups, she does not need to be concerned about grams and milligrams.

Fruits and Vegetables

Group—Two or more servings of fruit a day, including one serving of citrus fruit or tomatoes, or other good source of ascorbic acid. Two or more servings of vegetables a day, including one very yellow vegetable or dark-green leafy vegetable. Vegetables should often be used raw in salads.

Bread and Cereals Group—

Four or more servings of whole-grain cereals and breads each day.

Protein Group—Two or more servings each day.

Milk Group—Three to five cups of milk for children and teen-agers, and two cups or more for adults (mainly in low-fat or non-fat forms).

A common shortcoming in many diets is a limited amount and variety of vegetables, especially the dark-green leafy and deep yellow ones. As a result vitamin A

is one of the nutrients which surveys have shown to be often deficient. However, it is easy to get enough of this vitamin if more really dark-green vegetables such as broccoli, kale, watercress, or romaine lettuce are used in place of the pale green ones. Carrots, of course, are an excellent source of vitamin A values.

Vitamin C is the fresh food vitamin and comes in abundance in such tasty packages as the citrus fruits, strawberries, cantaloupe, tomatoes, and fresh cabbage. Other fresh fruits and vegetables contain varying amounts of this vitamin. It has been observed that vitamin C also often comes up short when meals are not well planned.

One of the minerals which needs to be watched, especially in young girls' and women's diets, is iron. If the protein needs are met and if the calories are not diluted with refined foods, especially sugar and high fat foods, following the basic four food pattern should provide sufficient iron in normal conditions. Good sources of iron include whole grains, a variety of legumes, leafy green vegetables, and dried fruits. Milk is notoriously low in iron, although an excellent source of calcium.

Common foods which are

not mentioned in the Four Food Groups are fats and sweets. They are not listed because it is highly unlikely that a diet will be deficient in them. Their built-in taste appeal makes an excess the usual problem—and remember, they should be used sparingly.

You will find when the guide is put into practice it will help balance your meals and make sure you are giving your family a nutritious diet. Of course, the succeeding lessons are going to give you much more information which will assist you in preparing balanced and wholesome meals your family will really enjoy.



The Guide in Practice

BREAKFAST

For a good start on the day!

Fruits, 1-2 servings
Whole-grain cereal and/or
Whole-grain bread
Margarine or other spread
Egg or other protein food
(If eggs are used, not more than 2-4 weekly)
Milk or milk alternate

* * *

DINNER

To keep you fit all day long!

Entree, 1 serving Potato, 1 serving
Vegetable, 2 or more (one raw in a salad)
Whole-grain bread Spread
Milk or milk alternate
Simple dessert, if desired

SUPPER

Keep it light for refreshing sleep!

Vegetable soup or fruit
Light entree dish
(such as cottage or soy cheese)
Whole-grain bread or cereal
Beverage, if desired

* * *

Good nutrition is a long-term program, not a meal-by-meal or even a day-by-day emergency. Family meals should be balanced, not so much for each single meal, but for the day and for the week.

ANSWER SHEET—LESSON NO. 1

- Fill in the blanks below:
 - The human body needs foods for:
 - _____
 - _____
 - _____
 - According to several authorities, the most important single environmental factor affecting health is _____.
 - Having a basic knowledge of nutrition is the best safeguard against being influenced by _____.
 - A chemical substance in food that functions in nourishing the body is called a _____.
- In the following list, place a check (✓) after each true statement:
 - Carbohydrates are either sugars or starches which furnish mainly fuel for energy and heat. _____
 - Fats are fuel foods. _____
 - Proteins build and repair body tissue and serve regulatory functions. _____
 - Minerals are energy foods and furnish mainly calories. _____
 - Vitamins perform functions in regulating body processes. _____
- Underline the phrases which correctly complete this sentence:
Two fundamental principles which will best guarantee good health are:
 - Use high-potency vitamin-mineral supplements daily.
 - Use a wide variety of wholesome, unrefined foods.
 - Maintain an ideal body weight.
- The following basic food groups should be represented in adequate amounts each day:
 - _____
 - _____
 - _____
 - _____

THOSE ENERGY FOODS



Every minute of life involves the expenditure of energy. We are more aware of this when we are working or playing hard. But when we are less active the amount of energy expended is only reduced; it never stops.

Energy is required for every breath and every heartbeat. It has been estimated that the amount of work performed by the heart each hour is equivalent to lifting the body about one hundred feet in the air. Even resting, the muscles all retain some degree of tension, requiring energy.

Calories are needed to maintain body temperature at a constant level. The metabolic activities of the body, of which we are totally unaware, continually require calories. Children, of course, need extra energy for growth.

The first need of the body, then, is for fuel and energy. Carbohydrates—starches and sugars—are the pre-

ferred foods to meet these needs.

In the ordinary diet of mixed foods, carbohydrates are usually the most plentiful. In fact, it is difficult to plan a diet without including a high proportion of this nutrient. Carbohydrates supply more than half the energy food of our national diet, while in other parts of the world as much as four-fifths of total calories come from grains.



Structure of Carbohydrates

Carbohydrates can be classified in three major groups, depending upon the complexity of the molecules: single or simple sugars, such as glucose; double sugars, such as sucrose (cane and beet sugar) and lactose (milk sugar); and finally, complex carbohydrates, such as starches which represent many particles of simple sugar.

All the forms of carbohydrates that occur in food are changed in the digestive process to one form, the simple sugar glucose, before the body uses them. This takes place in the liver. Then, from the circulating blood, glucose is absorbed by the muscles and other tissues, and through a series of complex steps it becomes the body's main source of energy.

When more carbohydrates are eaten than are necessary for immediate use, the surplus is converted to glycogen as a temporary fuel reserve. If the carbohydrate intake continues to be high, the excess will be stored as fatty tissue.

Functions of Carbohydrates

Besides being the main source of energy, carbohydrates have other functions. They help with the oxidation or burning of fat. If not enough carbohydrate is available, it is difficult for the body to oxidize fat com-

pletely to carbon dioxide and water. One of the organic acids formed during carbohydrate oxidation is required for the complete burning of fat.

Carbohydrates can spare proteins. If the body runs low on fuel, it will burn proteins for energy. But if there are enough carbohydrates in the diet to supply energy, the amino acids (the building blocks of protein) are spared for the functions which they alone can do.

Energy Needs

The energy in food is measured in terms of calories, just as temperature is measured by degrees, length by feet, and weight by pounds. The number of calories we need depends on body size, on age and growth rate, and on the kind and amount of activity. A 150-pound man may use about 70 calories per hour when lying down quietly, about 100 calories per hour doing desk work, and 200 calories per hour if walking at a moderate pace. If he engages in strenuous physical exercise, his calories may be double or triple his needs for moderate activity.

Fortunately, we do not need to count calories to know whether we are getting enough of them. Normally, appetite will regulate the intake to provide for activity, maintenance, and growth.



It is not, however, always a safe guide. If the healthy child is growing steadily, or if the adult's weight is appropriate for his height and body build, then he is getting the right number of calories. On the other hand, if a person's body weight is above normal and he keeps on gaining, he is getting too many calories for his needs.

Calorie Value of Foods

Foods differ widely in the number of calories they provide for a given weight. Note the following comparisons of the approximate calorie values of various foods:

	Calories per Oz.
Oils and fats	250
Margarine or mayonnaise	200
Nuts and nut butters	165-195
Dry cereals or sugar	105-110
Dry legumes	95-100
Bread	75
Eggs	45
White potatoes	25
Bananas	23
Whole milk	20
Oranges	15
Skim milk	10
Spinach, tomato, celery, or cantaloupe	6



Fats—
refined and
natural

What a range from the same weight of food—6 to 250 calories! The foods with the relatively high calorie values are fat-rich foods; next come the concentrated carbohydrate foods; and lowest in energy values are the fruits and vegetables, which are high in water content. A full cup of cooked carrots or two cups of finely shredded cabbage contain fewer calories than a tablespoon of sugar. One medium-sized baked potato has fewer calories than a tablespoon of fat. An average serving of pie contains between 250 and 350 calories, depending on the kind. To get the same number of calories, one would have to eat five or six medium-sized peaches, three bananas, or four oranges or apples. A large serving of lettuce-and-tomato salad has about 20 calories, while the tablespoon of mayonnaise served with it adds 100 calories.

Right Choice of Calories

Fruits, vegetables, whole-grain cereals, legumes, and milk provide not only calories but an excellent bonus of other nutrients as well. These are the foods which we should choose first in meeting the energy needs of the body.

Most people actually need considerably fewer calories today than was the case a generation ago. In the shift from rural to urban living, we generally have a life style which is much less active. Labor-saving machines in the shop, office, and home reduce energy need for work. Today, then, we are confronted with the problem of packing more protein, vitamins, and minerals, into a smaller "package" of calories.

In addition to our decreased need for calories, we must realize that many of our common foods have undergone refining and processing techniques which remove some of their nutrients. This explains in part why, in this land of plenty, there are many whose diets would be rated only fair or even poor by standards found desirable for good health. Today it is recognized that major diseases, such as diabetes, certain forms of heart disease, obesity, and dental decay are associated with faulty nutrition.

The Average American Diet

When we look at the average American's diet, what do we see? He is eating 17 percent of his calories in the form of sugar and sweeteners; 18 percent comes from visible fats, such as margarine, butter, and cooking fats; another 20 percent comes from cereal products, of which approximately 97 percent are refined. This means that the average American obtains about 55 percent of his calories from refined foods. Dr. Margaret Ohlson has noted: "Many Americans, particularly adult men, eat diets which are badly balanced because of the large intakes of muscle meats, sweets and fats, and almost complete omission of cereals, except as refined flour entering into the preparation of sweet rolls and desserts. The vegetables and fruits used are limited in both amount and variety."

Let us take a closer look at some of the "empty calories." Sugar, a triumph of the modern refining process, contributes many calories and is entirely devoid of any other nutrients. The average annual consumption of sugar, syrups, and other caloric sweeteners for every man, woman, and child is more than 120 pounds, or more than 30 teaspoons of sugar each day. Much of this sugar is eaten in the form of pies,

cakes, cookies, ice cream, candy, and soft drinks. A dessert or two and snacks between meals, besides the sugar used on cereals and in beverages, will easily account for more than a half cup of sugar each day.

One billion dollars is spent each year on enough soft drinks to provide each person with 250 bottles. Teen-agers, however, drink double their share, averaging 500 bottles per person each year. Two and a half billion dollars is spent on the 3¼ billion pounds of candy eaten in the United States in a year. The Commerce Department reports that Americans consumed domestic and imported candy at the rate of 19.8 pounds per person in 1971. There has been a 50-fold increase in the consumption of ice cream.

Sugar is habit-forming. The more one eats of it, the more he craves it, and other foods taste flat and unappetizing. Dr. R. M. Wilder observed, "The more of this drinking of soft drinks between meals or eating of rich carbohydrate foods, such as candy bars, at those times of the day when one feels weak and empty, the more likely one is to need to continue to do so." This is especially serious since sugar displaces balanced foods.

Concentrated sweets irritate the mucous membrane lin-

ing the stomach. They have a tendency to absorb water and cause irritation. In general, it is best to take sugars in the comparative dilution in which they occur in natural foods such as fruits.

The question comes up, what about honey and raw or brown sugar? Often in an eagerness to avoid the use of refined foods, we turn to the liberal use of cruder sugars such as brown sugar, sorghum, honey, or molasses. It is true that these sugars contain minerals, in very small to larger amounts. Molasses, especially the cruder forms, contains considerable iron. One tablespoon of ordinary molasses has as much iron as an egg. However, even these less refined sugars are still very concentrated forms of carbohydrate and should be used sparingly.

Milling of Grain

The removal of vital nutrients occurs not only in the refining of sugar but in the milling of grains for bread and other cereal products. The enrichment of bread and flour, made compulsory by legislation, has done much to overcome the acute deficiencies resulting from the milling of grains. Three B vitamins—thiamine, niacin, and riboflavin—and one mineral, iron, are restored to approximately the levels found in whole grain.

The difference, however, between enriched and whole-grain flour is still significant. Note the following comparisons, based on one cup:

	Whole-Wheat Flour	All-Purpose Enriched Flour
Calories	400	409
Protein	16.0 g.	13.2 g.
Fat	2.4 g.	1.2 g.
Iron	3.2 mg.	4.0 mg.
Phosphorus	446 mg.	106 mg.
Magnesium	136 mg.	28 mg.
Calcium	49 mg.	18 mg.
Thiamine	.66 mg.	.49 mg.
Riboflavin	.14 mg.	.29 mg.
Niacin	5.2 mg.	3.9 mg.

Some of the best quality of protein, that found in the germ of the grain, is removed in milling, so that the protein in enriched white flour is inferior in quality to that found in the whole grain. Whole-wheat flour has three times as much vitamin B₆, three times as much vitamin E, four times as much phosphorus, and about five times as much magnesium, as does white flour.

Relatively new information indicates the importance of some minerals which have not always been in the forefront. Magnesium, for example, is essential to many body processes as an activator of enzymes, the biochemical spark plugs of most of the body chemistry. Whole grains constitute one of the important food groups containing magnesium. The trace mineral chromium is required to metabolize carbohydrates. Whole wheat not only furnishes energy, but is an excellent source of chro-

mium, which is needed in order to use the carbohydrates eaten.

Effects Upon Health

How does the liberal use of highly refined foods affect health? It is impossible to determine the total effect, but let us look at a few results.

First, highly refined carbohydrates not only fail to supply their quota of essential nutrients, but require vitamins and minerals provided by other foods in order for the body to utilize them for energy. Thus they actually increase our need for vitamins and minerals.

The vitamin B complex plays a vital part in carbohydrate metabolism, and the need for this group of vitamins depends upon the amount of carbohydrates eaten. Only in comparatively recent times has the natural union between the vitamin B complex and carbohydrates, a union found in the grains and plants, been broken by the refining and milling of foods. Before this happened, the supply of vitamin B was automatically adjusted to the amount of carbohydrates eaten.

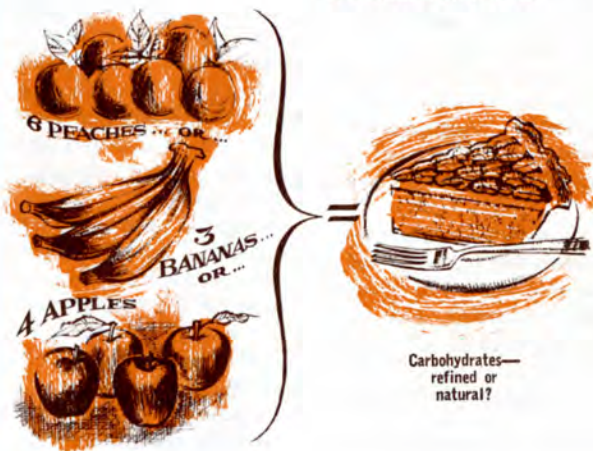
The below-par feeling experienced by many who eat these highly refined foods contributes to the multi-million dollar yearly sale of vitamin and mineral products in the United States.

Second, a highly refined diet is low in roughage and tends toward constipation. Americans spend millions to correct this condition. It has also been observed that there are fewer diseases of the colon in those few parts of the world where refined foods are not eaten.

Third, by the refining process we concentrate our foods and make it much easier to overeat. It takes a considerable amount of sugar cane to make one teaspoon of refined sugar, and a number of ears of corn to make one tablespoon of corn oil. Eating that quantity of sugar cane or corn in their unrefined forms would be quite a task; but a teaspoon of sugar and a tablespoon of oil disappear in our foods and we are scarcely aware of eating them.

We are living in an age of the snack and the coffee break. For many, eating is almost a nonstop activity. High fat, sweet foods with strong taste appeal are constantly accessible. Overloading the diet with these high-calorie foods is one of the chief reasons why so many people, including children and adolescents, are overweight. Obesity has been designated as our nation's most glaring nutritional fault.

Every year about a million persons in the United States have heart attacks, and of this number about 600,000 die. Because of the magnitude of this health problem, large-scale investigations have been conducted to determine the causes. It is now recognized that some of the factors contributing toward developing coronary heart disease (heart attacks) are closely associated with diet.



The kind and amount of fat in the diet have been the focus of many studies during the past two decades and have the most data to substantiate their involvement in atherosclerosis. (This is a condition in which harmful changes are occurring in the blood vessels; it often precedes a heart attack.) However, carbohydrates have also been considered by some authorities as important factors in abnormally raising the level of certain fats (triglycerides) in the blood. Refined table sugar is more responsible for this elevation than are the more complex carbohydrates, the starches. It is particularly undesirable to live on a diet high in *both* animal fats and refined sugar—an eating pattern which is typical in most industrialized countries.

In countries where people eat more legumes and whole grains and much less sugar, the population generally has lower blood cholesterol levels. High levels of cholesterol have been often associated with heart attacks.

Experimentally it has been shown that monkeys deficient in vitamin B₆ develop atherosclerosis. Also animals placed on a diet high in refined sugar and fats will develop this condition.

Fourth, one of America's

most costly diseases, tooth decay, is closely associated with a highly refined diet. In the northern European countries during and after World War II, the reduction of decay corresponded closely with the amount of sugar reduction. If a country had a reduction of 60 percent in sugar imports, there was a similar drop in the percentage of decayed teeth.

The teeth are adversely affected several ways by the use of refined sugar and other refined carbohydrates. First, they are deprived of essential nutrients which maintain the health of the tooth. Second, bacterial growth, which is favored by sugar, produces substances which attack the enamel.

Teeth are very much alive, and biological processes are rapidly and constantly occurring inside the tooth. In the normal tooth, fluids circulate freely through small canals in the dentin. It has been shown in experimental animals that when sugar replaces starch these canals become clogged. Continued use of sugar makes the teeth susceptible to decay. Bacteria which are present in the mouth grow on the food packed in the deep grooves of the teeth. As teeth lose their ability to resist infection because of a high sugar intake, the bacteria take ad-

vantage and become active in destroying the teeth with cavities. The form of carbohydrates and timing of eating are important too. Eating candy or sugary snacks between meals is more damaging than eating the same foods at mealtime. Carbohydrates that are sticky and those that are finely ground adhere to the teeth and promote the growth of bacteria more than do coarse ones. Crisp, juicy fresh fruits and vegetables help to prevent tooth decay, since they act as tooth cleansers.

Fifth, on a highly refined diet the body's defense mechanisms against disease and infection may be impaired. Vitamin B₆, folic acid, and pantothenic acid are among a number of essentials needed for the production of antibodies. If the diet is low in these B vitamins, the body's ability to produce antibodies will be decreased.

Studies also indicate that the amount of sugar eaten affects the activity of the phagocytes (white blood cells) which destroy bacteria. Phagocytic activity is reduced as the level of sugar increases. Many persons, especially children, who eat candy and excessive sweets often have colds, sore throats, and other upper respiratory infections.

We would all do well to consider the extent to which we use refined foods. A modification of food habits, replacing refined foods by unrefined ones, will greatly improve the average American's diet. Often it makes the difference between passable and buoyant health.

Recommendations

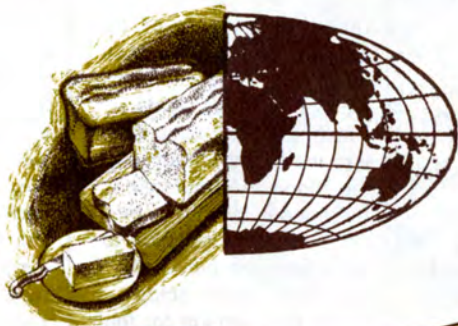
In summary, it is recommended that carbohydrates, largely unrefined, furnish 50 to 65 percent of the calories in the diet, and fats 25 to 30 percent. If proteins are adequate; if fruits and vegetables are used liberally, especially the ones containing a rather

high percentage of moisture; if whole grains and legumes are used moderately; and if these foods are prepared without the addition of much refined sugar or fat, a wholesome diet which will meet energy needs without excessive calories is sure to result.

ANSWER SHEET—LESSON NO. 2

1. Supply the missing words in the following statements:
 - a. The first need of the body is for _____ and _____.
 - b. Of the nutrients in the ordinary diet, _____ are usually the most abundant.
 - c. The simple sugar _____ is the form to which carbohydrates must be changed in order for the body to use them.
2. Underline the phrases which correctly describe the functions of carbohydrates:
 - a. Provide material for building tissues.
 - b. Exert a protein-sparing effect.
 - c. Supply fuel and energy.
 - d. Aid in the oxidation of fat.
3. Place a check (✓) after the correct statements below:
 - a. Foods differ widely in the number of calories they provide for a given weight. _____
 - b. Two cups of shredded cabbage contain fewer calories than a tablespoon of sugar. _____
 - c. The average American obtains about 20 percent of his calories from refined foods. _____
 - d. White sugar contributes only calories to the diet. _____
 - e. Concentrated sweets are irritating to the mucous membranes lining the stomach. _____
 - f. Enriched white flour contains all the nutritive elements found in the whole grain. _____
4. Some of the effects of a liberal use of highly refined foods are:
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____

BUILD YOUR BODY WITH PROTEINS



Every living cell in the body contains protein. Skin, muscle, hair, eyes—every part of the body we see is protein in nature. And the parts of the body we cannot see contain protein—heart, lungs, brain, nerves. Proteins make up 22 percent of body weight, excluding fat. When you add water, which is another 72 percent of the body weight, you can readily see that proteins are a very important factor in building a healthy body.

About 1839 the Dutch chemist, Mulder, isolated a nitrogen-containing compound in the human body which he called "protein." The word comes from the Greek word meaning "to take first place." From his studies, Mulder concluded that proteins were "unquestionably the most important of all known substances

in the organic kingdom." Since then much has been learned about nutritional needs of the body, and it is recognized that no one nutrient can be singled out as being the most important. A balance of all the essentials is required for life and health.

However, there is no known life without protein. Plants are able to build their own proteins from materials which they get from the soil and air, but man and other animals cannot do this. They must depend on the plants for their sources of protein. "Vegetation is nature's chemical factory," and all proteins come directly or indirectly from plants.

The Body's Need for Protein
Proteins perform many important functions, which can



LESSON # 3

be grouped into the following main categories:

1. They supply materials for the growth and upkeep of body tissues.
2. They serve as regulators of body processes. One such function is to help keep the blood in a slightly alkaline condition.
3. They furnish energy, if body needs are not met by carbohydrates and fats.

Proteins are made up of carbon, hydrogen, oxygen, and—as their distinguishing characteristic—nitrogen. Some also contain other elements such as phosphorus, sulphur, or iron.

When the chemist analyzes proteins, he finds that they are really packages of basic units called amino acids (commonly referred to as building blocks). The twenty or more different kinds are hooked together by chemical bonds into long chains of hundreds and sometimes thousands of amino acids to form a protein molecule. Each amino acid has a precise place in the chain.

Proteins differ from one another in (1) the size of the molecule—the number of amino acids it contains; (2) the amount of each amino acid; and (3) the order in which the amino acids are found in the protein molecule. That is why milk protein differs from

wheat protein, even though both contain the same assortment of amino acids.

During the process of digestion, protein is broken down into these chemical units, the amino acids, which are then absorbed into the blood stream. As the blood is circulated throughout the body, the cells have the capacity to take from the blood the particular amino acids which they require for their special needs.

Scientists are beginning to unravel the mystery of protein formation. It is now known that within each cell nucleus there are molecules which carry the instructions and provide the means for lining up amino acids in proper sequence to produce a specific kind of protein. For efficient use, all of the amino acids that are needed to make a specific protein must be present at the same time and in sufficient amounts.

Growth and Upkeep

Since protein is present in every cell, the major function of protein is to build new tissue. Thus the need for adequate protein is especially important during childhood and adolescence and during pregnancy and lactation (child-nursing).

Adults, however, never outgrow their need for protein. There is a constant

tearing down and building up of body tissues from the beginning to the end of life. As some body proteins are broken down, new proteins are being built into the body to replace them. This continual exchange is one of the basic characteristics of living things. In this exchange, there is always some leakage; destruction and loss from the body make necessary a continual replacement by food. A well-nourished body has small protein reserves to draw upon for short periods of emergency; but a diet continually unbalanced will not meet the needs for upkeep, and symptoms of protein lack will develop.

Proteins as Body Regulators

Besides being necessary for the growth and replacement of cells, proteins participate in all biological processes. In this way, they serve as body regulators.

Many of the hormones which regulate vital body processes are protein in nature. Certain vitamins and minerals combine with proteins built by the body to form enzyme systems which promote and coordinate essential chemical reactions throughout the body. The enzymes of digestion are examples of protein having specialized functions. Antibodies, the body's defense against disease, contain protein. Proteins in the blood aid in

regulating the acid-base balance of the body, and act as carriers of oxygen and other nutrients to every cell.

Individuality and hereditary traits and characteristics are determined by the genes in the body, which are protein in nature.

It is really wonderful how a limited assortment of amino acids can be constructed into proteins with a multiplicity and diversity of functions. The chemical make-up of one protein is such that it acts as an enzyme to digest food, while another functions as a hormone to regulate the use of food. One protein acts as an antibody to protect against disease, while another forms a deadly virus.

The laws governing the continual, rapid, and orderly formation of the numerous complex proteins in the body are significant evidences of a great master mind at work in controlling our life processes.

Proteins and Fuel Foods

Proteins, like starches, sugars, and fats, can supply energy. One gram of protein will yield four calories when it is burned by the body. This is about the same amount of energy provided by starches and sugars.

The body gives absolute priority to its need for



energy. It will ignore the special functions of protein if its energy needs are not met with sufficient carbohydrates and fats. In this event, some of the protein that would otherwise be used for tissue building or repair must be used as fuel, and the building and regulating activities are handicapped.

Since only a limited storage of protein occurs in the body, any excess over and above the amount needed for tissue building and upkeep is burned. In this case, the protein is split by the liver into a nitrogen and a non-nitrogen fraction. The nitrogen part of the protein is excreted by the kidneys as urea, while the remaining part is used as fuel or transformed into fat and stored.

Biological Value of Proteins

Some of the amino acids can be made by the body from simpler substances. Others cannot, and must be obtained from food. Nutritionists have called these amino acids "essential," while those which can be formed by the body are referred to as "non-essential." However, they are all needed to meet the protein needs of the body. These terms refer only to the fact that the essential acids must be furnished in the foods eaten, and not to the fact that one amino acid is more important than another.

Early in nutritional research it became apparent that the proteins found in various foods differ widely in their value, as observed in the rate of growth of young

experimental animals. For example, when young rats were fed casein, one of the proteins in milk, they grew normally. When zein, one of the proteins found in corn, was the *only* source of their amino acids, the animals lost weight and died.

What made the difference? The answer lies in the amino acid make-up of the various proteins. Zein is lacking in two essential amino acids, while casein contains a sufficient quantity of all of them. The kind and amount of amino acids are important in determining the protein quality of foods.

Generally speaking, proteins from animal sources contain all of the amino acids in proportions that are efficiently used by the body. The amino acid composition of plants naturally differs from that of animals.

One way to measure how well the body can use protein is the biological value method. If an absorbed protein is completely utilized, it is assigned a value of 100; if there is no utilization, that value would be zero. For adequate nutrition, the U.S. Food and Nutrition Board has recommended a biologic value of 60 or more for adults and 70 or more for children. The table on page 23 lists a number of vegetables and

animal proteins with values of 60 or above.

In practice, our meals are made up of more than one food. For instance, breakfast usually includes a cereal, milk, fruit or fruit juice, perhaps a meat alternate or nuts. The assortment of amino acids in these foods varies. During the process of digestion, the amino acids from these various foods enter the bloodstream and are selectively withdrawn and utilized by the tissues throughout the body according to their needs.

The quality or biological value of a *single* protein tells only a part of the story. It is the combined nutritive value of *all* the proteins in a meal that is really important.

Dr. Ancel Keys of the University of Minnesota says: "In actual practice the importance of protein quality of each individual food is much less than previously supposed. In an ordinary diet, even of the vegetarian type, the protein part is made up of many different proteins and the chance that all of them will be low in one or more amino acids is small."

Examples of Protein Supplementation

It is a well-known scientific fact that animal foods adequately supplement plant proteins. Thus the practice

of adding milk to breakfast cereal is an example of a very excellent combination. What is not so generally known, however, is the excellent supplementation which occurs among the various kinds of plant proteins.

In general, legumes and vegetables are low in sulphur amino acids, and cereals are low in a different amino acid, lysine. Since legumes and vegetables are generally good sources of lysine, they will nicely supplement cereal proteins. Thus the protein found in peas supplements well that found in wheat. Other good combinations are whole-wheat bread and peanuts or peanut butter, or whole-wheat bread and beans.

Dr. Sherman has observed: "The customary combination of baked beans and brown bread makes a 'main dish' that ranks with meat as a source of nutritionally good proteins and vitamins of the B group."

Studies have shown that laboratory animals on a combination lentil-and-gluten diet grew five times as fast as those on either a lentil or a wheat gluten diet alone. A mixture of soy and sesame proteins has a high nutritive value, and the proteins of some leafy vegetables remarkably supplement those of cereals. Simply speaking, a

combination of protein from two sources eaten together is often better than either one alone.

Upon adding only 5 percent of soy flour to 95 percent of wheat flour, the quantity and quality of protein is increased; and in experimental animals this combination gives twice the growth-promoting value of wheat flour alone.

Wheat germ—which contains a good quality of protein along with an excellent source of the B-complex vitamins—can easily be added to breakfast foods. Yeast flakes and nonfat milk powder are other excellent additions to improve the nutritional value of grain proteins.

In meeting protein needs, it must be recognized that the protein part of the diet should supply more than amino acids. A good protein food will also carry its share of other nutrients, especially vitamins and minerals. A diet which is low in protein is often deficient in other respects.

When a sizable proportion of the diet is made up of foods which are refined, often protein-rich portions as well as vitamins and minerals have been partially or totally removed. This is especially true of highly-milled grains. In such refined diets, the use of animal foods, such as milk

and eggs, often compensates in part for the losses which have occurred.

These foods not only provide easily digested protein containing all of the essential amino acids in a proportion that is well used by the body, but they supply a number of other nutrients. For this reason, when milk and eggs are not used, extra care should be taken to supply the various nutrients which they so readily furnish.

Protein Requirements

Because of the importance of proteins in life processes, there has been considerable discussion and much research undertaken to determine the quantity of protein requirements. The evolution of protein knowledge is interesting. Voit, in 1881, conducting a survey among Berlin workers, found the average intake of protein to be approximately 118 grams per day. He then set this as the protein requirement. Atwater, one of his students, coming to America, conducted a similar study among Boston workers. He found that the protein intake of this group was approximately the same. Thus this high protein requirement was established on the basis of dietary surveys rather than on *physiological* need.

Further studies in the field of protein needs were done

by Chittenden at Yale. He fed athletes 45 to 55 grams of protein per day. The athletes continued to win prizes and maintained their health on this program for more than a year, the duration of this experiment. He concluded that the recommendation of Voit and Atwater was too high and should be lowered.

In 1920, Dr. Sherman reviewed more than a hundred studies employing quantitative procedures for measuring protein requirements. The average requirement, based on these studies, was 40 to 45 grams per day. In 1945, with further refinements of methods, Dr. Mitchell of the University of Illinois and Dr. Hegsted of Harvard University independently showed that the minimum daily requirement was even lower.

However, it is not a safe nutritional practice to supply only the minimum amount of protein. Our needs vary, even in health, and a margin of safety is desirable.

Clinical studies and human experience have shown that the recommendations of the National Research Council—65 grams of protein for the average man and 55 grams for the average woman—which represent a liberal margin of safety, are consistent with good health. A generous supply of protein contributes no-

BIOLOGICAL VALUES OF SOME SELECTED FOOD PROTEINS

Foods	Biological Values	Foods	Biological Values	Foods	Biological Values
CEREALS		NUTS AND SEEDS		MILK AND PRODUCTS	
Barley	64	Cashews	72	Casein	72
Buckwheat	77	Coconut	69	Cheese, cheddar	72
Oats	65	Cottonseed meal	67	Milk (cow)	85
Rice, whole	73	Pecans	60	VEGETABLES	
polished	64	Pumpkin seed	63	Kale	64
Rye, whole	73	Sesame	62	Maize, sweet	73
milled	63	Sunflower	70	Mustard (greens)	74
Wheat, whole	65	Watermelon seed	73	Potato	73
germ	74	MEAT AND POULTRY		Sweet potato	72
gluten	40	Beef and veal	74	YEAST AND FUNGI	
LEGUMES		Chicken	74	Brewer's yeast	67
Chick peas	68	Fish	76	Mushrooms	80
Lima beans	67	Pork	74	Recommended protein quality	
Peas	64	Eggs, chicken	94	Adults: 60	Children: 70
Soybeans	73				

ANSWER SHEET—LESSON NO. 3

- Supply the missing words in the following statements:
 - Every living cell in the body contains _____.
 - The adult human body contains about _____ percent protein and _____ percent water (excluding fat).
 - All proteins come directly or indirectly from _____.
- Proteins perform the following functions:
 - _____
 - _____
 - _____
- Place a check (✓) after each true statement below:
 - During the process of digestion, protein is broken down to basic units called amino acids. _____
 - Adults never outgrow their need of protein. _____
 - Proteins primarily serve to supply energy needs. _____
 - The body needs only the essential amino acids to build tissue. _____
 - Foods vary widely in the biological value of the proteins they contain. _____
 - In a mixed diet, the proteins in the various foods tend to supplement each other and make up for shortages of amino acids that exist in any single protein source. _____
- Examples of protein supplementation are:
 - _____
 - _____
 - _____
 - _____
- To meet the protein needs of the body, the following foods in addition to fruits and vegetables are recommended:
 - _____ cups of _____ for adults.
 - _____ cups of _____ for children and adolescents.
 - _____ servings of _____.
 - _____ servings of _____.

WHAT ABOUT FATS?



What about them? You have heard a lot about them the last few years. You have heard that they can be very dangerous, even fatal. But you must remember that they are also important to body health.

Your friend Harry is faced with the prospect of dieting. His doctor has told him he must cut down his daily calorie intake and lose some weight. Harry is a pretty average American who has always eaten what he wanted when he wanted it, without worrying about his health. Now the extra weight he is carrying around is imposing a burden on his heart, while at the same time he has clogged his system so that his heart must work harder than it should just to make the blood circulate. Harry needs to listen to his doctor. If he continues in his

present pattern, he is headed for trouble.

The trend in fat consumption is revealing. In the United States, fats from all sources furnish about 41 percent of the total yield of calories from foods. This percentage has increased from 32 percent in 1905.

As the proportion of calories from protein has remained about the same, an average of 11 to 12 percent, the shift to a higher proportion of calories from fat has been largely at the expense of carbohydrates.

This trend toward a high-fat diet is undesirable from a health standpoint. First of all, it contributes to obesity, which is a serious problem in our well-fed country. Secondly, fats are implicated in degenerative diseases of the heart and arteries.



Functions of Fats

Fats and oils make our meals tasty and satisfying. They are the most concentrated source of energy—9 calories in a gram, compared with 4 calories furnished by a gram of carbohydrates or protein.

Besides serving as energy-producing material, certain fats are important in the structure and functions of body tissues. One such, linoleic acid, cannot be synthesized by the body, and must therefore be included in the diet. It is considered a dietary essential. Fats serve as carriers of the fat-soluble vitamins, A, D, E, and K. Fats are essential to life.

Composition of Fats

In order to better understand the complicated role of fats in nutrition, it will be helpful to know a few facts about their chemical make-up. Fats are compounds of fatty acids and glycerol—a complex structure of carbon, hydrogen, and oxygen. Fatty acids are made up of a chain of carbon atoms to which two hydrogen atoms can be attached.

The kinds of fatty acids attached to the glycerol may vary. If all of the carbons in the chain contain all of the hydrogen that is possible, then the fat is spoken of as a saturated or "hard" fat. If some of

the carbon atoms do not contain as many hydrogen atoms as are possible, they are spoken of as unsaturated. Animal fats, generally speaking, contain more of the saturated fatty acids, while plant oils contain more of the unsaturated ones. The more saturated fats are solid at room temperature, while unsaturated ones are liquid at the same temperature.

Many of the plant oils offered for sale have undergone a process known as hydrogenation, which involves the addition of hydrogen atoms. This process decreases the amount of linoleic acid and changes the physical form of the oil, making it more like animal fats such as butter. It is by this process that margarines are made from grain or seed oils. This change which affects the degree of saturation of the fatty acids is not desirable from a health standpoint.

However, newer methods of preparing some margarines employ techniques by which a higher proportion of the fatty acids remain in an unsaturated form. These are the soft margarines.

Linoleic Acid

Polyunsaturation in food fats depends chiefly on the amount of linoleic acid present. Grain and seed

oils range from 40 to 70 percent of linoleic acid, safflower and sunflower oil testing highest. Among the legumes, soybeans have the highest fat content, of which 55 percent is linoleic acid. Nuts vary in general from 20 to 30 percent. There are notable exceptions, however; a low of 2 percent in coconuts, and a high of 60 percent in walnut oil. Fruits such as avocados and olives contain about 10 percent linoleic acid.

At the present time, no recommended allowance for this dietary essential has been established. If largely unrefined cereals are selected and plant oils are used mainly in place of animal fats or hard shortenings, along with a varied selection of nuts, legumes and other vegetables and fruits, the need for linoleic acid will normally be met.

Fats and Medical Problems

The intensive study of fats undertaken during the past two decades and still in progress, stems from evidence which links this foodstuff with serious degenerative diseases. This is particularly true of heart and blood vessel disorders—conditions which contribute to the major cause of death in the United States.

Hardening of the arteries, or arteriosclerosis, is a term rather commonly used to describe a process once

thought to be simply the inevitable consequence of growing old. To a certain extent this is true, in that as we grow older the arteries tend to become less elastic and more rigid.

The kind of change in the arteries doctors worry about is atherosclerosis. This is a buildup of patches of fatty material and other substances in the smooth inner wall of the artery. In addition, the artery becomes less elastic. These patches, it turns out, contain a considerable yellowish, waxy substance called cholesterol.

Cholesterol is a normal and essential constituent of the blood and nerve tissues, as well as other parts of the body. It has important functions to perform. While not all of its functions are fully understood as yet, we know that keeping the level of blood cholesterol within normal limits is of considerable physiologic importance. Only when the level rises too high and cholesterol is deposited abnormally in the walls of arteries do difficulties arise.

Continual deposits in the artery wall tend to decrease the opening through which the blood flows. Tiny areas of ulceration may occur which are healed by something like scar tissue that still further chokes the normal cells of the wall. Such places in the arteries

grow until the opening for blood flow is seriously decreased or even stopped completely; or a blood clot may form which may totally block the flow of blood. The clot may break loose and travel to smaller arteries, blocking blood flow there.

These atherosclerotic changes may take place in arteries in various parts of the body. If the coronary arteries (those arteries supplying the heart) are involved, the result can quickly be catastrophic. The heart muscle, like tissues throughout the body, is dependent on a constant supply of oxygen from the blood supply. Body cells can live and function only a very brief time without it. If a major artery to such a vital organ as the heart is blocked, a large part of the heart muscle soon becomes incapacitated. In this case the individual is said to have had a heart attack, a "coronary." If arteries in the brain are involved, a "stroke" results.

Atherosclerosis is an underlying change which develops over a prolonged course of time before symptoms occur. Then it often becomes apparent in heart attacks. Each year about a million persons in the United States have heart attacks, and 600,000 die from this cause. Over

200,000 more die from disorders of arteries in other parts of the body. About 165,000 of the coronary deaths occur in people under 65 years of age; and there is a greater toll among men than among women. The average American man has about one chance in five of developing heart disease, usually in the form of a coronary, by the time he is 60. It is estimated that the cost of medical care and loss of productivity due to disability reaches at least 25 billion dollars each year.

Fat and Atherosclerosis

How does atherosclerosis develop? A number of complex factors are involved. Some of these are:

1. High levels of blood fats —cholesterol and triglycerides.
2. High blood pressure.
3. Cigarette smoking.
4. Overweight.
5. Lack of physical exercise.
6. Stress.
7. Excess coffee drinking.
8. Sex factors—more men than women are subject to heart attacks.
9. Heredity—genetic differences.

As you look over the list you will notice that some are controllable factors; others are not. Investigators have labeled several of them as prime risk factors.

Population and animal studies have shown that an elevated blood cholesterol is one of the prime risk factors. No significant amount of atherosclerosis is found in countries where people generally have levels of blood cholesterol less than 160 mg. percent, while the average level of Americans—among whom heart attacks are so prevalent—is more than 200 mg.

In one long-term study done in Framingham, Mass., at the end of eight years of observation it was found that the rate of coronary heart disease in men 45 to 62 years of age was four times greater in those whose cholesterol levels were 260 mg. percent or above, as compared with those whose levels were 200 mg. percent or below.

Some diseases, such as diabetes and certain inherited conditions, can elevate blood cholesterol; but the major cause appears to be associated with the diet. A high intake of cholesterol and of "hard" or saturated fats has been repeatedly found to elevate the blood cholesterol. Although some individuals appear to be genetically protected, most of us are not.

Experimental animals respond to diets in a similar way. As early as 1913, a Russian pathologist reported that rabbits fed

large amounts of cholesterol and animal fats developed hardening of the arteries. Monkeys on the average American diet develop atherosclerosis, and it can be decreased by changing their food.

Although the kind and amount of fats affect cholesterol, some investigators believe that sugar will also raise it. Current research has not yet yielded conclusive answers on this point. However, it has been shown experimentally that where diets are high in saturated fats and cholesterol, *sugar* rather than starches will result in higher cholesterol as well as other blood fats.

Some individuals, particularly those who are carbohydrate-sensitive, will have normal or only slightly elevated blood cholesterol, but

marked increases in another class of blood fat, the triglycerides. The kind and amount of starches and sugars rather than fats in the diet affect the triglycerides of those individuals. Starches such as unrefined breads and cereals do not have the same effect as do various kinds of sugar, but the total amount of all carbohydrates may need to be watched.

Although triglycerides have not been investigated as intensively as has cholesterol, it is very desirable to maintain a normal triglyceride level in the blood. High levels have been implicated in coronary heart disease.

Studies have also strongly indicated two other major risk factors—high blood pressure and cigarette smoking. In population



Use
Sparingly

studies, the number of heart attacks has increased with the level of these risk factors and also with the number of them present at one time. In other words, the higher your blood cholesterol or blood pressure, or the more cigarettes smoked, the greater is the risk of your having a heart attack. Also the more of these risk factors that are present at one time, the greater the danger.

A recent Boston study suggests that coffee drinking may be implicated in heart attacks. The investigators found that many of the coffee drinkers were cigarette smokers as well, but concluded that the "association with coffee seems stronger." They suggest the key may lie in caffeine's ability to liberate stored fat into the blood and to elevate the cholesterol level.

After taking a long hard look at all the diet-heart data, a government-sponsored panel of medical authorities has advised all Americans to reduce their consumption of fats and cholesterol in order to curb heart disease. The recommendation comes from the Inter-Society Commission for Heart Disease Resources, made up of more than 150 heart specialists and representatives of 29 leading health organizations. In their latest report the Commission stated frankly that

there is as yet no *final* proof that fats and cholesterol cause heart disease in man. But, the panel added, "At times, urgent public health decisions must be made on the basis of incomplete evidence."

In addition to advising adequate treatment of high blood pressure and the elimination of cigarette smoking, the Commission made the following specific recommendations in regard to diet:

1. Eat less food to avoid being overweight.
2. Eat less than 300 mg. of cholesterol a day.
3. Not more than 30 percent of total calories should come from fat.
4. Not more than 10 percent of total calories should come from "hard" or saturated fats.

Saturated fats are mainly animal fats, such as the fat of meat, eggs, whole milk, cream, butter, and cheese. Coconut oil and the fat in chocolate also have a high content of saturated fat. In contrast, most plant oils, such as corn, cottonseed, soya, and safflower, as well as the fat of fish are relatively low in saturated fats and high in fats of the polyunsaturated kind.

Through mechanisms which as yet are not totally clear, saturated fats raise blood cholesterol while polyun-

saturated fats lower it. Since the polyunsaturated or "liquid" fats are the only nutritionally essential ones, and since they lower blood cholesterol, they should replace a substantial amount of saturated fats in the diet. However, even the unsaturated fats should not be eaten in excessive amounts, since all fats contain more than twice as many calories per ounce as do carbohydrates and proteins.

Total caloric intake is important, for the body seems to be stimulated to make excessive cholesterol when too much food is eaten. Maintenance of proper weight cannot be stressed too strongly.

PERCENT OF FAT CALORIES IN SOME ANIMAL FOODS
(mainly saturated)

Milk, whole	52
Ice cream	55
Eggs, raw	64
Eggs, fried	80
Cheddar cheese	72
Cream cheese	90
Steak, cooked	70
Hamburger	74
Frankfurters	73
Potato chips	61
Milk chocolate	60
Cooking shortenings	100
Butter	100
Margarine	100

PERCENT OF FAT CALORIES IN PLANT FOODS
(mainly unsaturated)

Nuts	60-90
Whole wheat	6
Fruits (most)	less than 1
Vegetables (most)	1-5
Legumes	5

Although the body makes cholesterol, the amount present in the diet also has an effect on the blood levels. Plant foods do not contain cholesterol. The following list indicates the

approximate amounts in some foods of animal origin.

Food	Amount	Cholesterol (mgs.)
Milk, skim	1 cup	7
Cream	1/4 cup	30
Half-and-Half	1/4 cup	30
Butter	1 tablespoon	30
Milk, whole	1 cup	30
Cheese, cheddar	1 oz.	30
Ice cream	1/2 cup	30
Beef, pork, lamb	3 ozs., cooked,	70
Poultry, fish	lean and fat	70
Egg yolk	1	250

The recommendations of the Commission are intended for the adult population, but there is considerable evidence that long-range prevention should begin in the second decade of life. It is shown that atherosclerotic changes in the blood vessels are occurring already in adolescence. This is the time when patterns of eating and exercising, and other habits, such as cigarette smoking, become established. Many adolescents are already becoming overweight.

A life style with good dietary patterns needs to be developed in early adolescence and maintained throughout adulthood.

Foods to Emphasize

In planning menus, it would be well to emphasize the following foods: fruits, vegetables, whole grains (which include the oil present in the germ portion), legumes, and a moderate amount of nuts that are from 60 to 90 percent fat, mainly of the unsaturated type.

Dr. Ancel Keys, of the University of Minnesota, who has studied this problem for many years, states that "most populations that seem to have relatively little coronary disease live on diets that are rather high in leafy vegetables and fruits as well as being low in sugar and dairy fats."

Nonfat milk or plant milk is generally to be preferred to whole milk, especially for adults. High-fat dairy products, such as butter, rich sweet or sour cream, ice cream, cheddar cheese, and eggs should be de-emphasized.

Desserts especially need to be watched. Pies, cakes, cream puddings, and many other desserts are high in calories, saturated fats, and refined carbohydrates. Fruits, particularly if little or no sugar is used, make excellent desserts.

Not only careful food selection but good techniques in food preparation are important. Fried foods should be used sparingly, and the free use of hydrogenated vegetable and animal fats avoided.

What can you do for your friend, Heart Attack Harry? You may be able to help him see the urgency of changing his life patterns. His doctor has no doubt kept abreast of the latest scientific research on prevention of America's leading cause of death. (While you're about it, why not check with your own doctor? Maybe you and Harry should form a jogging team.) Encourage Harry to go easy on fats—and to be sure that the fats he does eat are mostly polyunsaturated. The life he saves may be his own.



ANSWER SHEET—LESSON NO. 4

1. List four functions of fats:

- a. _____
- b. _____
- c. _____
- d. _____

2. Underline the correct answers.

Too much fat has the following effects:

- a. Contributes to obesity, rated as serious problem of over-nutrition.
- b. Makes one healthy.
- c. Contributes to degenerative diseases of the heart and arteries.

3. Complete these sentences:

- a. Fats are compounds of fatty acids and glycerol, a complex structure of _____, _____, and _____ atoms.
- b. If all of the carbons in the chain contain all of the hydrogen that is possible, the fat is spoken of as _____.
- c. If some of the carbon atoms do not contain all of the hydrogen atoms possible, the fat is spoken of as _____.
- d. Plant oils contain more _____ fatty acids than animal fats.

4. Place a check (✓) after each true statement:

- a. Cholesterol is an abnormal and nonessential substance in the body. _____
- b. When there is an abnormal deposit of cholesterol in the arteries, difficulties may arise. _____
- c. When the intake of saturated fats is reduced, blood cholesterol levels usually decrease. _____
- d. Such oils as corn, safflower, and soya are high in fats of the unsaturated type. _____

5. Factors which relate to development of atherosclerosis are:

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

6. In the light of current scientific findings, the following diet changes are urgently recommended:

- a. _____
- b. _____
- c. _____
- d. _____

Your Mineral Mine



Can you, by any stretch of the imagination, envision life in America if our mineral supplies were suddenly cut off? In this highly mechanized country, we have become absolutely dependent upon iron, aluminum, copper, and many other metals for almost every activity in which we engage. The simplest tool, the most complex machine, the smallest cooking utensil, the high-powered auto, the screens on our windows, all require mineral elements in their manufacture.

Health, even life itself, is dependent upon mineral resources, too. Minerals, found in every cell of the body, are regulators of many body processes. Some of the minerals are needed in minute amounts,

but their presence is absolutely essential. For example, iron makes up only one part in 25,000 in body weight, and the body contains only a hundredth as much iodine as iron. Yet this minute amount of iodine is absolutely necessary.

Minerals Furnish Building

Have you heard this before?

Mother: Johnny, please finish your (spinach, broccoli, kale, chard, etc.)

Johnny: Aw, Mother! *Why* do I have to eat that stuff?

Mother: It's good for you. It has minerals in it.

Johnny: Minerals! Who needs *them*?

Why are minerals important? First of all, they supply building material. The fact is well known that compounds of calcium and phosphorus are concentrated in the skeleton or bony framework, and that an insufficiency will result in stunted growth, weakened or soft bones, and malformed teeth.

The need for bone-building material is largest during the growing years of childhood and adolescence. But adults sometimes think that, once their growth is completed and their bones and teeth have become permanent structures, they do not require further building materials for these hard tissues. This is not true. The minerals in bones and teeth continue to undergo exchange. As blood and other body fluids carry away some minerals, fresh supplies are brought in as replacements. Since small amounts are continuously lost, a constant supply is needed throughout life.

Not only bones and teeth, but every cell of the body contains small amounts of minerals. The hair, nails, skin, muscle and nerve tissues, blood, and even glandular secretions contain certain essential minerals. Phosphorus is found in every cell nucleus. Sodium, potassium, calcium, magnesium, and chlorine are important constituents of body fluids. Iron is a

vital element in the formation of hemoglobin, the pigment in red blood cells which enables them to combine with oxygen.

Minerals as Body Regulators

Minerals play an essential role as body regulators. Mineral salts are needed for the normal exchange of body fluids, for the clotting of blood, for the maintenance of the acid-base balance of the body.

All of the complicated biochemical and biophysical reactions which are constantly going on, proceed normally only when the temperature, water and mineral concentration, and other properties of the internal fluids which bathe every living cell are kept within very narrow limits. Potassium, sodium, and chlorine figure largely in the movement of water into or out of the tissues. If certain mineral salts in the tissues get a little too high, they will be diluted to their normal concentration by water passing from the surrounding fluid into the tissues. In certain kidney diseases there is often a gain in weight due to the retention of fluid. This is the body's attempt to keep the concentration of these elements in the tissues normal when the kidneys are unable to excrete them in normal amounts.

Then, too, neither muscles

nor nerves will function properly unless the fluids around them contain certain minerals in the right proportions. Calcium salts have a stimulating effect, while sodium, magnesium, and potassium salts have the opposite tendency, or a relaxing effect. An example of this regulation is seen in the rhythmic contraction and relaxation of the heart muscle, a process influenced by the fine balance of all the necessary mineral salts.

Calcium salts are necessary for blood clotting. If calcium were not present in the blood stream, hemorrhages would follow minor cuts and lacerations.

The maintenance of the proper relation between acid and base elements in the body is important. Although large amounts of acid are produced, the reaction of the blood plasma normally remains remarkably constant and slightly alkaline. The body has several regulating mechanisms, and minerals assume an important role in this process.

Minerals of Nutritional Significance

Mineral elements, unlike proteins, fats, and carbohydrates, neither furnish energy nor are they acted upon by digestive juices. After being freed from foods during digestion, they



are absorbed through the walls of the small intestines in practically the form in which they occurred. The absorbed minerals are then carried in the bloodstream to the tissues throughout the body where they are needed. In the dynamic way in which the body functions, an exchange of minerals is continually in process, and a regular supply in the diet is essential for replacement.

The Food and Nutrition Board of the National Research Council has included only five minerals among the nutrients for which human dietary allowances have been determined. These minerals are calcium, phosphorus, magnesium, iron, and iodine. It is believed that if the allowances for these minerals, along with the other nutrients, are met, the remaining minerals will also be present in adequate amounts.

Calcium and Phosphorus

There are two or three times as much calcium and

phosphorus in the body as all the rest of the mineral elements combined. This, of course, is because they make up a large proportion of the bones and teeth of the body, as well as being present in other tissues.

Besides the fact that a poor selection of food may result in an insufficient intake of calcium, the body's ability to absorb and utilize it varies considerably, depending upon several factors. Many studies indicate that on the average, only about one-third or less of the calcium taken in foods is actually used by the body. Utilization is favored by the proper ratio of calcium and phosphorus and by a liberal supply of vitamin D. There is evidence that ascorbic acid (vitamin C) aids in the absorption of calcium. Studies also suggest that although some fat is necessary, large amounts will result in poor absorption. Laxatives, emotional upsets, or large amounts of fiber tend to speed up the pas-

sage of food through the intestines, resulting in a lowered absorption of calcium as well as of other nutrients.

How much calcium do we need? Naturally, the need varies somewhat in individuals, and children require several times as much per unit of body weight as do adults. Animal experimentation has shown that improvement in health and increase in longevity may result if the level of calcium intake is kept at adequate levels. The National Research Council's recommendation for the adult is eight hundred milligrams per day.

Although calcium is unevenly distributed in foods, it is particularly plentiful in milk and most leafy vegetables. Legumes, nuts (especially almonds), dried fruits, and green vegetables can also be counted on to furnish some. Cereals, rich in phosphorus, are not good sources of calcium. As a nutritional safety mea-

sure, it is recommended that adults drink a pint of milk or satisfactory milk alternate each day, and children and adolescents 3 to 5 cups.

Green leafy vegetables on a weight basis supply as much calcium as milk. A large serving (at least one full cup) of such greens as collards, kale, turnip, and mustard greens provides as much calcium as one cup of milk. A few of the common leafy greens, such as spinach, chard, and beet greens, contain some oxalic acid so that the calcium is not fully utilized. However, it does not interfere with the calcium present in other foods. The use of cabbage, broccoli, and cauliflower will contribute lesser amounts of calcium, but more than many other vegetables.

Phosphorus enters into more varied activities than any other mineral, and is often spoken of as the "busy mineral." Since it is well distributed in foods, it is unlikely that a deficiency will occur if protein and calcium needs are adequately met. However, recent studies would indicate that because of the increasing consumption of highly refined foods, more attention should be given to this nutrient. It has been shown that the addition of phosphates to the diet reduces the amount of tooth decay.

Whole-grain flour contains four times as much of this nutrient as does enriched white flour.

Iron Needs

Although the healthy adult body has but 1/7 to 1/10 of an ounce of iron (barely enough to make a small nail), this element is absolutely necessary to life. The fact is well known that iron is the essential element of the oxygen-carrying hemoglobin of the blood. Minute amounts of iron are found in enzymes that promote vital body processes.

Of the total body iron, only 70 percent is actually in use in the blood, cells and enzymes. The remaining 30 percent is held in reserve. That makes for a slim margin of safety, because one milligram is lost daily in urine, sweat, and cast-off cells. While the average diet provides 10 to 15 milligrams, only about 10 percent of that amount is absorbed.

Iron metabolism is unique; iron is frequently described as a "one-way" substance. Once it is absorbed, the body ordinarily holds on to this element and uses it over and over for hemoglobin formation. Although under normal conditions little is excreted, nutritional anemias or deficiencies are not uncommon, due to insufficient intake. This is particularly true when blood

volume increases, as it does during periods of growth and pregnancy. Continued small losses of blood also are likely to result in anemia unless measures are taken to correct the condition. Faulty absorption is another factor in producing anemia. An additional cause, especially for women and adolescent girls, is that in their concern to keep their calories and weight down, they adopt diets which fall far below their iron needs.

The actual requirement for iron, especially for adult men, is small. But women and growing children must obtain enough to allow for increased needs and to keep up good iron reserves in the body. Menstrual blood losses and greater needs during pregnancy and lactation make it especially important for women to have a diet with plenty of iron and other blood-building elements.

In a ten-state nutrition survey completed in 1970, the largest nutrition survey ever undertaken in the United States, a major finding was that many diets were deficient in iron content, confirming what many authorities have considered the most prevalent nutrition deficiency in the nation. As many as 20 percent of women of childbearing age and one-third of the children under six are iron-

deficient. The deficiency is very common in infants. Recent studies show that adolescent girls are getting 30 percent less iron than they need. So, too, are a great many older people. Insufficient iron to the point of anemia produces paleness of the skin, weakness, fatigue, irritability, and other symptoms of below-par health. By choosing a diet adequate to maintain iron values, many people now living in "second gear" could enjoy much more vigorous health.

The Food and Nutrition Board recommends 10 milligrams of iron for the adult man and 18 milligrams for girls and women. This higher amount will not be obtained in a carelessly chosen diet. It is important to recognize good food sources of iron and include them consistently in one's everyday diet. The following foods are practical sources of iron: legumes, whole-grain cereals, green leafy vegetables, egg yolks, dried fruits, and some nuts.

Evidence suggests that vitamin C has a favorable effect upon iron absorption. If this finding is applied to menu planning and plenty of vitamin C foods are included in meals, it will help to alleviate the existing iron deficiency problem.

Many factors influence the absorption of iron. At best,

only a portion of the iron found in food is absorbed. It appears that the body's need for iron is a determining factor in the amount which is actually absorbed. Favorable factors include proper acidity of stomach secretions, and the presence of traces of copper.

Iodine

Although iodine is used only in minute amounts, it is a nutritional necessity in the prevention of goiter and also plays an important role in our general well-being. In most areas the iodine found in drinking water and vegetables will meet the body's requirement. However, there are some localities known to be deficient in iodine. Because goiter was so prevalent in parts of the Midwest, investigations were conducted to find a common article of food to which iodine could be added. As is well known, the most satisfactory food was found to be common table salt. No ill results, but on the contrary improvement in general well-being, is to be anticipated from the use of iodides in the minute concentration in which they occur in iodized salt.

In the ten-state survey, goiter was found to be more prevalent than anticipated, although it was less common and less severe than in the years before iodization became

widespread. Iodized salt was found to be not regularly available in all of the communities surveyed. Its use continues to be an important public health measure.

Magnesium

A comparative newcomer to the group of nutrients for which the Food and Nutrition Board has specified allowances is magnesium. Magnesium belongs to the same chemical family of elements as calcium, and is utilized in some of the same ways. The body contains about an ounce of this mineral. About half of the magnesium in the body is present in the bones. The remainder is found primarily in the soft tissues of the body, with a very little present in body fluids. In human beings, magnesium is principally used in activating enzymes, although it is important in other ways as well.

It appears that with diets containing high protein, calcium and vitamin D, or if there is high consumption of alcohol, there is an increased requirement for magnesium. It is abundant in green plants since magnesium is a constituent of the green pigment, chlorophyll. Wheat germ, wheat bran, oatmeal, corn, and cornmeal, as well as other unrefined cereals, are excellent sources. High on the list of good food sources

are nuts, especially almonds and seeds such as sunflower, sesame, caraway, and pumpkin seeds. Mothers of young children will be glad to know that peanut butter is on the list of magnesium-rich foods. An unrefined healthful diet supplies sufficient amounts for the average individual.

Sodium

Sodium is one mineral that can be eaten in too large amounts. An oversupply comes from the excess salt—sodium chloride—added to food, rather than from the sodium present in foods as they are grown. Sodium consumption is increasing today because of the sodium-containing additives used in food processing.

Large intakes of sodium may aggravate a tendency toward high blood pressure. Moderation in the use of ordinary table salt is one of many things one can do to prevent hypertension from developing.

Trace Elements

Scientists have studied other minerals which are required in very minute amounts but have been found to function in important physiological roles. Copper is necessary, along with iron, for the formation of hemoglobin and occurs in many of the same foods as iron. Excellent sources include legumes, nuts, and dried fruits.

Cobalt is a part of vitamin B₁₂ and its function is linked to that of the vitamin. It is bound to protein in foods of animal origin.

Zinc, found only in minute quantities in the body, has nevertheless important functions. It is involved in a number of enzyme systems and has been found to promote wound healing. Zinc is widely distributed in foods. However, in a poor diet high in refined carbohydrate foods and soft drinks, and low in protein, the intake of zinc might fall below the minimum needed for balance.

Another trace mineral, fluorine, has been the center of considerable controversy in connection with the fluoridation of water supplies. It has been established that adequate fluorine helps to maintain strong bones and to prevent dental decay. For the formation of a cavity-resistant enamel a certain fluoride supply is evidently essential. It appears that it may also be important in osteoporosis, a condition in which there is a breakdown of bone due to loss of minerals, especially in older persons.

New work done by Dr. Henry Schroeder, professor of physiology of Dartmouth Medical School, indicates that large losses of trace minerals and some vitamins occur in processing food.

His work shows, for example, that milling of refined wheat flour caused a loss of 40 to 88.5 percent of seven essential trace metals, which passed into cattle feeds. White bread, as compared with whole wheat bread, was lower in magnesium by 40 percent, in chromium by 71.4 percent, in cobalt by 69.4 percent, in copper by 69.8 percent and in zinc by 77.4 percent. Such figures as these point up one of the causes why surveys find that marginal intakes of minerals are not uncommon. On the other hand, diets that are varied by following the basic four-food guide and are not unbalanced by highly processed and refined foods will meet the body's mineral needs.

In summary, to thrive and function at one's best, attention should be given to mineral resources. Increased physical activity and emotional stress put increased demands upon the human body. An optimal response to these demands can only be maintained as a sufficient supply of all of the essential nutrients is supplied.

"So, Johnny, finish your spinach. It has minerals in it."

"Minerals—who needs them?"

"You do—that's who."

ANSWER SHEET—LESSON NO. 5

1. Complete the following statement:

Minerals are needed in the body to—

- a. _____
b. _____

2. Place a check (✓) after each true statement:

- a. The need for bone-building material is large during childhood and adolescence. _____
b. The minerals in our bones undergo constant exchange. _____
c. A small proportion of the cells of the body contain small amounts of minerals. _____
d. Calcium salts are necessary for blood clotting. _____
e. Calcium and phosphorus make up a large proportion of the structural framework of the body. _____

3. List food sources of calcium.

- a. Excellent sources: _____

b. Good to fair sources: _____

4. Underline the correct answer to each statement:

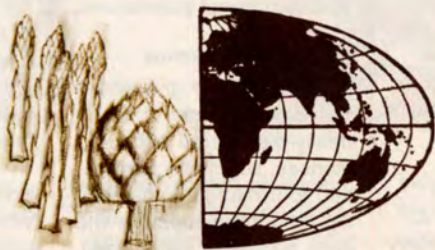
- a. Whole-grain flour has (twice), (four times) as much phosphorus as enriched white flour.
b. (Phosphorus), (iron), (sodium) is the essential element of the oxygen-carrying hemoglobin of the blood.
c. Certain nutritional anemias develop due to insufficient (chlorine), (zinc), (iron).
d. (Men), (women) need a continual liberal intake of iron.

5. The following are good sources of iron: _____

6. Supply the missing words in the following statements:

- a. Iodine, a nutritional necessity for prevention of goiter, found in _____ and _____, will meet the body's requirement in most areas.
b. Traces of _____ are necessary along with iron for hemoglobin formation to occur.

Vitamins for Vitality



Sue is busy getting the children ready for school while her husband finishes his breakfast. Suddenly she remembers—and she calls to him, "John, don't forget to take your vitamins."

His coffee and coffee cake almost gone, John rushes over to the cupboard where Sue keeps the family's generous supply of vitamins. Quickly he selects several; surely they will make up for everything he didn't get in his breakfast. As he swallows the bright-colored tablets and capsules, he breathes a sigh of relief and gratitude to his wife for reminding him not to neglect his health.

What would John have done before anybody knew about vitamins? Well, first of all, John might have gotten up

a little earlier because he would probably have gone to bed a little earlier the night before. With more time to eat, he might have eaten a better breakfast, quite probably a more balanced breakfast. Furthermore, he would have had no misgivings about his diet, because it was then generally thought that carbohydrates, fats, proteins, and minerals met all the nutritional needs of the body. But they didn't!

At about the turn of the century, scientists uncovered some rather disconcerting evidence: purified mixtures which included all of the then known nutrients did not support growth and life in experimental animals. For example, studies done in England showed small amounts of milk added to a highly purified diet made



the difference between life and death for laboratory animals.

Long before the discovery of vitamins, the results of their deficiencies in the diet had been observed. For hundreds of years ship's crews on long voyages developed scurvy, now known to be caused by a deficiency of vitamin C. A doctor in the British Navy discovered that limes and lemons cured the disease. A Dutch physician in Java, a Cambridge professor, and a Japanese navy doctor each added scientific evidence to the detection of the cause of beriberi, another disease resulting from a lack of vitamins. Beriberi was particularly common in countries where polished rice was the main staple of the diet. Little by little, it became evident that there are mysterious but potent substances in foods which are absolutely essential for life and health.

These essential nutrients were called by some "accessory food substances." It was in 1912 that Casimir Funk found in rice bran one of these potent substances that seemed to belong to the class of compounds which chemists called amines. He suggested that these essentials should be known as "vitamines" (amines essential to life). The name caught the popular fancy, and although

vitamins are not related chemically, the name is still used (the "e" has been dropped) to designate these vital nutritional substances.

Naming the Vitamins

Attracted by the mysterious but essential role of the newly-discovered substances, scientists continued to investigate vitamins. By 1920 three separate vitamins had been recognized as essential nutrients. To distinguish one from another, scientists began to use letters of the alphabet, naming them in order of their discovery vitamin A, vitamin B, vitamin C, and so on. Vitamin B, however, was found on closer study to include a whole family of vitamins, called the B complex. These were distinguished from one another by subnumerals: vitamin B₁, vitamin B₂, etc. All of the known B vitamins can now be given more exact scientific names, such as thiamine, riboflavin, and niacin.

All living organisms need vitamins, but not every vitamin that has been discovered is needed by all animals. Plants can manufacture most of the vitamins that they require, but animals must have most of their vitamins supplied in food.

General Use of Vitamins in the Body

Although individual vitamins have special functions, as

a group of body regulators they all share in certain functions. Vitamins generally are necessary for growth, reproduction, the health of every cell in the body, conversion of food into energy, nervous stability, and resistance to infection.

How do vitamins work? Why can such minute amounts accomplish such important results? Why are they a matter of life and death? These are some of the questions which have intrigued investigators through the years; and some of the answers have been found.

Most, if not all, of the vitamins act as catalysts. A catalyst is a substance that speeds up a chemical reaction but does not itself take part in it. It is much like the jolly, good-natured person who is the "life of the party" just by being present.

Catalysts are used in many industrial processes. Platinum is used as a catalyst in producing high-octane gasoline. A large quantity of ordinary gasoline can be converted to a large quantity of high-octane gasoline by using a small amount of platinum. Very little of the catalyst is lost in the process.

Most of the hundreds of chemical reactions occur-



ring in the body require catalysts. The special catalysts that promote these reactions are known as enzymes. Many of the vitamins have been found to occur in the body as part of enzymes responsible for promoting some essential chemical reaction.

Our body, for example, gets its energy through the oxidation (burning) of glucose, a simple sugar. This process takes place in many intermediate steps, so that energy is released gradually instead of all at once in a big explosion. Several of the B-complex vitamins are part of the enzymes, each of which acts as a catalyst in a single step in the oxidation of glucose.

If any one enzyme is lacking, it means the failure of an indispensable link in the chain. Thus if a vitamin which is an essential part of such an enzyme is lacking or is deficient in quantity, it can cripple all of the vital processes in the cells. As a result, tissues all over the body may suffer. Although it has not yet been

established that all vitamins play their role through enzyme action, it seems probable that they act in some way to promote chemical reactions which are essential for life and health.

There are 13 recognized vitamins which need to be included in everyday food selections. (Actually, one of these, vitamin D, can be made in the body, and in adults sufficient will be formed under normal conditions of exposure to sunlight.) Fortunately, one need not be concerned about choosing a different food to furnish each vitamin. Quite a number of them are found in the same assortment of foods.

The story of the vitamins is a long and fascinating one. We can touch upon only a few highlights.

Vitamin A

Vitamin A was the first of the fat-soluble (dissolving in fat) vitamins to be discovered. It is needed for growth and normal development as well as for maintaining the health of the

skin. It is also necessary for the upkeep and functioning of the linings of various parts of the body—including the nose, mouth, respiratory tract, and digestive tract—which provide protection against the invasion of bacteria.

Vitamin A prevents the condition called night blindness—a diminished ability to see clearly in dim light.

This vitamin is a colorless, fat-soluble substance found in milk, cream, butter, fortified margarine, egg yolk, and liver. It has not been found in plants. What we do find in plants is carotene, a substance which the body converts to vitamin A. Carotene is plentiful in green and yellow vegetables and fruits. It is the yellow pigment associated with the natural orange-yellow coloring matter of yellow vegetables and fruit. It is also found abundantly in green leafy vegetables but is masked by the green pigment, chlorophyll.

One shortcoming frequently revealed by nutrition sur-

veys is an insufficient use of the green and yellow vegetables, with the result that vitamin A is in short supply. Many people could substantially improve their diets by including really deep green or yellow vegetables—not just pale green or rather yellow ones.

The green leaves of the plant are its chemical laboratories which manufacture vitamins, along with many other substances. Thus, green leafy vegetables have a high content of most vitamins.

Vitamin D

Vitamin D, another fat-soluble vitamin, called the "sunshine vitamin," helps the body to use calcium for normal growth and mineralization of the bones and teeth. In vitamin D deficiency, the bones do not grow well; calcium is not deposited in the bones as it should be, and they become soft and deformed. This vitamin is of special importance to infants, growing children, and pregnant and nursing mothers.

Vitamin D is one vitamin which can be made by the body. This is accomplished by the action of the sun's rays upon the skin, or by exposure of the skin to ultraviolet light. The effectiveness of sunlight is lessened if the air is filled with smoke, smog, or fog. The amount of vitamin D

in common foods is small, often insignificant. This fact has led to the program of fortifying certain foods with vitamin D. Milk, margarine, and cereals are examples of fortified foods. Milk seems to be the most suitable as a carrier of vitamin D.

Vitamin E

Vitamin E is also a fat-soluble vitamin. Extravagant claims concerning the beneficial effects of vitamin E have been exploded by clinical trials on humans. While known to be important in human nutrition, its exact role is not yet clearly defined.

The best sources of vitamin E in the diet are vegetable oils. Thus, whole grains and nuts are good sources.

Vitamin B Complex

Thiamine, riboflavin, and niacin, three of the vitamin B complex, are coordinated in the task of providing energy. They appear in minute amounts in every living cell.

Thiamine, or vitamin B₁, besides helping the body obtain energy from carbohydrates, stimulates the appetite and promotes good digestion and elimination by helping to maintain good muscle tone in the digestive tract. It has been often called the "morale vitamin," since it is closely associated with nervous stability.

Deficiency of this vitamin, along with other B vitamins, is a common type of malnutrition which occurs in all parts of the world. It is especially common where polished rice is the staple cereal.

Whole grains, peas, beans, soybeans, oatmeal, and peanuts are all good sources of thiamine. In grains, the germ and the outer layers contain the greatest concentration of the vitamin. Milk is a good source; first, because it is taken in relatively large quantities, and second, because, as a rule, it is not subjected to treatment other than pasteurization, which does not materially reduce the thiamine level. Dry brewer's yeast and wheat germ are concentrated food sources.

Riboflavin, or vitamin B₂, is also involved in the processes by which energy is released from food. It is essential to normal growth and health at every stage of life. The continued use of a diet supplying too little riboflavin causes dryness and redness of the skin and cracking of the lips at the angles of the mouth. Riboflavin is needed for the health of the eyes; it prevents itching, burning, and undue sensitivity to light.

Vitamin B₂ is widely distributed in foods, although the concentration in many foodstuffs is not high.

Among the best food sources are milk and dark-green leafy vegetables. It is interesting that cereals and legumes, which are excellent sources of thiamine, are rather poor sources of riboflavin.

Niacin is another of the vitamins essential for the oxidation of carbohydrates in the body. It helps to prevent and cure pellagra, a disease common among those whose diet consists largely of corn with very little good protein.

The amino acid tryptophan can be converted to niacin by complex chemical processes in the body. Milk and eggs, even though low in niacin, are good sources of the vitamin because they are high in tryptophan. The best plant sources are peanuts and yeast. Potatoes, whole wheat, and some green vegetables contain fair amounts.

Two members of the B complex, folic acid and vitamin B₁₂, have been called antianemic factors. Both are needed for normal formation of red blood cells, and deficiency of either results in anemia. Folic acid is widely distributed in foods. Dark green leafy vegetables are excellent sources, and whole grain cereals, legumes, and nuts are also good sources.

Vitamin B₁₂ is one of the

most potent substances used in the treatment of pernicious anemia. A lack of this vitamin may cause sore tongue, abnormal sensations of burning and pricking of the skin, non-specific nervous conditions, and menstrual disturbances. It is essential for growth. There are also some indications that a deficiency affects alertness and learning ability. Vitamin B₁₂ is synthesized, or made, primarily by micro-organisms and occurs mainly in animal foods. No practical sources have as yet been found in plant foods.

Very small amounts of this vitamin are required. One glass of milk per day meets normal individual needs. On a good diet, considerable storage in the liver takes place.

Pantothenic acid, another B vitamin, is probably associated in functions with riboflavin. A deficiency will cause growth failure, dermatitis (disease of the skin), and gastrointestinal complaints. It is widely distributed in foods, and a deficiency is not likely to occur.

Pyridoxine, or vitamin B₆, is associated with the utilization of proteins in the body. A deficiency may cause failure of growth in young animals, dermatitis, convulsive seizures, anemia, hardening of the arteries,

and lowered resistance to disease. Whole-grain cereals, legumes, vegetables, milk, yeast, and wheat germ are all good sources. While a shortage of pyridoxine is possible in a highly refined diet, a good diet of natural foods will meet the needs of the healthy individual.

Ascorbic Acid

Ascorbic acid, or vitamin C, appears to be present in all living tissues. Humans must obtain it in food, although many animals can make it in their bodies from other food substances. Ascorbic acid helps the cells to use oxygen. It also plays a vital role in the formation and maintenance of the material which binds living cells together. Weakness of this "cement substance" between cells in the capillary walls causes widespread hemorrhages under the skin, as seen in scurvy. Loosened teeth, bleeding gums, stiff joints, and weakened and fractured bones, are also the effect of severe ascorbic acid deficiency.

Vitamin C has been called the vitamin of fresh foods, since it is found in highest concentration just as the food is fresh from the plant. Vitamin C comes packaged in such delicate foods that it is hard to understand why any diet would not have enough. Fresh, frozen, or canned citrus fruits such as or-

anges, lemons, and grapefruit are recognized to be excellent sources of this vitamin. It should be remembered that tomatoes, strawberries, cantaloupe, broccoli, kale, peppers, and green leafy vegetables such as cabbage and spinach are all good sources if used raw or properly cooked.

Proper Cooking Is Important

Not only the selection but the preparation of foods has much to do with their nutritive value. Studies indicate that a considerable loss of vitamins and minerals occurs in the kitchen because of poor techniques of food preparation. This factor often spells the difference between an adequate and inadequate diet. Good preparation techniques will make sure that you get the most nutrition from that food you selected so carefully.

Vitamin Supplements

Many people think that if such small quantities of vitamins are so important, larger amounts may be even better. As a result, millions of dollars are spent on multi-vitamin and mineral products each year. John and Sue, for instance, believe that if they take one or two of these capsules each day, it doesn't matter too much what they eat. But one cannot balance a poorly chosen diet by taking vitamin and mineral supplements.

What John and Sue need to remember is that other nutrients are essential too. The body needs protein, not only for building but for regular upkeep. Calories are needed for energy. No amount of vitamin D can build or maintain children's bones and teeth without the necessary minerals. All of the nutrients which are needed for life and health are important, regardless of how much or how little of each is needed.

There is an optimal level of any nutrient which will afford the greatest good to the body. Beyond this level, the nutrients are not useful. In fact, large amounts of vitamin A and D can be harmful, since once the body has absorbed them, it has no way of excreting them. Excessive intakes of the water-soluble vitamins, such as the B complex and ascorbic acid, may not be harmful but are wasted in the body excretions. Sue, you can actually waste good grocery money by trying to supplement your

family's diet with ignorantly chosen vitamins.

Today, more than ever before, as a result of decades of research which has demonstrated the intimate relationship existing between the various elements, nutritionists are emphasizing the importance of a *balanced* diet. The basic food groups are reliable guides to the planning of adequate diets. Moderation in calories so as to maintain one's ideal body weight, and the selection of a wide variety of unrefined foods, without either undue emphasis on, or excessive restriction of, any one nutrient, are the best nutritional goals in the light of present knowledge.

It may take a little more time to plan a balanced diet for your family, Sue. It may even take more time to properly prepare it from the unrefined and unprocessed foods which you can find in your local supermarket. But it's worth it—every moment of it!



ANSWER SHEET—LESSON NO. 6

1. Complete the following statement:

Vitamins, essential to life, are necessary for _____

2. Supply the missing words below:

a. Most of the vitamins appear to function in _____ systems.

b. Vitamin A is needed for:

(1) _____

(2) _____

(3) _____

c. Vitamin A prevents _____.

d. Excellent sources of this vitamin are _____ and _____.

3. Place a check mark (✓) after each true statement below:

a. Vitamin C helps the body to use calcium for mineralization of bones and teeth. _____

b. Vitamin D is made in the body by the action of the sun's rays upon the skin. _____

c. Thiamine, often called the "morale vitamin," is closely associated with stability of the nerves. _____

4. Food sources of thiamine.

a. Concentrated food sources: _____

b. Good sources: _____

5. Place a check (✓) after each true statement:

a. Riboflavin is essential for the health of eyes and prevents undue sensitivity to light. _____

b. Milk and dark-green leafy vegetables are excellent sources of vitamin B₂. _____

c. The amino acid lysine can be converted by the body into niacin. _____

d. Since milk and eggs are excellent sources of tryptophan, they are good sources of niacin. _____

6. Underline each true statement below:

a. Folic acid and vitamin B₁₂ have been called anti-coagulant factors.

b. Vitamin B₁₂ is needed for normal formation of red blood cells.

c. One glass of milk daily meets the normal individual's need of B₁₂.

d. Vitamin C has been called the fresh food vitamin.

It's your world of
Good Food

Cooking for health & happiness - Lessons 7-12



SQUARE MEALS IN a round world



The life style of families a few generations ago called for three square meals a day. No doubt our great-grandmothers would have felt conscience-stricken had their families started the day without a substantial breakfast. But today, in many homes, breakfast "on the run"—if at all—is the pattern. Why?

"I'm not hungry in the morning." "I don't like to eat alone." "I don't have time for breakfast." "I'm reducing, and breakfast is fattening, isn't it?"

Several of these excuses are a matter of timing. Because of different work and school schedules, the day often starts at varying times for members of the family. Eating alone is not an inviting prospect, and so breakfast is skipped completely. Or the cupboard and refrigerator are raided for a few ready-to-eat items which are hurriedly consumed. The result is

usually an unbalanced, inadequate meal.

Getting to bed too late makes it hard for any family to have time for breakfast together. Breakfast is often a casualty of wanting to sleep as late as possible and still get to work or school on time. Many think they will "catch up" later in the day the nutrients they should have had for breakfast. Studies, however, show this is not true. Those who skip breakfast generally do not make up later in the day for the foods they missed in the morning. As a result there is often a shortage of nutrients, except perhaps of calories.

For example, the physiological responses, mental attitudes, and scholastic attainments of boys twelve to fourteen years of age who went without breakfast for a time were studied at the University of Iowa. It is significant that even when the total food intake sup-



LESSON # 7

plied later in the day was equivalent to what they were eating when breakfast was included, the accomplishments of the boys remained inferior while they were on the no-breakfast schedule. Their work rate and work output were noticeably less.

During the period when breakfast was omitted, some of the boys became careless and inattentive before lunchtime. These behavior problems were not noted when breakfast was eaten. At the conclusion of the study there was a consensus among the teachers that the omission of breakfast had a detrimental effect on the boys' attitudes and school records.

Many other studies have shown in children and in adults that throughout the morning there is a consistent feeling of well-being and good performance, both physical and mental, when an adequate breakfast is eaten. Breakfast follows the longest period of time when the body is without food, and the nutrient reserves are at a low ebb. Blood sugar level falls, and unless food is eaten, an "all-gone" feeling is likely to be experienced by mid-morning. Efficiency is reduced, even making an individual more accident-prone. The "10 a.m. headache" is a common symptom of breakfast skippers or skimpers.

The timing of other meals also affects the breakfast habit. Most people today eat a large evening meal. This meal is often the only one at which all the family members are present. However, this custom is hard on the digestive system.

The evening meal usually is substantial with considerable fat and protein, which slow down the rate of digestion. If this meal must be the largest of the day, it should be eaten as early as possible. Digestive organs that are forced to work a night shift will not be ready to take on a good meal early in the morning. The benefits of a good breakfast habit, however, are worth the effort of making some changes.

A good breakfast supplies at least one-fourth of the daily dietary needs. Sufficient protein should be included, along with carbohydrates for energy, furnished by fruits and grains. Protein foods tend to maintain the blood sugar above the fasting level for a longer period of time than do carbohydrates.

In order to maintain the blood sugar above this level throughout the morning, there must be at least 15 grams of protein in the breakfast meal. The following two patterns each contain somewhat more than this amount of protein.

Menu 1

Fruit
Whole-grain cereal
Whole-grain bread
1 tbsp. nut butter,
or nuts, ½ oz.
Milk or milk alternate

Menu 2

Fruit
Meat analog, 1-2 oz.,
or one egg
Whole-grain bread
Spread for bread
Milk or milk alternate

To insure an adequate intake of ascorbic acid for the day, it is well to include a fruit rich in vitamin C for breakfast.

Cereals and breads play an important role in the breakfast menu as well as during the rest of the day. The least refined are nutritionally the best. A number of ready-to-eat toasted cereals have been subjected to high temperatures which lower the protein value of the grain. Sugar coatings have been added to increase their appetite appeal. Home-cooked cereals, besides retaining a greater portion of their nutrients, are more economical to buy.

What about the overweight person who skips breakfast because he thinks it makes him fat? Breakfast for even this person is important, since it controls hunger, while providing some of the most valuable nutrients in the day's menu. And breakfast is usually not the meal

with the largest calorie content.

Do you plan breakfast for your family? And, just as important, does your family plan for breakfast? Remember, a family which skips or skimps breakfast is cheating itself of some of the good health and other advantages that could be attained by proper nutrition.

It is not surprising that when the day is started without adequate breakfast, snacking and nibbling—often of sweets and high-fat foods—go on during the rest of the day. In fact, eating is for some a non-stop activity! Solomon has admonished us in Ecclesiastes 3 that there is a time for everything. By eating continually one is constantly activating body processes in digesting and metabolizing food.

Most body functions follow a rhythmic pattern; for instance, beating of the heart and breathing. The replenishing of nutritional stores can be done best in a regular planned program of eating rather than in a hit-or-miss fashion.

The Adequate Lunch

Packing a lunch is a daily responsibility in many homes. The lunch should not be thought of as just something to tide the person over until supper. It is a meal in itself and requires



as careful planning as the meal you set on the table. Slighted lunches, like slighted breakfasts, cannot be made up at other meals.

The nutritionally balanced lunch will—

1. Contain at least one-third of the day's requirements of protein, calories, minerals, and vitamins.
2. Fit into the daily food scheme—hearty breakfast, adequate lunch or dinner, light supper. (If a third meal is not eaten, the lunch must be more substantial.)
3. Be suited to the individual's nutritional needs.
4. Contain milk or milk alternate in some form, whole-grain bread, a high-protein food, fruit or vegetable, and sometimes a simple dessert.

The lunch should be appetizing and attractive. Everyone enjoys a lunch that looks good and tastes good. It should be varied from day to day. If possible, someone other than the person who is to eat the lunch should prepare it. The element of surprise adds zest to any meal, especially to a lunch.

Here are suggestions for lunch menus for persons doing different kinds of work. The amounts included will vary, depending upon the one for whom it is planned.

For a school child:

- Banana and peanut butter sandwich
- Potato salad
- Carrot and celery sticks
- Stuffed dates
- Milk

For an office worker:

Cottage cheese and
lettuce sandwich
on whole wheat
Raw carrot strips
½ pint tomato juice
Oatmeal cookies

For the moderately active:

Garbanzo-egg sandwich
on whole wheat
Fruit salad or red apple
½ pint milk
2 wheat germ cookies

For the very active:

2 whole-wheat buns
with vegemeat patties
Nut-bread sandwich
with cream cheese
Potato salad
Relishes
1 pint milk
Red apple
1 or 2 oatmeal cookies

Often the homemaker is the worst offender in getting an adequate lunch. With the family away at school or work, she plans little if any lunch herself. The refrigerator is raided for a few leftovers or she skips the meal entirely and picks up a snack now and then—a couple of cookies, some candy. Some of these rather common habits may help to explain why women, next to their teen-age daughters, are usually the most poorly fed members of the family, according to a number of surveys.

Some of the lunch suggestions in this lesson can be used as a guide for any member of the family,

whether he carries his lunch or eats at home.

Ideally, dinner should come at midday, thus replenishing energy stores for the remainder of the work day. In many families this is difficult because of work and school schedules. It becomes, therefore, doubly important that your day start with a nourishing breakfast and that an adequate lunch be provided.

The Evening Meal

Since your day has already included a good breakfast and an ample lunch or dinner, your supper meal can be simple and yet round out your nutrient intake for the day. Most of the day's work is finished, so this meal need not be so large as the other two.

A nutritional supper might include:

Menu 1

Baked lima beans
Fresh vegetable salad,
dressing
Whole-wheat bread, spread
Milk or soy milk

Menu 2

Cottage cheese with
fresh fruit
Oatmeal bread with spread
Hot milk beverage

The working wife will find these quick and easy to prepare. Since a minimum of clean-up is required following these simple, light meals, a maximum of time can be spent with the family each evening.

Following the guide in lesson 1 will ensure a balance of nutritive values for the entire day.

Preserving Food Values

Whether or not the family eats all of its meals at home, each meal requires careful preparation. It is possible to plan a meal containing foods high in nutritive values and yet be shortchanged on nutrition because of the losses which have taken place before the food reaches the table.

There are two general types of losses occurring in foods. One is the obvious physical loss which takes place when portions of the food have been removed in preliminary processing or handling. A number of foods on the market today have undergone various kinds and amounts of physical losses.

Secondly, there are the chemical changes taking place within the food itself. Deterioration—the loss of nutrients, especially vitamins, which takes place before the food actually spoils—is accelerated under certain unfavorable conditions. The temperature, humidity, length of storage, method of handling, method of preparation, and (in some instances) exposure to light are factors which must be kept in mind when considering retaining food values.

Many fruits and vegetables are highly perishable and are susceptible to vitamin losses if not properly handled. Green leafy vegetables, such as spinach, chard, salad greens, and broccoli, need to be refrigerated as soon as possible, for they retain their nutrients best at low temperatures and high humidity. If these vegetables have wilted, putting them in cold water may revive them, but vitamins already lost cannot be restored.



The more tightly packed leaves do not lose their vitamin content so readily. Cabbage held in the refrigerator will retain three-fourths or more of its ascorbic acid as long as two months, while broccoli and other dark green leafy vegetables will have lost about half of their vitamin C after five days in the refrigerator. The vitamin C of plants such as bell peppers, green beans, lima beans, and tomatoes, tends to be more stable.

Citrus fruits retain their ascorbic acid well. Orange juice, whether freshly squeezed, canned, or frozen, retains most of the vitamin even after several days in the refrigerator. The natural acid present in the fruit helps to preserve vitamin C. Usually a change in flavor occurs before there is an appreciable loss of nutritive value. There is a loss of nutrients

when orange juice is strained, since one-fourth to one-third of the edible portion of the fruit is discarded in the pulp. Of course, babies need the juice strained; but children and adults will get more from the fruit if it is eaten whole, in sections, or as unstrained orange juice.

Freezing helps to retain nutrients and fresh flavor in foods. Some losses of water-soluble vitamins and minerals occur in the blanching process before freezing. Frozen foods which are held below the freezing point retain their nutrients remarkably well.

Vegetables always require a little trimming, but this must be done carefully so as to lose as little as possible of the nutrients originally present.

The outer leaves of leafy vegetables are coarser but contain higher concentrations of vitamins and min-

erals than the tender inner leaves. The leafy portions are considerably richer in nutrients than the stems or midribs.

Trimming head lettuce, cabbage, and broccoli often involves discarding nutritious parts. The dark green outer leaves of head lettuce can be thirty times as high in vitamin A as the inner, pale leaves. If these leaves are not used, more than three-fourths of the vitamins are lost. Considerable care needs to be taken to retain all the edible portions of vegetables and fruits.

Principles of Cooking

Ascorbic acid, all of the B vitamins, and some of the mineral elements are important nutrients that can be lost in water unless good cooking methods are used. Losses are proportionate to the amount of water used, the length of cooking, and the amount of surface area (cut portion) exposed.

The three R's of cooking to conserve food value are: *reduce* the amount of water used; *reduce* the length of cooking time; *reduce* the amount of surface area exposed. The smaller the pieces, the greater the loss.

The most important of the three R's is the quantity of water used. Cabbage cooked quickly in a small amount of water retains nearly 90 percent of its vitamin C, but if it is cooked in a large amount of water, it retains less than half. Make it a practice to use as little water as possible in cooking, and serve with the vegetable any that is left at the end of the cooking period.

The longer the food is cooked, the more vitamins are destroyed. If a vegetable is started in cold water, fairly large losses of vitamins occur before the water begins to boil. This loss is due to enzyme activity which is stopped when the temperature is high enough to destroy this enzyme. This critical period, as well as the total cooking time, is shortened if the water is boiling when the vegetables are added.

Overcooking not only causes a loss of nutrients in vegetables, but adversely affects color, flavor, and texture. It may be necessary to re-educate the family's taste to crisp-cooked vegetables. Such

a program will pay dividends in the taste of full-flavored vegetables in their natural goodness, and in the retention of a maximum of vitamins.

Vitamins are not only dissolved in water and destroyed, but are inactivated by a process known as oxidation. This simply means that when the vegetables are cut or shredded, chemical changes occur at the cut surfaces which destroy the vitamins. Cabbage which has been finely shredded for slaw loses considerable vitamin C if allowed to stand as long as half an hour. Vegetables for salads should be prepared shortly before serving time. This will ensure crisp, nutritious salads.

To reduce losses by oxidative processes: (1) Avoid fine shredding, dicing, and cutting; (2) cook with cover on; (3) avoid stirring air into vegetables as they are cooking; (4) minimize the number of times mashed or whipped vegetables are served.

Foods that are held hot for a period of time continue to lose vitamins. It is well to cook vegetables just before mealtime and serve immediately. Leftovers and food cooked in advance for late meals may save time, but it costs in food values. As much as possible, cook just as much as your family needs for

the meal. In this way you can serve freshly-cooked vegetables.

Cereals cooked in just enough water to be absorbed lose only a small amount of thiamine—probably less than 10 percent. Not only do such products as rice, macaroni, and noodles lose some of their thiamine by heat destruction during cooking, but fairly large losses of water-soluble nutrients occur when they are cooked in an excess of water which is discarded.

Toasting reduces the thiamine content of bread 10 to 20 percent. The thinner the slice, the greater the heat penetration and the greater the destruction. The high temperature used in roasting nuts also reduces the vitamin content. Thus, lightly toasted bread or lightly toasted nuts or nut butters are better.

As we consider the various types of food preparation, it becomes clear that careful craftsmanship in the kitchen not only transforms foods into meals that the family enjoys but provides all of the nutrients in sufficient amounts to ensure good health.

And remember, it is better to serve a hearty breakfast, a good lunch or dinner, and a light supper, if you want a healthy family. It's so true—healthier families are happier families.

ANSWER SHEET—LESSON NO. 7

1. Write Yes after the statement if true; write No if false:

- Studies at the University of Iowa showed that omitting breakfast had a detrimental effect on the attitudes and classwork of schoolboys. _____
- The "10 a.m. headache" is a common symptom of breakfast skippers or skimpers. _____
- A good breakfast supplies a liberal supply of protein and carbohydrates. _____
- Home-cooked cereals are more economical than ready-to-eat cereals. _____

2. Fill in the following blanks with the correct answers:

A nutritionally balanced lunch will:

- _____
- _____
- _____
- _____

3. Fill in the blanks in the statements below:

- A lunch should be not only appetizing but _____.
- Every lunch box should contain a _____ for hot or cold liquids.
- Preferably, lunch should be prepared by _____.
- Often the worst offender in getting an adequate lunch is the _____.

4. Complete the following statement:

Two types of nutrient losses occurring in foods are:

- _____
- _____

5. Place a check (✓) after the correct statements:

- Green, leafy vegetables retain their nutrients best at a low temperature and low humidity. _____
- Straining orange juice removes some of the nutritive content. _____
- Frozen foods retain their fresh flavor and nutrients remarkably well. _____
- The outer leaves of leafy vegetables contain more vitamins and minerals than inner leaves. _____
- When cooking vegetables they should be started in cold water in an uncovered kettle. _____
- More food value is conserved when vegetables are cut in large pieces rather than shredded or cut in small pieces. _____

6. Complete the following sentence:

The three R's of cooking to conserve nutrients are:

- _____
- _____
- _____

TODAY'S FOOD, TOMORROW'S CHILD



Six-foot Tom tiptoes into the room where his brunette wife lies in bed all smiles. Jane has just given birth to their first—and it's a boy!

Tom, excited almost beyond containment, smiling from ear to ear, tenderly enfolds his wife's hands in his own and stoops to kiss her.

"He is surely a healthy one," John breaks out finally. Then with dreamy eyes, he gazes into space, "He'll be a good baseball player! Jane, we've got to be sure we give him the right food. That's important for an athlete, you know."

And Jane laughs aloud and understandingly, "Of course, I know. We will give him the very best."

Lucky little boy! Every child has the right to a good start in life. You can be sure that Tom and Jane were preparing for their little one long before he

came. And wise parents they are. There is no other time when the diet habits of one individual influence the well-being of another so directly as during pregnancy.

Although pregnancy is an entirely normal physiological event, it does subject the body to special strain. The nutrients needed for the unborn baby must be furnished by the mother. A woman who has formed good eating habits and is well-nourished when she becomes pregnant will be able to meet these nutritional needs. She will need to change her diet only by increasing some of the foods she is already eating.

A young girl who has not completed her growth and development or whose body is not adequately nourished, or a woman who may have depleted her reserves, needs to give immediate and careful thought to improving her diet.



Influence of Mother's Diet

What scientific evidence do we have that the diet of the mother during pregnancy influences the well-being of her child, or that it affects her own health?

A number of studies have examined this relationship. At the medical school of Harvard University, 216 women attending the prenatal clinic were classified according to whether their diets were considered by nutritionists as "good," "fair," or "poor." Records were kept of the condition of the mother and baby at and after delivery.

Mothers on the poorest diet had more complications and difficult deliveries. All the stillborn babies, and all but one of those who were premature or died soon after birth, were born to mothers in this group. Many of the babies were rated only "fair" or "poor" by pediatricians. On the other hand, a high proportion of babies whose condition was rated at birth as "superior" or "good" were born to mothers who were on "good" or "excellent" diets during pregnancy. This study and others indicate that the nutritional status of the mother is important to the quality of life of the baby. A deficient diet can have a direct effect on unborn babies, and they may carry the physical and/or

mental defects the rest of their lives.

Mothers have usually felt reassured by the popular concept that if there were shortcomings in a mother's diet, she, not her offspring, would suffer. There is growing evidence, however, that the unborn baby competes with its mother's body for essential nutrients. If the mother does not eat the right foods to supply these nutrients, it is the baby who will suffer the effects of the deficiency.

Although the physical effects of prenatal nutrition have been studied for some time, scientists have more recently become increasingly interested in the effect on mental development. This interest has been heightened by the fact that many mothers and children of the world, especially in the developing countries, do not receive adequate nutrition.

Among body organs, the brain first completes its growth. The most rapid growth period seems to be from the fifth month of pregnancy to the end of the first year of the baby's life, a period highly susceptible to nutritional deficits. Faulty nutrition during the rapid growth period may not only inhibit brain growth but may also result in irreversible damage to brain functioning.

A group of scientists at John Hopkins University were interested to learn what effect diet restriction of pregnant mothers would have on the brain and behavior of their babies. Naturally they could not test this on human mothers, so they used pregnant rats. One group was fed only half the food eaten by a similar group. The day after birth, all the babies were taken away from their own mothers and given to well-fed foster mothers to nurse. At four weeks, the little rats were weaned and allowed all the food they wanted.

In every factor studied, the scientists found the rats from the underfed mothers were handicapped. They were distinctly more timid in a strange environment, more emotional, had less curiosity and less confidence, and showed peculiar nervous symptoms. So it seems that, at least in rats, the mother's insufficient diet had a permanent effect on mental and nervous stability and behavior that later adequate diets could not undo. Ideally, the "Head Start" school program should start with adequate nutrition for the mothers-to-be.

The tendency toward early marriages and parenthood emphasizes the importance of good dietary habits of teen-agers. Today teen-agers make up between



one-third and one-fourth of all women pregnant with their first babies. It has been observed by many that the younger the mother, the less likely she is to get professional advice and the more likely she is to continue eating the nutritionally poor diet common to teenagers. Adolescent girls, pregnant or not, tend to have inadequate and sometimes bizarre diets.

In Chicago, nearly a thousand diet records from pregnant adolescent girls were examined. The analysis showed that only one-third could be rated "good" for their food habits, with almost 45 percent classified as having "poor" diets. This same situation was found in a study of high school-age girls in San Francisco.

Dr. Genevieve Stearns, an authority in the field of infant and child nutrition, states:

"The girl who marries during her mid-teens is apt to be a girl poorly nourished through most of her lifetime and to be equally ill-equipped to meet the many psychological problems inherent in establishing a successful marriage and the new family. It is not surprising, therefore, that she is the least successful mother in producing a healthy full-term infant. These young adolescent girls greatly need counseling in nutrition and in the whole area of preparation for successful family life."

Meeting Dietary Needs

The nutritive needs during pregnancy are best met by a simple, wholesome diet including a liberal selection of fruits, especially citrus fruits, tomatoes, or other good vitamin C foods; vegetables; whole-grain cereals; milk; and protein-rich foods.

These are the same foods around which the normal diet should be built.

Food Pattern For

Normal Diet	Pregnancy	Lactation
PLUS—		
Milk	1-2 glasses	2 or more
Vegetable-fruit	1 serving	2 servings
Protein foods	1 serving	2 servings
Cereals-breads	same	same

The risk to the well-being of the mother and the child increases as the mother's weight gain drops below 18 pounds or climbs over 30. The National Research Council recommends: "An average weight gain during pregnancy of 24 pounds (range 20-25 pounds) is commensurate with a better-than-average course and outcome of pregnancy. This would be a gain of 1.5 to 3.0 pounds during the first trimester and a gain of 0.8 pound per week during the remainder of pregnancy. There is no scientific justification for routine limita-

tions of weight gain to lesser amounts. . . . Severe caloric restriction, which has been very commonly recommended, is potentially harmful to the developing fetus and to the mother and almost inevitably restricts other nutrients essential for growth processes. Weight reduction regimens, if needed, should be instituted only after pregnancy has terminated."

If the woman is overweight before pregnancy, her physician may recommend a lesser weight gain during pregnancy. This must be done under careful medical and dietary supervision, making every calorie carry its weight in terms of protein, vitamins and minerals.

The general living habits should be checked, since good nutrition is hampered by overfatigue, irregular meal hours, and insufficient sleep. Sunshine, fresh air, and moderate exercise are also important.

Doctors often recommend vitamin D to promote utilization of calcium and phosphorus. This may be obtained daily in a quart of vitamin D fortified milk or taken in capsule form.

Advantages of Breast Feeding

Good nutrition before and during the months of pregnancy will prepare the mother for breast feeding her child. It is generally

agreed that breast milk is the best food for young infants. Besides being the natural way to feed babies, mother's milk contains adequate quantities of the food elements best adapted to the infant and is the safest food from the standpoint of sanitation and protection against infection and allergies. It is probably the best way to give the baby a sense of security.

Nutritive Needs for Lactation

The need for almost all nutritive essentials is greater during lactation (breast feeding) than during pregnancy. The mother needs liberal amounts of milk, proteins, fruits, and vegetables to furnish the extra calories, protein, minerals, and vitamins needed. (See chart on page 3 for recommended diet increases.)

Milk is an important food for promoting milk secretion and for protecting the mother's bones and teeth against any drain on calcium. It is recommended that at least one quart of milk be taken each day.

It is also important to have plenty of fluids. One to two quarts are recommended. Some of this can well be in the form of fruit and tomato juices, to add extra vitamins and minerals.

While it is essential to have enough food to meet the increased requirements,

overeating must be discouraged. Undesirable weight gains should be prevented.

Meeting the Infant's Needs

The nutritive needs of the infant are the same whether he is breast fed or bottle fed. Although in the past rather complicated formulas were used, today's simplified ones feed the baby just as adequately. The formula which the doctor prescribes is based on the needs of the infant.

During the first year of the baby's life, a number of additions are made to his diet, for two reasons. First, they are needed to insure nutritional adequacy for the baby, since milk, although a good food, does not contain enough of all the nutrients for the fast-growing infant's needs. Secondly, these additions gradually accustom the baby to the common foods he will be eating the rest of his life.

A milk formula is usually supplemented fairly early with orange juice and a vitamin D source. The doctor will also indicate when other foods should be added. Often cereals are the first solid foods given. Pureed vegetables and fruits are added shortly after cereals. Usually after six months such foods as cottage cheese and custards are given.

Very little salt or sugar or

other sweetener should be added to the baby's food. Grown-ups should not season the baby's food according to their own tastes.

By the end of the first year the child's diet will be chosen from all four of the basic food groups. Further changes will be minor.

Exact quantities of food cannot be specified since children's appetites vary and good judgment must be used. A normal, healthy child will satisfy himself within a reasonable time limit without force or coaxing, if moderate quantities of tastily seasoned, attractive food are served.

Parents generally pay careful attention to nutrition during infancy and very early childhood. Yet often, after babyhood, a carelessness about food habits creeps in, with the result that the child loses the healthy, vigorous appearance which is characteristic of good nutrition. Extensive research and human experience have amply demonstrated that proper nutrition is important at every stage of growth and development. Good food habits must be continued week after week and year after year.

Mothers need to plan and provide wholesome, balanced meals which their children enjoy. There is little room for "empty cal-

ories" in the growing child's diet. Priority must be given to those foods which carry their share of protein, minerals, and vitamins. Fruits, vegetables, milk, and whole-grain cereals should be featured prominently in every day's menu.

Suggestions on Feeding the Young Child

1. Try to take the child's point of view.
2. Keep mealtime happy and cheerful.
3. Let the child serve himself as much as possible.
4. Keep foods simple and lightly seasoned.
5. Avoid strong-flavored, coarse, stringy foods.
6. Use finger foods often.
7. Keep helpings small, and let the child ask for seconds.
8. Introduce new foods in small amounts, one at a time and usually when the child is hungry and in a good mood.
9. Serve foods in small bite sizes which are easy to pick up.
10. Remember that children are individuals and have rights to preferences as much as adults do!

How can we check the growing child's diet to make certain that he is getting the materials he needs for growth? Mothers should use special care to include

the following each day in portions suited to the child's needs:

Milk at each meal, as a drink.

A good protein food besides milk at each meal.

At least two servings of fruit, especially citrus fruit and juices or tomato juice.

At least two servings of vegetables, often one that is dark green or deep yellow.

At least three or four servings of whole-grain cereals and bread.

A vitamin D source as recommended by the doctor.

If desserts appear in the menu, they should be simple and only mildly sweet and in the main contain milk, eggs, or fruit.

One of the food problems facing parents is that many children do not like vegetables, especially cooked ones. Children generally do like crisp, raw vegetables. When the little one can chew raw carrot or celery strips and other crisp foods, they should appear at one or two meals during the day. Some cooked vegetables are important, however, since children cannot eat enough of the raw ones to get the nutrients we expect to get from vegetables.

It is important to watch the texture, flavor, and consistency of vegetables. Children have a keener sense



of taste and smell than adults. They do not like strong flavors and find tough, stringy vegetables hard to manage. They do not like dry or gummy foods. Be careful not to combine two dislikes in the same meal. Give the child an opportunity for a choice, whenever practical.

Parents should not become disheartened and stop serving vegetables because some are unpopular. At times, however, when the mother is tempted to become discouraged, she can give her children fruit in place of vegetables. Finicky appetites often perk up when only fruit appears on the plate.

Developing Good Food Habits in Children

Besides caring for their children's nutritional needs, parents are responsible for the development of good food habits. It should be

kept in mind that attitudes are caught as well as taught. Parents must set a good example. Children imitate older people.

All of the experiences involving food and eating should be pleasant ones. Mealtimes should be happy times for the entire family. Unhappy mealtimes result in feeding problems. A mother who displays patience, gentleness, and calm pleasantness—qualities so conducive to happy mealtimes—can do more toward establishing good eating habits than she can with any amount of punishing, scolding, coaxing, or bribing.

A child who is constantly frustrated with do's and don't's while eating cannot be in a receptive frame of mind toward food.

A mother is storing up future trouble for herself and her child if she unduly

coaxes or forces him to eat food he refuses. Prejudices and actual dislikes may develop which persist throughout life.

Children as well as adults take more interest in food that is well-cooked, well-seasoned, and attractively served. The child will learn to like more foods if care is used in their preparation.

Good health and the advantages that go with it are the rightful heritage of every child. Establishing good health practices is a part of this heritage.

Parents like Tom and Jane have a vision of a strong, healthy young man leaving home for college, or of a glowing daughter about to begin her own home. But along with the vision comes a responsibility. It includes developing good food attitudes which will influence the child's health and happiness throughout life.

ANSWER SHEET—LESSON NO. 8

- Underline each true statement below:
 - A well-nourished woman with good food habits needs only to increase her intake of some of the foods when she becomes pregnant.
 - A direct relationship exists between the quality of the prenatal diet and the welfare of mother and child.
 - The very young and developing fetus is least sensitive to nutritional deficiencies.
 - The tendency toward early marriages and parenthood emphasizes the importance of good dietary habits of teen-agers.
- Fill in the blanks below:
 - A desirable weight gain in pregnancy averages _____ pounds.
 - To promote good utilization of calcium and phosphorus a good source of vitamin _____ is recommended.
 - Two reasons for adding foods to the baby's diet are:
(1) _____
(2) _____
- Underline the correct word or words:
 - The need for nutritive essentials during lactation is (the same as) (greater than) during pregnancy.
 - During lactation (more than) (less than) 1 quart of milk should be used each day.
- Place a check (✓) before all true statements below:
 - _____ In a growing child's diet there is little room for "empty calories."
 - _____ A healthy child will eat his food with a reasonable time limit without being urged.
 - _____ Parents generally pay attention to the nutritive needs of their children from infancy through adolescence.
- List helpful suggestions for feeding the young child:
 - _____
 - _____
 - _____
 - _____
 - _____
- The daily food pattern for children should include:
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____

MILKSHAKE MEALS & DONUT DINNERS



Someone is coming up the steps. Yes, and she is opening the door. Well, it's that time of day; she is home from school. You think to yourself, "Isn't she pretty . . . and the picture of health too . . . such a lovely girl and a real joy to her father!" You are glad that you've always provided the very best meals you knew how to prepare.

You are getting dinner ready, and it won't be long before your husband, Jack, will be home from the office. You have planned one of Sue's favorite dishes. You're anticipating this evening because the family will be home together.

There is Jack now, coming down the driveway. You haven't much time to finish that salad. But in minutes everything is on the table and you call the family.

Sue responds half-heartedly, "I'll just sit and keep you and Dad company, Mother.

I'm not really hungry. Tom invited me after class to Charlie's Cool-it. He ordered me a milkshake, and I couldn't turn it down."

Of course you don't show it, but your world has just tumbled in. It wouldn't have perhaps, if this had been the only time that Sue had made this excuse, but it has been more and more common lately.

You say to yourself, you must have a quiet talk with Sue and explain to her that habits of good diet need to be continued during her teens. In fact, the need for energy, proteins, vitamins, and minerals increases sharply in this age bracket. Proper food is important all through life, but never is it more important than in the years when tissues and bones are being formed that must serve one throughout a lifetime.

It is something of a paradox that, although many surveys show that teen-agers are



not including in their diets enough of the foods which provide what many consider essential nutrients, adolescents today are growing taller and many give the appearance of vitality and health. This, no doubt, reflects the good nutrition of their early childhood. Interesting too, is the fact that teen-agers themselves do not agree with the commonly-held poor opinion of their diets. In a four-year study of 1,000 high school students in Berkeley, California, about 50 percent rated their diets as "good," 15-20 percent as "fair," and less than 4 percent "poor." However, only about half of the students mentioned all four major food groups when they were asked what foods should be eaten every day for health.

What are some of the shortcomings of the teen-age diet?

In the largest nutrition survey ever undertaken in the United States, it was found that adolescents between 10 and 16 years have the highest proportion of unsatisfactory diets of any population group. Although problems vary considerably, insufficient intakes of vitamin A and iron are the most common. Other studies indicate that ascorbic acid (vitamin C) and calcium also may be in short supply in some diets. There is a wide range in the



number of calories eaten, and as a result we find large numbers of overweight and underweight adolescents. And between-meal snacks of candies, soft drinks, and pastries are associated with the high tooth decay seen in this group.

If teen-agers ate more fresh vegetables, especially leafy green and yellow ones, they could meet their vitamin A requirements. Citrus fruits and tomatoes in particular, along with other fresh fruits and vegetables, will supply sufficient ascorbic acid.

Iron does present a problem that needs special attention. This nutrient has been found to be short in many diets, from young children to senior adults. Foods generally contain a limited amount of iron, and even this small amount is not well absorbed by the body. Legumes, whole grain cereals, a number of vegetables (especially dark green leafy ones), and dried fruits are good sources.

But in actual fact, instead of choosing largely those foods which carry their share of nutrients, teenagers often eat too many rich, refined, high-carbohydrate foods. The American youngsters' diet has been described as "one great big milkshake." Dr. Stanley M. Garn, in his book *The Nation's Children*, comments that with our nation's "calorie intake at an all-time high an increasing proportion of our juvenile population appears to be growing fat. Tap water is being replaced by sugared juices, milk by carbonated drinks, . . . candy and nuts are inseparable with television viewing."

Dr. Garn further states that overweight in youngsters is "of more than passing importance." Heart and artery diseases, especially the kind in which fatty substances are deposited in the lining of the arteries, "actually begin with overweight in childhood." In fact, obese children may be "starting in the nursery school for a coronary occlusion."

A large number of high school students studied at the University of Iowa had disturbingly high cholesterol levels and an abnormally large intake of fat. American young men have more diseased arteries and are more prone to heart attack now than they were fifteen

years ago, an Army study of Vietnam soldiers showed.

Another medical problem of particular concern relates to the adolescent girl, who often has the poorest food habits of any age group. Complications of pregnancy and the birth of defective babies occur more frequently among teen-agers whose nutrition is poor.

Adolescence is generally recognized as a period of increased stress. Physical stress is due to the demands of growth, which reaches its peak during this period. At the time of accelerated growth, nutritive needs are greater than at any other age—except, for girls, during pregnancy and lactation.

What is the dietary basis for a good nutritional state during these important years? A good pattern would include each day:

Fruit and vegetable group—four or more servings, being sure that one is a deep green or deep yellow and one a good source of vitamin C.

Bread-cereal group—four or more servings, whole-grain foods as far as possible.

Protein-rich group—two or more generous servings.

Milk group—three or more glasses, or the equivalent,

each day. Some or all may be in the skim or non-fat form.

A nutritionist has stated that "self-selection, self-direction, self-demand—as used in child rearing—were never meant to imply self-indulgence, or self-destruction." During these formative years, teen-agers are developing habits which will either strengthen the foundation for buoyant health throughout life, or which will undermine it and pave the way for such illnesses in later years as diabetes, heart attacks, and strokes.

Parents must not abandon their responsibility for the health and well-being of their teen-agers. That many teen-agers continue to rely on their parents, particularly their mothers' judgment, for proper food has been shown in many investigations. This may seem to conflict with the teen-agers' struggle for independence; nevertheless, it is an indication that, in general, the teen-ager values his family relationship.

Perhaps it will mean that Mother needs to get up a little earlier in order to provide a tasty, nutritious breakfast. In fact, no breakfast, or a poor one, which is altogether too common, means a poor total diet for the day.

Poor breakfasts have often been blamed on lack of

appetite, rushing to get to school on time, no regular family breakfast time, and dislike of the foods commonly served at breakfast. Studies show that those who take time to eat a good breakfast feel less rushed, enjoy eating with their families, and appreciate the fact that their mother has prepared an appetizing breakfast.

Snacks need attention, too. Since teen-agers are becoming more socially conscious, snacking during or immediately after school hours is a frequent occurrence. Snacks should contribute to the total nutritive needs of the adolescent. Fruit, fruit juices, milk, or nuts are examples of those which do. On the other hand, candy, potato chips, and soft drinks are quite devoid of nutrients other than calories. In general, eating between meals should be discouraged.

Besides providing and following a good diet and showing enthusiasm for proper eating habits, parents should make their concern for better nutrition felt in the community and in the school. Surveys of food habits where a school lunch program was available showed that students ate considerably less of concentrated sweets than those attending a school where lunch was not available. Studies further show that

lunches eaten in the school cafeteria often provided the most balanced meal of the day for many teen-agers.

Effective nutrition education should be a part of the school learning experience of children and adolescents. An awareness of the principles of good nutrition taught and practiced at home and school can make for a happy, healthy family experience for teen-agers and their parents.

Needs of Adults

The same nutritional principles that apply earlier in life are applicable to the adult. Even though one has grown and matured, the adult's basic food needs are the same. The maintaining of the structure and well-being of the body tissue replaces the more active process of growth. The difference between these processes in the adult and the young individual is largely one of degree. The adult's diet must supply energy foods, proteins for replacement needs, and vitamins and minerals for regulation of body processes.

As the person ages, his basal metabolism requirement is lower and his total activity is less. This means that the calories must be decreased, otherwise creeping overweight results. Eating just twenty extra calories a day means

adding two pounds a year. Eighty extra and unwanted pounds will thus be accumulated between the ages of twenty-five and sixty-five.

The life style of American adults in food selection and food habits contributes to a number of health problems. Habitual snacking, over-eating (especially on gourmet treats and rich desserts), large use of processed and refined foods, and the no-breakfast, lunch-on-the-run schedule characterize our national eating pattern. Doughnuts and coffee often take the place of a planned, prepared meal made up of the four food groups.

Americans eat over one thousand pounds of food a year per person. We eat less potatoes and cereals, but far more sugar and fats—especially those that lead to atherosclerosis—than did our ancestors. Sixty years ago, Americans ate 87 pounds of sugar a year; today it is around 120. Then, they used 39 pounds of fat and oils a year; now it is 55. When it comes to snacking, adults are almost as bad as young people.

Medical and nutritional authorities agree that Americans are paying a high price for their faulty food habits. Though considerable debate still goes on as to the precise role which diet plays in certain

diseases, doctors generally agree that it is a major factor in several serious illnesses.

One of these is coronary heart disease, which is the number one cause of death in the United States. Although it has not been conclusively proved that diet is responsible for heart attack, the statistical case is strong not only in the U.S. but in most of the more highly industrialized countries of the world. For instance, since the Japanese have adopted more of a Western diet with a higher consumption of fat, there has been a steady increase in heart disease.

A tendency toward mild forms of diabetes is brought out by obesity and overeating, especially of sugar. Tooth decay is another major health problem; it is estimated that more than 98 percent of Americans are affected. Proper food and eating habits are essential for sound tooth structure and for resistance to bacteria that promote tooth decay. Many chronic degenerative diseases appear to be associated with our rich diets—high in calories, protein, and fat and low in essential nutrients such as vitamins and minerals. A recent report on nutrition by the U.S. Department of Agriculture speculated that good eating habits could reduce the incidence of

heart and blood vessel disease by 25 percent, reduce respiratory infection by 20 percent, and cut diabetes, arthritis and infant mortality by 50 percent.

A major effort is being made to explore an apparent relationship between overeating and cancer. Dr. Ernest Wynder, president of the American Health Foundation, has recently said, "We think that overnutrition, especially saturated fats and cholesterol, is a major national problem relating not only to cardiovascular and heart disease but to a whole variety of cancer."

With so many of these diseases taking their toll during some of the most productive years of an adult's life, it is sensible to think in terms of a preventive program. It would include weight control and a balanced diet—low in fats, especially saturated fats, low in cholesterol, sugar, and other refined and concentrated foods. On the other hand, plenty of fruits and vegetables and more proteins from plant sources will make the basis of a healthful diet throughout adult life and on into the sunset years!

Diet for Older Adults

Senior citizens have nutritional problems which need consideration, too. Obesity, inadequate diets, and inappropriate use of vitamin



and mineral supplements are some of the major dietary problems of older people, according to the surveys.

"Diet is one of the most important factors in determining how long an individual lives," said Dr. Henry Sebrell, Jr., professor of public health nutrition at Columbia University. "We like to say in public health that, while a good diet can't guarantee that you will be in good health, you can't be in the best of health unless you live on a good diet. . . . Even though you never suffer acute malnutrition, years and years of improper eating—of dietary indiscretions—will add up to various kinds of damage to your body that will inevitably shorten your life."

Besides physiological changes occurring during the passing years, there may be emotional and psychological problems. These include a disinterest

in food, loneliness, food dislikes acquired over years of living, and unsatisfactory living arrangements.

The social aspect of eating is very important. How many people living alone prepare the meals they need day after day? Instead they snack, which means that they often eat the wrong foods.

Although we do not know all that we should know about food requirements of older people, it is certain that they are benefited by a *good* and *varied* diet. Their basic needs are the same as those required for a good nutritional well-being all through life.

Since calorie needs are usually lower while the protein, mineral, and vitamin needs continue at the same levels as earlier in adult life, it is important that the intake of high-calorie foods containing fats and sugars be decreased. One reason, of course, is that it will help to control weight. But another important reason is that, with a decrease in digestive juices, the body is less able to handle the food, especially fat. Fat may thus not only retard digestion, causing digestive distress, but it may interfere with the absorption of other nutrients.

The nutrients most likely to suffer when older people make changes in their diets

are the vitamins and minerals. In several studies of the food habits of men and women over fifty years of age, ascorbic acid and calcium were low in the diets of many. Some of the women's diets were also low in iron, vitamin A, thiamine, and riboflavin.

This may be partly due to difficulties in chewing foods which are good carriers of these nutrients. Any diet which does not include a liberal supply of fruits and vegetables is very likely to be deficient in vitamin A values and ascorbic acid. Other food groups will not make up these shortages.

Then, too, older people frequently use more carbohydrates and less proteins. They tend to choose more breads and cereals. If these are made from the whole grain, they will furnish their share of many of the minerals and the B vitamins. Often, however, bakery goods such as sweet rolls, sweet breads, cookies, or cakes are chosen. These are usually made from refined sugar and flour products which are deficient in the minerals and vitamins found in whole grains.

Protein foods should not be overlooked. The need for this nutrient does not decrease with age. In fact, older people who skimp on proteins often lack a sense of well-being.

People who have difficulty in chewing can maintain a well-balanced diet by chopping, mashing, or pureeing hard-to-chew foods. Shredding vegetables just before cooking, using only small amounts of water, and cooking until just tender, prepares them in such a way as to make chewing easier. If raw fruits and vegetables cannot be taken in sufficient amount, fresh juice can be used to good advantage. Equipment for pureeing or homogenizing food is useful in the kitchens of older people.

Not only is the food selection influenced by such practical problems as ability to chew, but food likes and dislikes become progressively serious barriers to the attainment of good nutrition. Certain unfounded ideas about food will often influence the individual's choice—for example, the idea that acid-containing foods will produce a condition of acidity in the body. Many older people have a tendency to eliminate from their diet most acid-tasting foods such as tomatoes, oranges, and other citrus fruits. These foods do not increase the acidity of the body; in fact, they have just the opposite effect, leaving a residue of minerals which help to increase the alkaline reserve and neutralize the acids formed in the body. They are also some of the best sources of vitamin C.

Some think of milk as a food primarily for children. Milk or a satisfactory alternative is highly nutritious, easily digested, and tolerated by most individuals of all ages.

Perhaps the biggest obstacle to securing a balanced diet is that many have not done so during their lifetime.

Specially prepared foods and vitamin concentrates are generally not required by the average older person. The best place to get the nutrients he needs is at the market rather than the drugstore.

Everyone needs to take a look at his eating habits. Parents need to examine their own food prejudices and set a good example for their children, as well as tactfully and positively educate their children as Sue's mother planned to do. Young people will then become more aware of the importance of their diet now and all through life. Senior citizens will also become more conscious of proper eating habits if the younger people they know are actively interested in good diets. After all, the goal of a prolonged useful and healthful life is well worth the effort of better nutrition.

Milkshake meals may tickle the taste buds, but the price in health is high.

ANSWER SHEET—LESSON NO. 9

1. Underline the true statements below:

- a. The adolescent period is one of the highest in terms of nutritive requirements.
- b. The eating habits of adolescents generally are poorer than those of younger age groups.
- c. The calories of teen-agers' diets often are made up from many refined foods.
- d. Almost all adolescents are a "picture of health."

2. Complete the following sentences:

An adequate dietary for adolescents includes:

- a. _____
- b. _____
- c. _____
- d. _____

Parents' assistance for better adolescent nutrition includes:

- a. _____
- b. _____
- c. _____

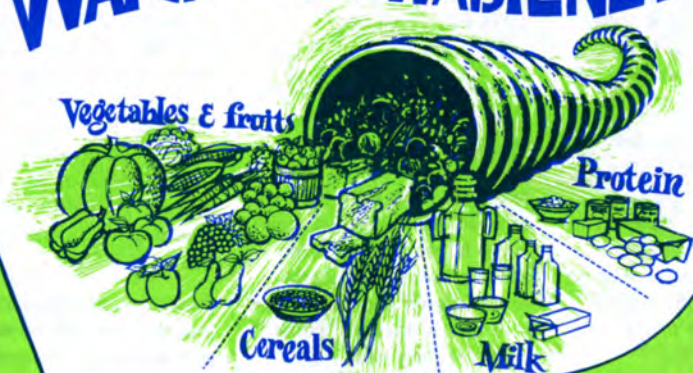
3. Fill in the blanks below:

- a. Even though he is grown and matured, the adult's basic food needs are the _____; but there is a _____ food need requiring _____ calories.
- b. An older person will be benefited by a _____ and _____ diet.
- c. High-calorie foods containing _____ and _____ should be decreased.
- d. The diet of elderly people is often deficient in _____ and _____.
- e. If raw fruits and vegetables cannot be taken in sufficient amount, _____ can be used advantageously.

4. After the true statements below write Yes; after the false, write No:

- a. Milk or a satisfactory alternate contains many of the nutrients needed by the adult person. _____
- b. Food prejudices and eating habits of a lifetime often interfere with a balanced diet for elderly people. _____
- c. Mineral and vitamin preparations always provide ample nutrients not present in foods for the elderly person. _____
- d. Natural food concentrates can often be used advantageously by the older person. _____

WATCH THAT WAISTLINE!



Overweight is a symptom of our prosperity—too much food and too little exercise. It has been called a disease of affluence.

There are many individuals who achieve a good balance between intake of food and output of energy, and they are able to maintain their ideal weight without varying more than a pound or two. On the other hand, overweight is a problem shared in some degree by many millions of Americans. In fact, it is a problem in most industrialized countries.

Estimates vary as to the number of overweight persons in the United States, but studies make crystal clear that obesity is *our most prevalent disease*. One of the findings in the Ten-State Nutrition Survey pointed up the fact that although there were many who were overweight in all age groups studied, obesity was most common in

women over fifty. In general, one out of four adults takes in more calories than he needs.

Causes of Overeating

Just why do people overeat? Many use food to fill unsatisfied emotional needs. Food will temporarily relieve tensions resulting from unsatisfied needs for success or security or affection. Some people eat because it is their chief source of pleasure, because they are bored, because it relieves a feeling of tension, or because food symbolizes to them the love and affection they need and cannot find. For them, the taking of food deadens the pangs of a frustrated life.

Then, of course, there are those who simply like food too well and have become habitual overeaters. A good appetite is characteristic of a healthy person. But a pattern of eating which maintained a person in good health and at his ideal



LESSON #10

weight during his twenties will probably lead to thirty or forty pounds of excess weight by the time he reaches fifty or sixty.

The best weight to maintain throughout adulthood is the weight that was ideal for height and body frame at age twenty-five. However, many people believe that an increase in weight during middle and later life is inevitable. It is not.

We must recognize, as people grow older, however, that their metabolic rate—the rate at which chemical and physical processes are going on in the body—decreases. Fewer calories are needed to maintain desirable weight. If in addition, they become less active physically as they grow older yet eat as much as when they were young, weight gain is the result.

Today's style of living makes most of us, young and old, less active than were our ancestors. Modern machines in the home, office, and industry save energy. Instead of walking, we ride in cars. In recreation and sports, we no longer participate—we watch. Children and adults of all ages spend large amounts of time watching television, which requires very little energy. It often is snack time too—chips, cookies, candy, and nuts. Although we are much less active, yet we are eating

as much as if we were more so.

Choice of foods for family meals is vital in weight control, too. The family that begins a meal with a clear soup or tomato juice and ends with a fruit cup or fresh-fruit plate will have many fewer calories than will the family that starts with a cream soup and ends with a rich dessert. More than anything else, *habit* determines what and how much we eat.

The homemaker largely holds the key to weight control. Many cooks feel that the adding of liberal amounts of margarine, cream, and other rich foods to the dishes they prepare makes them tastier. "Rich foods" have been equated with "tasty foods." Mothers should accustom their families to less fattening foods.

Health Hazards

Physicians view overweight as an alarming health problem. Clinical and life insurance studies have demonstrated time and again that obesity is one of the chief threats to continued good health and longevity. The term "overweight" is generally used to describe an individual who is 10 to 20 percent above normal, and "obese" when he is 20 percent or more above his desirable weight.

Obesity carries with it increased health hazards,

particularly diabetes and diseases of the heart. The chances of developing serious heart, blood vessel, and kidney disease are as much as 50 percent greater among the obese than among those of normal weight. Reduction of weight would alone prevent many cases of diabetes.

Insurance statistics show that the greater the degree of overweight, the greater the risk, particularly after age forty. In the 40- to 44-year-old bracket, 20 percent excess over normal weight carries with it a 30 to 40 percent increased death rate above that expected, while a 40 percent excess of weight involves an 80 to 100 percent increase. In other words, a man who is 50 pounds overweight has about half the life expectancy of one of the same age who is of normal weight.

The obese individual runs a greater risk when surgery is necessary and also seems to have less resistance to infection.

Many of those who are overweight realize that pounds are potentially dangerous—and certainly unattractive. Our culture favors a lean look. The overweight are handicapped, not only physically but socially and economically. For these and other reasons, the overweight person, especially if he is young, often has serious psychological

handicaps. The truly happy fat person is hardly more than a figment of the cartoonist's imagination.

Scientific Research

Much research is being directed toward determining the underlying causes of obesity. To say that it results *only* from excess calories is an oversimplification, not helpful for either prevention or treatment. In animal studies, some hereditary relationship has been shown; for example, certain strains of mice inherit obesity. In people, it has been seen that 10 percent of children of normal parents may become obese. This number jumps to from 40 to 50 percent when one parent is overweight, and to 80 percent when both parents are overweight. Heredity may be involved but is not the only cause. Certainly family food habits are important, and where a "groaning" table is regularly set, overeating and overweight are common.

Besides a possible heredity relationship, research has shown that there are some metabolic changes or deviations from normal in the markedly obese person. These appear, however, to reflect how the body is *adapting* to obesity rather than *causing* it. At the present time, caloric restriction and nutritional balance are what medical science has to offer for the management of obesity.



Although the causes of obesity may be many and varied and sometimes complex, the basic problems are overeating and inactivity, usually in combination. "Calories" and "balance" are the key words. To maintain ideal weight, calories must be balanced with energy requirements. To lose weight there must be a negative balance of calories. The treatment, then, in the majority of cases is reducing the calorie intake below energy output. This procedure should be as simple as setting a thermostat. As millions know, it is *not* that simple. Weight for most people can be lost only through serious, hard work. Many are not able to work so hard on themselves.

Preventing Overweight

Prevention, of course, is the better part of wisdom. We should keep an eagle eye on that waistline and call a halt before excessive pounds have accumulated. Slight excesses may not be noticed at first, but over a period of time they become sizable.

One-half slice of bread with butter eaten beyond the *actual need each day* would mean about an additional half pound of weight at the end of the month. These *extra* calories each day would mean six pounds in a year's time and 30 pounds in five years! Then after those 25 or 30 extra pounds have been accumulated we look about for a magical solution to our problem—"miracle foods," "weight control pills," a "quickie sure-cure" reducing program.

Fad Diets

Probably the most misleading type of fad diet is one that allows eating unlimited amounts of certain high protein foods. Examples of these have been the "Calories Don't Count" diet or "The Doctor's Quick Weight Loss Diet." Dieters have been told they could eat unlimited protein, especially meat, and fats, but little or no carbohydrates. After a short time on these diets, they usually found they could eat only a limited amount, and this is how they *decreased their calorie* intake and lost pounds.

However, such an extreme diet does not achieve a lasting weight loss. The dieter has not learned how to eat a proper diet in order to *stay reduced*. Remember, *calories do count!*

Another type of fad diet usually requires some caloric restrictions but demands a sharp reduction of carbohydrate intake, or none at all. The so-called "scientific" explanation is that in the fat person carbohydrate is more readily stored as adipose or fatty tissue, rather than being burned for energy, while calories from protein and fat are used up in the metabolic processes of the body as well as for energy and are not stored to the same extent. This is not true.

Dieters on a high-protein but low-carbohydrate reducing diet often appear to be losing weight faster than those on a low-calorie-balanced diet. This is because less water is being held in the tissues and therefore the scales show a lower weight. This behavior in water balance (retention of water) is associated with the carbohydrate part of the diet, and it is not yet understood why it happens. Despite this frustrating disadvantage, carbohydrate is *important* in the diet. In time the water balance problem clears up and the *total* weight loss will depend



upon the number of calories in the reducing diet and not on the level of the protein, fat, or carbohydrate.

Diets which are low in protein are equally faddish. The Grapefruit Diet, the Skimmed Milk and Banana Diet and the "Doctor's Quick Inches-Off Diet" are examples of this kind of diet. Weight may be lost all right and usually fairly fast, but this loss will include protein tissue (muscles, etc.) which is definitely not desirable. A low-calorie weight-reducing diet must provide sufficient essential amino acids to prevent breakdown of body protein. It must also insure that the weight loss is due to *using the stored body fat*.

The Commonsense Diet

The best diet is varied; low in total calories (800 to 1400), attractive, simple to follow, and well-balanced as regards all essential nutrients. Such a diet should be made up from

the Four Food Groups—vegetable-fruit, cereal-bread, protein-rich, and milk group—and include small amounts of fat.

Using the guide provides a mixture of carbohydrates, protein, fat, vitamins, and minerals. The only drastic change is in the number of calories. Most of the calorie reduction is in the fat, some in the carbohydrate, while the protein intake is reduced least and remains entirely adequate.

When the dieter has lost the needed number of pounds, he can change over from a reducing diet to a maintenance diet simply by increasing the portions or number of servings. If the weight loss is to be maintained, the dieter must have learned how to eat and what to eat while reducing. His reducing diet should have been based on a balanced, nutritious, normal diet. Dieting is a time when faulty food habits should be corrected. The diet should emphasize a sense of *fitness* rather than a sense of *fullness*.

It is well for dieters to remember that weight is not lost at a steady rate, even though they stay on their diets. Plateaus are reached. This is due partly to the variation in water balance and partly because the body adjusts to a lower caloric intake by slowing down its metabolism (the rate at

which chemical and physical activities are going on in the body).

The largest weight loss usually occurs in the first and possibly second week. The third week is often crucial for dieters. Lack of much, if any, weight loss causes them to get discouraged and quit. But if they persevere *and* if they step up their exercise, they will continue to lose even if less spectacularly than the first week or so.

The most important single ingredient in a successful reducing program is determination. "We do the thing we want to do," an old saying goes. In order to lose weight, the dieter must use will power and persevere, but most of all he must want to reduce.

Having made his decision, the dieter should see his physician for a physical examination and general diet advice. The doctor will probably recommend that weight reduction be accomplished slowly. Two to three pounds in a week is a good rate in the beginning. It is a safer program to follow, since the calorie allowance permits a greater selection of food, resulting in a diet that is more adequate nutritionally. It avoids the danger of deficiencies and imbalance which often lead to physical and nervous exhaustion. The dieter will be able to carry on his

regular duties without undue fatigue and weakness. This slower reducing program should be a time for adjusting to a decreased intake of food which will need to be maintained throughout life if the ideal weight is to be held.

In order to prevent the excessive hunger which many experience, the low-calorie diet should contain sufficient protein and some fat. Foods containing adequate protein and fat give a feeling of satisfaction after the meal because they delay the emptying time of the stomach.

It has been recommended that the third meal of the day be eliminated on a reducing program. Some people feel that there is less hunger sensation on this program than when eating three skimpy meals a day. Some find that a fast one day a week is helpful.

Losing weight does not necessarily mean that one must "starve to death." It is important, however, to eliminate the so-called "hidden calories." These include jams, jellies, syrups, honey, cream and sugar on cereals, extra pats of butter, rich sauces, whipped cream, salad dressings, cakes, pastries (or other sweet desserts), soft drinks, sodas, between-meal and TV snacks indulged in "just to be sociable." Snacks and rich des-

serts are high in calorie content, and in most instances low in protein, mineral and vitamin values.

Obesity is a problem not only of adults but of children and adolescents. While a balanced diet is important for the adult, it is even more important in dealing with the obese child or adolescent. Every calorie must count for protein, vitamins, and minerals during this crucial developing stage of life.

The overweight *adolescent* should be treated, not just his obesity. A sensible approach is to talk to the adolescent about his appearance and health rather than just about calories; about diversified interests, not just about weight; about moderation at the table, not special diets; about balance, not taboos.

Exercise

Exercise can be an important aid to weight reduction if it is carried out frequently, consistently, and moderately. There are, of course, some medical problems which would make an increase in physical activity impossible. If a physical check-up shows no medical limitations, exercise should be included.

Overweight students studied by Dr. Ancel Keys at the University of Minnesota were given a reducing diet

of 1,200 calories a day. Some of them were put on a program of walking for two hours a day at three and a half miles per hour on a slight incline. The students who had no special exercise program lost an average of three pounds a week. Those who walked averaged a loss of five pounds a week and improved their fitness at the same time.

The benefit of exercise goes beyond just burning up more calories because of the physical activity itself. Exercise affects the rate of metabolism and this increased rate continues after the exercise has stopped. When metabolism is increased, more calories are burned. How much the rate is increased depends in part on the intensity and length of the exercise. It is sensible to increase activity, not by short, sudden outbursts of strenuous exercise, but by planned, regular, reasonable increase as fitness improves.

Loss of surplus pounds is only half the battle. What is more difficult for many is to *stay reduced*. There is no magic formula; you must have a determination to maintain your most attractive self and to enjoy better health after shedding those pounds! Resolve to develop a tailor-made appetite to fit your needs exactly.

Obesity is preventable. As with other diseases, prevention is infinitely better than cure. Children should be educated early in correct eating habits. Often parents take pride in plump babies and chubby children. Our goal in feeding boys and girls should be *well-nourished* children, but not *fat* ones.

Many of our cultural and social habits revolve around

food. Parents reinforce eating as a most important way of life and focus the developing youngster's activities around it. We create a situation in which any discipline in food intake later in life becomes a hardship. Food was meant to be enjoyed, not to be indulged in!

Success to you—may you stay lean and fit the rest of your years!

Food Guide for Reducers

A basic grouping of foods which supply a good share

of all nutrients (except calories) needed each day.

	Protein 17.0 grams (17.0)	Calories 170 (330)
Non-fat milk, 1 pint (whole milk, 1 pint)		
High-protein foods, 3 servings		
Low-fat cottage cheese, 1/2 cup	19.5	100
Egg, 1 (limit to 2-4 per week)	6.5	70
Legumes or low-fat meat alternate	7.0	95
Whole-grain cereal, 3 servings		
Oatmeal, 2/3 cup	3.5	100
*Whole-grain bread, 2 slices	4.0	115
Dark-green leafy or yellow vegetables, 2 servings		
Broccoli, 1 cup	5.0	45
Leafy green salad, 3/4 cup	2.0	20
Whole orange or grapefruit half, 1	1.0	75
Seasonal fresh fruit: Strawberries, 1 cup, or cantaloupe, 1/2, or apple, 1 small	1.0	55
Oil or equivalent in margarine, dressings, etc., 4 tsp.	.0	155
	<u>66.5</u>	<u>1,000</u>

*1 medium potato may be substituted for one slice.

Minutes of Various Degrees of Activity Required to Burn Calories in Food

Food	Calories (Approx.)	Walking Min.	Biking Min.	Running Min.	Resting Min.
Bread, 1 slice and margarine, 1/2 pat	80	15	10	4	60
Cake, 1/12, 1-layer	355	68	43	18	274
Carbonated beverage, 1 glass	105	20	13	5	82
Cookie, 1 chocolate chip	50	10	6	3	39
Doughnut	150	29	18	8	116
Ice cream, 1/6 quart	190	37	24	10	148
Milk shake	420	81	51	22	324
Pie, apple, 1/6	375	73	46	19	290
Potato chips, 10 medium	115	21	13	6	83

ANSWER SHEET—LESSON NO. 10

1. Fill in the missing words:

- a. Many individuals can maintain ideal weight by achieving a good balance between food intake and _____.
- b. A serious problem in preventive medicine in the United States today is _____.
- c. The best weight to maintain is one's ideal weight at age _____.

2. Underline the correct word or words:

- a. As one grows older, one needs (fewer, more) calories.
- b. Overweight persons have a (higher, lower) death rate than average and underweight persons.

3. Underline only the instructions that are helpful in a successful reducing program:

- a. Decrease food intake.
- b. Select a well-balanced, adequate diet containing all nutrients except calories.
- c. Select foods abundant in "hidden calories."
- d. Emphasize a sense of fitness rather than a sense of fullness.
- e. Develop determination and persistence.
- f. Select a low-calorie diet containing sufficient protein and some fat.

4. Place a check (✓) after each true statement:

- a. A safe weight reduction is five to seven pounds a week. _____
- b. A slower reducing program permits a greater selection of food resulting in a nutritionally more adequate diet. _____

5. Basic food groups which supply a good share of all the nutrients except calories are:

- a. _____
- b. _____
- c. _____
- d. _____

BETTER MEALS FOR LE\$S MONEY



The rate of change has been accelerating in the American style of living. Changes have been taking place in the foods we find in our stores and in the number of foods we can now buy. The average supermarket carries between 7,000 and 8,000 items, and the number is growing! In fact, there are some 32,000 different products on grocers' shelves today and an estimated half of them were non-existent ten years ago. These changes make a good choice of foods even more of a challenge today than it ever has been in the past.

The challenge increases when the family's income is limited and food prices are high. Today's housewives are faced with an all-time high grocery bill that keeps going up, up, up! It becomes increasingly necessary to find ways to stretch the food dollar. Some women find this frus-

trating; others delight in the challenge.

A limited food budget does not mean that meals must be dull, uninteresting, or inadequate. On the other hand, a liberal budget does not guarantee good nutrition or even tasty meals. It's the homemaker who makes the difference.

Knowledge of Food Values

Whether the budget is liberal or limited, each homemaker should have a down-to-earth knowledge of food values. The advantages of nutritional knowledge were shown by a survey made at a large state college.

Twenty-three families were divided into two groups. Group one included those in which the housewife received some instruction in nutrition, either in college or in special community classes. In group two the homemakers received no training in nutrition. All of



these families lived under similar conditions. Their incomes were similar, and they purchased their food supplies at the same market. Two dietitians carefully checked all foods eaten, for their nutritional value. The results showed that in group one, 90 percent of the families were receiving a diet considered adequate, while in group two only 20 percent had satisfactory diets.

Dr. Pauline Berry Mack, who assisted in this project, commented: "Family income and education are shown to be the chief determinants of food choices, with education having twice as much influence as cash income, indicating the value of education as a means of improving nutritional well-being."

Surveys also show that as the educational level of the wife and mother increased, the evidence of nutritional inadequacies in children decreased. The Ten-State Nutrition Survey further pointed up the fact that among adults the same trend was apparent. While the relationship between increased education and better food choices involves other factors, such as income, it is gratifying to see that nutrition education, even though painfully slow, is making an impact.

A good nutritional yardstick to apply to meals each day

is the "Four Food Groups" pattern. The more insight the homemaker has into food values, the greater pleasure it is to apply this yardstick, for she can make variations in these groups to add interest to her meals and yet be confident that her family is well fed.

Two points to keep in mind when using this yardstick are these: Choose foods from each one of the groups every day; and, just as important, choose a wide variety of foods throughout the week.

Convenience Foods

In these changing times, food shopping and preparation as well as eating patterns have dramatically changed. Working wives have made an enormous impact on food patterns. They have less time and inclination to cook. Family income is higher because there are two wage earners. As a result, the working wife spends more money on carryout items, prepared entrees, pie fillings, frozen and ready-to-eat desserts, frozen vegetables seasoned and in sauce, and packaged dinners. Also, she and her family spend more money for meals away from home.

Today a family can count on two-thirds of its food coming out of cans or packages. Homemakers still want to cook interesting, tasty meals, but in no time flat!

Labeling

With so many new products, especially of the convenience kind, new regulations in regard to labeling are becoming necessary and will in time become mandatory. The Food and Drug Administration is spearheading this revolution which is taking place on the shelves and in the freezers of supermarkets.

The usual label on a package of processed or convenience food identifies the ingredients by name only and lets it go at that. The only way the housewife can discover the composition of the food inside is to write to the manufacturers.

The new label puts an end to the mystery. It will spell out precisely what nutritional values are provided by each serving (defined in an everyday measure) of what is in the package or can. "Nutritional labeling," as it is called, gives the shopper three essential facts about every serving:

1. How many calories it supplies.
2. How many grams of carbohydrate, protein, and fat it contains.
3. What percentage it contributes to the daily need for various vitamins and minerals.

Additionally, food processors are permitted to state the content of cholesterol and fatty acids.

Nutritional labeling has become a necessity, with the drastic change in the food supply and eating habits which followed World War II. Until then, the number of formulated or recipe products were comparatively few, and meals were made up of fresh meats and fish, fresh milk, and vegetables and other foods, mainly unprocessed except for canned fruits and vegetables.

It has been estimated that today well over half of everything that we eat is canned, frozen, combined, or processed in some way. Coincidentally, recent surveys have demonstrated that the American diet, which had been improving for decades, has been deteriorating in some respects during the past dozen years, while more and more new food products of every description appear on the supermarket shelves. Few until now have carried enough information on their labels to enable the average shopper to choose the best possible meals for her family.

Is mushroom soup high or low in calories? Is spinach soufflé a high-fat or a low-fat dish? What is the difference in calories between fruit packed in heavy syrup or light syrup? These are a few of the questions homemakers will be able to answer.

Knowing what is in a pack-

age or can is one thing, but doing something about it is another. The Consumer Research Institute, a marketing research group founded by the food industry, has been testing nutrient labeling concepts with the cooperation of several supermarket chains. They find that the consumer is *interested* in nutritional labeling, but does not *use* it; she continues to make choices primarily on the basis of taste and price.

The homemaker must not only be aware of nutritional labeling but must *use* the information to improve her family's nutrition. The sad truth is that, for all the money we spend on food and for all the variety of foods we can choose from, many Americans are not eating well.

Food Additives

"Water, hydrogenated palm kernel oil, sodium caseinate, sugar, di-potassium phosphate, propylene glycol monostearate, polysorbate 60, stearoyllactate, salt, artificial flavor and color." Yes, this all appeared on a label! Mystifying chemical terminology has appeared on labels for years.

Hundreds of additives are put into food to increase its longevity, add to its nutritional value, or enhance its taste or appearance.

Just what is an additive? In a sense, sugar is. So is salt. There are literally

hundreds of lesser-known compounds being added to our food. They can be divided into three groups: Preservatives—Because of the vastness of our country and the desire of people to be able to buy any food regardless of the season, the use of additives is widespread. They give "shelf life" to the food in the market. Without additives, most convenience foods would be impossible.

Improving agents—This group includes chemicals for improving the appearance and consistency of many foods.

Flavoring agents—Acids, for example, such as tartaric, citric, or lactic acid in fruit or fruit juice preparations give added tartness. Carbonic acid makes beverages effervescent (bubbly).

Additives include coloring agents; flavoring materials; emulsifiers, such as the ones used to prevent separation of French dressing; antioxidants, which delay development of fat rancidity; mold inhibitors, such as the propionates in bread; bleaching agents, used in flour; thickening agents; non-nutritive sweeteners; nutrients for food enrichment; substances to prevent caking of powders; preservatives, such as sodium benzoate used in margarine; substances which improve texture, such as calcium chloride added to canned tomatoes, or alum to pick-

les; and chemicals which prevent color changes, as treating dried apricots with ascorbic acid or sulfur dioxide. The list is long!

The question of safety of additives is not alone the concern of the consumer. Federal and state governments are also deeply involved. Current federal legislation requires the food industry to prove the safety of chemicals used in the processing of foods *before* the chemicals can be sold for use in foods. The manufacturer of the additive must test for safety on animals and submit the test results to the Food and Drug Administration. Scientists of the FDA will study the safety data and reach an independent decision as to the suitability of the new ingredient for use in our food supply.

Even after an additive has been used for years, scientific data sometimes turns up which makes it desirable to remove the compound from our foods. (The cyclamate controversy is an example). The public can be assured that a large amount of research is going on to evaluate the effect of these compounds in the body.

Although additives in food have become a necessity in our economic and social culture, one cannot quarrel with the conviction that food freshly prepared so as

to largely preserve its original characteristics would be an ideal goal. Use of foods with additives can, of course, be kept at a minimum if the family is able to do its own gardening, cooking, grinding of grain, baking, canning, freezing and the many other activities involved in total food preparation. Few of us are so situated, but we can sometimes find local sources of supply for some foods without additives.

"Empty Calorie" Foods

How often have you brought home a bottle of carbonated, sweetened beverage which sells for a price comparable to some of the canned fruit juices? The sweetened, flavored beverage adds only calories to the diet, but the same amount of canned citrus juice would furnish enough vitamin C for one person for a week, besides other nutrients.

How much are you paying per pound for potatoes in the form of potato chips? Or for fruit juices in "ade" drinks?

Bottled "ade" beverages may be refreshing, but they do not provide much nutrition. Check the label. If water is listed first, there is more water than fruit juice in the bottle. Powdered fruit-flavored drinks are usually synthetic, and do not contain vitamins and minerals.

Best Buys

The United States Department of Agriculture tells us that we get much more vitamin C for a dollar spent on citrus fruits and tomatoes than for a dollar spent on any other group of foods. The next most economical sources of ascorbic acid are the dark-green leafy vegetables (fresh or lightly cooked), potatoes (properly cooked), and other vegetables and fruits.

When it comes to vitamin A, a dollar spent for dark-green leafy and deep yellow vegetables buys, by far, the most of this vitamin. The second best buy is tomatoes, then fortified margarines, other green vegetables, whole milk, and Cheddar cheese.

Money spent for whole grains buys the most thiamine. Dry beans and peas are second on the list of "best buys" for this vitamin, followed by potatoes.

Planning Makes It Easy

All of the duties related to feeding the family can be done more efficiently, in terms of hours spent in the kitchen and money spent on food, by proper planning. As related to the budget, this means that menus will be planned well in advance. Try making out your menus for a three-day period or, better yet, for one week at a time. Your menus should be kept flexible,

with allowance for wise use of leftovers and for unexpected guests.

After the menu is shaped up, plan for the quantities needed in the four food categories. The following are those required daily by each person, though the size of serving may vary with the family member's age: in the protein group, two or more servings; four or more servings of fruits and vegetables; an equivalent of three to four cups of milk for children and two cups for adults; four or more servings of whole-grain cereals and breads.

Avoid Impulse Buying

By planning your menus in advance, you will know your shopping needs. After checking supplies on hand with your menus, make a list. Thus you avoid impulse buying, which is often an expensive way to shop. Planned purchasing centers not upon frills or eye-catching merchandise, but upon essentials. The more limited the budget, the more important this becomes.

Parents scarcely realize that one of the pressures in impulse buying is their children, who in turn have been pressured by television commercials. A study was done by Dr. Scott Ward and his associates at the Harvard Graduate School of Business Administration on the effects of television advertising on children.



Dr. Ward found among other things, that attention to television commercials was greatest among the youngest children and that they were most concerned with products that "relate to immediate impulsive needs." You may wonder, how do they satisfy their impulsive needs? Dr. Ward answers this question by giving statistics which he calls "Percent of mothers 'usually' yielding to child's purchase influence attempts." For five- to seven-year-old children, the following percentages of mothers "usually" yielded:

Breakfast cereals	88%
Snack foods	52%
Candy	40%
Soft drinks	38%

By the time the children were 8 to 10 years old, 91 percent of the mothers were yielding to their children's influence on which cereal to purchase.

Budgeting Time

Budgeting time as well as dollars is vital to successful homemaking. The menu must fit into the time the homemaker has for meal preparation. If you know

that only a short time will be available at mealtime, you will need to use more convenience foods.

Don't overlook the possibility of making your own convenience foods. For example, when making an entree, double the recipe and freeze half of it.

Cooked legumes freeze nicely, too, and can be used in hearty soups, baked dishes, salads, and sandwich fillings. Use larger recipes for home-made breads, rolls, and cookies and freeze them. Your family will want fewer desserts if you serve them good, home-made bread.

A planned menu also cuts preparation time and makes better use of fuel. Extra brown rice, for example, steamed for breakfast can be used in a rice-cheese patty for the next day's dinner or lunch. Nicely seasoned tomato sauce can be used with a number of different entrees and/or vegetables. The flavor even improves when it is held in the refrigerator for two or three days!

Tips on Balancing Your Budget

1. If possible, plan to buy all the necessary items for the week if refrigeration and storage space is available. This will limit the temptation to buy unnecessary items.
2. Read labels on packaged and canned goods. In the

listing of ingredients, the main ingredient is listed first, with the one in smallest amount appearing last.

3. Watch for sales. But never consider partially spoiled food at any price to be a bargain. A real bargain means that the yield and quality are the same but the cost per serving is less. Purchasing a large quantity of something the family dislikes or that will spoil quickly does not constitute a saving.

4. Buy in quantity whenever feasible. Consider purchasing in case lots those items which appear frequently in your menus. Do not, however, stock up on little-used goods.

5. Beware of overbuying perishable foods. When shopping infrequently, buy only the fresh produce you can eat in the next couple of days. For the last part of the week, buy green bananas, cranberries, crisp apples, dried fruits, dried legumes and grains, coconuts, whole pineapples that are not quite ripe. Cabbage keeps better than lettuce and is often cheaper.

6. When fruits and vegetables are in season, they are at the peak of their goodness and usually at the most reasonable prices.

7. When buying fresh vegetables with edible leaves, such as beets or turnips, select those with fresh tops.



Do not let the grocer discard them. They can be cooked and served with the vegetable or alone.

8. The purchase of nuts in the shell may offer a saving to the homemaker if they are of good quality. On a long winter evening, cracking nuts can be family fun!

9. Eggs are usually graded and sold according to size and quality, grade AA being best quality. Medium-sized eggs are a better buy when they are more than eight cents cheaper than large eggs of the same grade.

10. Nonfat milk powder is a bargain in food values. National distributors have recipes and other suggestions for its use.

11. Unfamiliar brands sometimes cost less than highly advertised ones. (Someone pays for the cost of advertising.) It is important, however, to check on quantity and quality before purchasing in any sizable amount.

12. In checking the quantity of canned fruits and vegetables, take into consideration the weight on the label and the drained weight.

So-called cheaper brands may contain more liquid and therefore less solids.

13. Compare the relative costs of different forms of food such as fresh, canned, frozen, and dried.

14. Bulk foods are often more reasonable per pound than packaged goods. Check on such items as legumes, dried fruits, cereals, nuts, etc. Be sure to have proper containers for storing these items in your home. Be especially careful during the summer months about the quantity of cereal, flour, and dried fruit on hand in order to avoid loss through spoilage.

15. Whole-grain uncooked cereals furnish more nutrition per cost of serving than ready-to-eat types.

16. Become acquainted with grades. Buy different grades of merchandise suited to the different uses to which the item will be put. Irregularly shaped and sized fruit in good color and condition offers as much nutrition per pound as uniform sizes. Standard brands of canned fruits may be suitable for pies or cobblers, or standard tomatoes may be the best investment for ordinary cooking use. In making your decisions be sure to run a drained-weight and quality test on one can. Each week take one item bought in quantity,

such as peaches, tomatoes or fruit juices, and buy two or more different brands of an item. Compare the amount of liquid, uniformity of size, color, and flavor for the price. Take time to write down the information. Soon you will know whether to buy nationally advertised or store brands, or which brand to buy for use in a casserole or soup and which brand to serve as a vegetable.

17. Waste in the kitchen represents an outright money loss.

a. Discarding portions, such as outer cabbage or lettuce leaves which could be used in soups, etc.

b. Failure to utilize leftovers properly.

c. Improper storage, especially of perishables.

d. Improper preparing and cooking—scorching, discarding cooking water, paring too thickly.

e. Careless scraping of kettles.

18. Spend your food budget for food, not vitamin-mineral supplements. All of the nutrients needed can be obtained in abundance in good food. In special health problems, let the doctor prescribe.

19. A garden is one of the best investments your family can make. The rewards are more than financial.

Vegetables fresh from the garden are at their best in nutrition and flavor. A garden project is a wholesome one for the entire family, and any surplus can be put in a freezer for winter use.

20. Buying convenience foods saves time in the kitchen, but the homemaker pays for the service in much higher food costs.

The problem of balancing the food budget is more than just spending a certain amount of money for a sack of groceries. It means spending the dollar wisely for foods which supply nutrients that are vital to the health and happiness of the entire family.

ANSWER SHEET—LESSON NO. 11

1. Fill in the following blanks correctly:

a. In planning her daily meals the homemaker should select foods each day from the _____ food groups.

b. The most economical food buys for vitamin C are _____ and _____.

c. The best food buys for vitamin A are _____ and _____.

d. A food dollar spent for whole grains buys the most _____.

2. If the following statement is true, write Yes; if false, write No:

It is desirable to plan menus from meal to meal. _____

3. Complete the following statements:

a. Besides identifying the goods, nutritional labeling will give information regarding _____, _____, and _____.

b. In the listing of ingredients on the label, the main ingredient is usually listed _____.

c. A bargain means the _____ and _____ are the same but the cost per serving is less.

d. Nonfat _____ is a bargain in food values.

e. Bulk foods are often more reasonable per pound than _____ foods.

4. Place a check (✓) after the true completion statements below:

Substantial economies can be made if:

a. Meals are planned in advance. _____

b. The homemaker does a large share of the cooking. _____

c. She buys services at the food market. _____

MEALS WITHOUT MEAT



Why would anyone, in this land of burgers and steaks, consider meals without meat? A growing number are doing just that! Vegetarianism is on the increase all over America today. But why?

Vegetarianism is not new. It is as old as the human race. The first record is the Biblical account which tells of a simple diet of fruits, seeds (grains), and nuts, to which vegetables were later added. The ancient account describes people on this all-plant diet who lived useful, long, and vigorous lives.

Through the centuries, however, various dietary changes have taken place, along with changes in the physical strength and health of the human race. Today, the usual diet includes generous amounts of meat wherever it is available and people can afford it.

The average U.S. citizen

eats more than 200 pounds of meat and poultry a year. Although we make up only 7 percent of the world's population, Americans eat more than 30 percent of the earth's animal protein. Even our farms are devoted to meat. At least half of our harvested agricultural land is planted with crops intended not for humans but for livestock. More than 70 percent of all our grain is fed to animals. Americans are among the most obsessive meat-eaters on the planet!

Yet in this meat-eating economy and culture, there is a phenomenal upsurge of interest in vegetarianism and healthful living. And who is in the forefront of this quiet revolution? The young of America! Why? They want to return to a more natural way of life.

Unfortunately, some of these young folk do not know enough about food values and nutrition. Some



are trying very rigid and completely unbalanced diets which are dangerous to health. These extreme diets should not be confused with a sensible diet made up of a variety of wholesome foods.

In a growing number of colleges and universities, students are asking for a more wholesome diet, including vegetarian entrees. At universities, such as Yale, longtime favorites like roast beef and mashed potatoes are giving way to meals featuring soybean patties, freshly cooked vegetables, and whole-grain products. The young people want to get away from the traditional fried foods, gravies, and mushy vegetables. They favor fresh and quickly-cooked vegetables and breads made of unbleached whole-grain flours without chemical additives.

All over the country young people are joining the search for a more natural kind of diet. However, parents, unfamiliar with meals without meat, are expressing concern about the effect on the health of their young people when they announce their plans to become vegetarians. Fortunately, nutritional science can assure parents and others that a well-planned lacto-ovo-vegetarian diet is adequate for every nutritional requirement, even during the

stressful developing periods of adolescence.

Many studies have been made by scientists on plant foods and meatless diets. Dr. U. D. Register of Loma Linda University School of Health has studied the quality of protein combinations. It is known that proteins supplement or complement each other; that is, the amino acids of one protein balance those of another. Not only do animal proteins supplement plant proteins, but plant proteins supplement each other.

Since wheat protein is so widely used, not only in bread but in vegetable entree foods, Dr. Register's research group studied the supplementary value of wheat protein with other proteins. Wheat is low in the amino acid lysine; therefore, foods that are high in this amino acid, such as milk, yeast, soybeans and other legumes (peas, beans, garbanzos, and lentils), and eggs, would supplement the wheat protein. When 70 percent of the protein in the diet is from wheat protein (gluten) and the remaining 30 percent from any one of the foods above, excellent supplementary action was demonstrated by animal growth studies.

To study the adequacy of a lacto-ovo-vegetarian diet, Dr. Register's group secured a week's diet from

the Loma Linda Hospital. For one group of animals tested, the entrees were removed and replaced by a mixture of meats containing the same quantity of protein as the meatless entrees. The other group received the regular hospital diet which contained no meat. Results showed that the lacto-ovo-vegetarian diet was as good as the meat diet in protein quality. The experimental animals grew equally well on either diet.

Studies involving human beings support the findings of animal experimentation and show that wherever an adequate food supply is available, the vegetarian diet presents no problem. True, there are many reports of nutritional diseases in underprivileged areas of the world where the people have very little animal food of any kind. These reports show, however, that the diseases generally are due, not to a vegetarian diet as such, but to an acute shortage of food, or to a diet consisting largely of such foods as refined corn meal, tapioca, or white rice, with practically no milk, eggs, leafy vegetables, or fruits. Lack of suitable postweaning foods particularly affects young children. Non-dietary practices of an unhealthful nature and parasitic infestations frequently accentuate the symptoms of nutritional diseases in these areas. These very de-

ficient diets under adverse conditions do not in any way resemble any reasonable vegetarian program.

A thorough and comprehensive study on vegetarians has been reported by Dr. M. G. Hardinge of the Loma Linda University School of Health and Dr. Frederick Stare of Harvard University. They studied adolescents and adults, including pregnant women, grouped into three classes: (1) lacto-ovo-vegetarians who include milk and eggs; (2) total vegetarians, who use no animal products of any type and (3) non-vegetarians. (Unless the term vegetarian is qualified, it usually refers to a diet containing no meat, but including some dairy foods and eggs.) The scientists found that foods eaten by lacto-ovo-vegetarians were very similar to those used by non-vegetarians, except that they did not use meat. The larger intake of protein by the non-vegetarians did not result in any apparent benefit. While the average intake of nutrients varied widely among individuals, the average intake of every group approximated or exceeded the recommendations of the Food and Nutrition Board.

There were no significant differences in the comparative weights of the lacto-ovo-vegetarian and the non-vegetarian groups.

Both averaged approximately fourteen pounds above their ideal weight. On the other hand, the total vegetarians averaged six pounds below their ideal weight.

Although lacto-ovo-vegetarian adolescent boys ate only about three-fourths as much protein, and the girls two-thirds as much as the non-vegetarians, no significant differences were found in their rate of growth. The weight gains and losses of the pregnant women of these same groups were similar, as were also the birth weights and lengths of the infants.

The vegetarians, however, had a lower blood cholesterol. Their diet also provided more unrefined foods, such as whole-grain bread and cereals, and more fresh fruits and vegetables which added a desirable amount of bulk to their diet.

Studies have been made of vegetarians in many places in the world. The Hunza people of North India, who are known for their excellent health, have lived on a diet largely made up of grains (especially barley, wheat, and millet), fruits (especially apricots), vegetables, nuts, and some milk and milk products from goats. Meat has been used mainly on feast days.

Dr. Paul Dudley White, well-known heart specialist, in

1964 visited Hunzaland. He studied about 25 Hunza men believed to be 90 years old or over. Even at this advanced age he found "normal blood pressure, normal blood cholesterol levels, and normal electrocardiographic patterns."

In 1966 a study comparing vegetarians with a similar group of non-vegetarians was done in Norway. The protein intake of the lacto-ovo-vegetarians was only a little less than that of the ordinary Norwegian diet, but a much larger proportion of it came from plant foods. The intake of minerals and vitamins was high among the vegetarians due to the liberal use of unrefined foods and of fresh fruits and vegetables. Fewer vegetarians than non-vegetarians were overweight. Again the meatless diet gave evidence of complete adequacy.

Studies of lacto-vegetarians in Britain showed that the bones of the vegetarians contained significantly more calcium than those of non-vegetarians of the same age. At about the age of seventy, no further loss of bone minerals occurred in the vegetarians while bones continued to weaken in the non-vegetarians. It should be recalled that milk is an excellent source of calcium, while meat is a poor one.

Another group who have adhered largely to a lacto-

ovo-vegetarian diet for over a century are Seventh-day Adventists. Although there is no requirement that they must abstain from clean meats, the church recommends a vegetarian diet. Dr. Jean Mayer of Harvard has observed, "Studies of Seventh-day Adventists who are ovo-lacto-vegetarians have repeatedly shown them to be in excellent health."

Many other studies give evidence that nutritional science has found "meals without meat" a completely adequate way of life. Why then has concern been expressed about the meatless diet, especially the protein quality? This concept arose from early studies on proteins and has persisted.

In the early days of protein research, studies were made of *single* proteins. Because of this method, the quality of plant proteins was undervalued. However, proteins are not eaten singly; this is possible only in controlled laboratory experiments. Meals contain varied proteins, each with different proportions of amino acids. When protein foods are digested, a mixture of amino acids results. They supplement one another and furnish the body with a suitable assortment for all of the many functions proteins perform. The assortment is much better

if they come from a diet of largely unrefined foods.

Dr. R. Bressani has commented: "From a nutritional point of view animal or vegetable proteins should not be differentiated. It is known today that the relative concentration of the amino acids, particularly of the essential ones, is the most important factor determining the biological value of a protein. . . . By combining different proteins in appropriate ways, vegetable proteins cannot be distinguished nutritionally from those of animal origin. The amino acids and not the proteins should be considered as the nutritional units."

Dr. N. S. Scrimshaw, professor of nutrition of Massachusetts Institute of Technology, says: "Fortunately, there is no fixed nutritional requirement for the relatively costly sources of protein—milk, meat, and eggs. Legumes and oilseed meal mixed with two-thirds of a cereal grain gives a mixture of a quality and concentration of protein adequate for all human needs, even of the infant and young child."

As Dr. Robert Harris said, at the time he was professor of biochemistry at the same institution: "There is not sufficient land in the world to feed all mankind the animal protein diet now consumed in the United

States. . . . People may prefer to eat diets rich in animal protein, but those diets are not necessary, and most people cannot afford them."

Since we know that a well-formulated lacto-ovo-vegetarian diet is completely adequate, we might ask, What are the advantages, if any? Besides being the more natural way of eating, a plant diet has certain desirable characteristics. An important one is a favorable effect on lowering blood cholesterol.

A substantial amount of scientific evidence indicates an association between a high level of blood cholesterol and the frequency of heart attacks. A good vegetarian diet is high in substances that tend to lower blood cholesterol—complex carbohydrates (starches, etc.), unsaturated fats, and fiber (roughage, such as cellulose). It is lower in factors that have been found to raise cholesterol levels—saturated fats and dietary cholesterol.

The total vegetarians in Drs. Hardinge and Stare's study had significantly lower serum cholesterol than either the lacto-ovo-vegetarians or non-vegetarians. In another study, serum cholesterol levels were studied in a group of 466 Seventh-day Adventists. In this group there

were degrees of non-vegetarianism—the number of times meat was used during a week. The scientists found that in the group who regularly used some meat, the levels of serum cholesterol increased as the amount of meat in their diets increased.

A ten-year study of 50,000 Seventh-day Adventists in California by Drs. Frank Lemon and Richard Walden of Loma Linda University showed that SDA's have a lower death rate due to diseases of all kinds than the general population. The fact that SDA's do not smoke accounts for the fact that they have fewer respiratory diseases. The lower number of deaths from other diseases may be due to the fact that many do not use meat, or use much less than the national average.

Dr. Walden reported that Seventh-day Adventists in the California study suffered their first heart attack a full decade later than most Americans. Further, he found that on the average SDA men can expect to live six years longer and women about 3.7 years longer than other Californians. In an earlier study he found that members had an 18 percent lower cholesterol rate than the general population of New York.

Chronic degenerative diseases are common in our

meat-eating civilization. Much evidence associates our rich diets, high in calories—many from refined sources, and high in fat, especially animal fats—with these diseases. Many of the middle-aged and older groups are overweight, painfully arthritic and rheumatic, afflicted with diabetes and kidney and liver disorders, and cut down by cancer and by blood vessel and heart diseases. These conditions do not exist to the same extent in countries whose people live largely on a plant diet.

Many of the diseases that human beings have are shared with animals. The same microorganisms or parasites which cause these diseases in animals also cause the diseases in people. The World Health Organization recognizes 80 of these diseases called zoonotic diseases. This number includes tuberculosis, undulant fever, typhoid fever, and salmonellosis.

Some zoonotic diseases caused by parasites are known to be caused by eating diseased meat. The beef tapeworm, one of the more common parasites, is frequently found in a cyst form in beef muscle. Rare steaks, and roasts undercooked in the center, are the most dangerous.

Meat is a second-hand means for getting the nu-



trients we need. It also contains the by-products of the animal's vital body processes, waste materials and poisons remaining in the blood and tissues. This means our body has to care for these waste products in addition to its own.

Recognizing the advantages of a vegetarian diet, how does one actually plan it? No trouble at all, once we understand what we are trying to do, and why.

When planning a meal it is customary to build it around the entree or main dish. Since meat is considered by many as the most important dish of a meal, salads and vegetables are often thought of as accessory menu items.

Although it is best to plan the entree first, it is important to consider the make-up of the *whole* meal. Vegetables and salads do *more* than enhance a main dish—they make essential contributions of vitamins, minerals, and unrefined carbohydrates, and furnish small amounts but excellent quality of protein.

Main dishes take many forms: hearty soups, protein-rich salads, loaves, patties, croquettes, and casseroles. Simple dishes should not be by-passed. Nicely flavored home-cooked beans and whole-wheat bread have been described by an eminent scientist as a "main dish" which ranks with meat as a source of proteins and vitamins of the B group.

Planning a vegetarian diet is not difficult. Actually, the lacto-ovo-vegetarian diet does not differ much from the average Western diet. The main difference is that meat is replaced with a variety of legumes, meat alternates, cereals, nuts, and more generous intake of milk and milk products. Because it is necessary to select from a wider variety of foods to replace meat, there is the advantage of a better assortment of nutrients.

In fact, the single most important point to keep in mind when planning a vegetarian diet is to choose a wide variety of foods, with a minimum number of refined products. Both aspects of this principle are important—*variety* and *quality*. When a wide selection of mainly unrefined food is eaten, there is a much better likelihood of getting enough of the many different nutrients the body requires.

You can use the Four Food Group pattern as a guide. The major change will be in the meat or protein-rich group. In using this guide, when changing from a non-vegetarian to a lacto-ovo-vegetarian diet, the following recommendations are important:

1. Reduce the empty calories by at least half.

It has been estimated that approximately 35 percent of calories in the typical American diet are from sugars and visible fats. Another 20 percent come from bread and cereals, of which more than 90 percent are refined. This means that more than half the calories that many Americans eat are from more or less refined and processed foods. Many diets scored as only "fair" by nutritionists could be rated "good" or even "excellent" if the empty calories were replaced by whole or unrefined foods as far as practical.

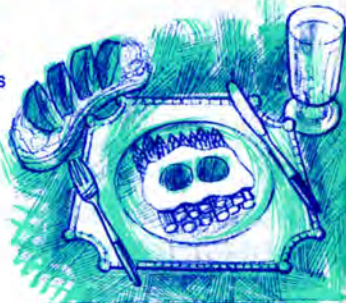
2. Replace meat in the protein group.

Meat will need to be replaced by other foods which supply not only the protein, but the calories, vitamins, and minerals that meat furnishes. A generous intake of a variety of legumes and meat alternates made from wheat and/or soy proteins and other vegetable proteins will do this.

Many common and excellent combinations can be planned using whole grain cereals and legumes. This can be in the form of a grain-legume dish, such as a lentil-rice loaf, oat-soy waffles, corn-lima bean succotash, or a bread which contains both bean and grain flours. Garbanzos served with cornbread for dinner is a tasty, nutritious combination. The peanut butter whole-wheat sandwich (peanuts really are legumes), a favorite of children and many adults too, provides a good assortment of amino acids.

Nuts make a good addition to your meals, contributing protein, a generous amount of unsaturated fat, and a great deal of satiety (satisfaction). They must be used in moderation; one-fourth cup of shelled nuts is about right for one meal.

Although commercially prepared plant proteins are not essential to a well-balanced vegetarian diet, every home-maker knows that these convenience foods do help. There are a number of canned, dehydrated, and



frozen meat alternates available in an expanding number of markets. Tasty and nutritious, they are enjoyed by many vegetarians. Especially are they appreciated by persons just changing their diet who miss the texture and flavor of animal proteins.

Eggs are excellent protein sources, too, and provide vitamin B₁₂. Because they contain large amounts of cholesterol, two to four a week are plenty.

3. Increase the use of low-fat milk products or satisfactory milk alternates.

Non-fat or low-fat milk products, such as cottage cheese, contribute the protein and other nutrients, especially calcium, riboflavin (a B vitamin), and vitamin B₁₂.

4. Increase somewhat the use of foods from the cereal and bread group, preferably in the whole-grain form.

This group also supplies some protein, as well as iron and B vitamins. Be careful, however, that this increase does not take place at the expense of other food groups.

5. Use plenty of fruits and vegetables.

A recent publication of the Department of Agriculture

pointed out that although this group provides only about 8.5 percent of the calories in our diet, fruits and vegetables supply almost all of the vitamin C, about 95 percent. They also provide approximately one-third of the vitamin B₆, one-fourth of the magnesium, one-fifth of the iron, and almost one-half of the vitamin A, along with substantial amounts of other nutrients.

In changing from a lacto-ovo-vegetarian to a total vegetarian diet, all of the points we have just considered are important.

Special attention must be given to calcium, riboflavin and vitamin B₁₂. Since milk is an excellent source of calcium and riboflavin, when the milk group is not included other foods which provide these nutrients must be regularly used.

There is no practical plant source of vitamin B₁₂. Either a vitamin B₁₂ supplement or fortified soybean milk should be used.

Let's summarize: You can plan tasty, healthful meals without meat by choosing a variety of ordinary foods in as unrefined and unprocessed form as practical.

Use whole-grain cereals and breads. These provide a fair amount of protein and are rich in minerals and B vitamins.

Use legumes of all kinds and vary these with prepared plant proteins.

Use nuts, but be careful! These are nature's most concentrated foods. They add richness and flavor, highly unsaturated fat, and minerals and vitamins.

Use fruits and vegetables plentifully. They are the least concentrated in calories but are rich in minerals and vitamins. On a calorie basis they carry their share of protein, too.

Low-fat dairy products used in moderation supplement a well-chosen vegetarian diet beyond any question of adequacy.

When a meal is no longer considered just a "meat-potato-vegetable" menu, many new and exciting culinary experiences become possible. Shopping and cooking will no longer be a monotonous routine, but a real adventure.

Experiment Recommended

Improvement in general health and well-being is a goal that everyone can achieve by practicing all the principles of healthful living, including good food selection and preparation. Test the truth of this statement for your family. Within even a few months you will note a gratifying change.

MEAL PATTERN	LACTO-OVO-VEGETARIAN	PURE VEGETARIAN	LACTO-OVO-VEGETARIAN	PURE VEGETARIAN
BREAKFAST				
<i>Fruit</i>	Grapefruit half	Grapefruit half	Whole orange	Whole orange
<i>Whole-grain cereal and/or</i>	Oatmeal with milk	Oatmeal with sliced bananas, slivered almonds	Brown rice with honey, milk	Brown rice with honey, soy milk
<i>Breadstuff</i>	Whole wheat raisin toast/margarine	Whole wheat raisin toast/margarine	Mixed grain toast/margarine	Mixed grain toast/margarine
<i>Protein food</i>	Braised Prosage	Braised Prosage	Lightly toasted cashew nuts	Lightly toasted cashew nuts
<i>Beverage</i>	Non-fat milk	Soy milk	Cereal coffee/low-fat milk	Cereal coffee/soy milk
MAIN MEAL				
<i>Entree</i>	Walnut loaf, brown gravy	Savory lentils	Baked soybeans	Baked soybeans
<i>Vegetables</i>	Baked potato/margarine Broccoli, lemon wedge	Baked potato/margarine Broccoli, lemon wedge	Parsley potatoes Carrot strips	Parsley potatoes Carrot strips
<i>Salad</i>	Sliced avocado/cottage cheese	Sliced avocado/mandarin oranges and ripe olives	Tossed green salad/sliced hard-boiled eggs (few)/herb oil dressing	Tossed green salad with garbanzos (few)/herb oil dressing
<i>Breadstuff, if needed</i>	Wheat roll/margarine	Wheat roll/margarine	Rye bread/margarine	Rye bread/margarine
<i>Simple dessert</i>	Melon slices	Melon slices Walnut halves	Pineapple juice	Pineapple juice
LUNCH OR SUPPER				
<i>Protein dish</i>	Split pea soup	Split pea soup	Corn chowder	Corn chowder made with soy milk
<i>Breadstuff</i>	Cornbread/margarine	Cornbread/margarine	Whole wheat toast with apple butter	Whole wheat toast with apple butter
<i>Fruits/vegetables</i>	Fruit bowl	Fruit bowl	Small whole banana	Small whole banana
<i>Beverage</i>	Low-fat milk	Soy milk	Non-fat milk	Soy milk