CHAPTER VII

THE DIET

WHEN you were very, very young you ate for three reasons—first, because you were "hungry" and had dreadful gnawing pains in the region of your stomach; second, because the taste and smell of whatever you were eating was exceedingly pleasant; and third, because the grown-ups simply made you.

When you grew a little older, you ate for the same reasons, but because you were bigger, you asserted your rights and refused to eat dishes that didn't please your palate. Then you were sent to bed without any supper, to dream of mountains of ice cream, gingerbread houses and rivers of soda water. But sending you to bed was the last resort. Your parents first tried to reason with you or bribe you.

Curly hair would be yours if you would eat the crusts of your bread; spinach would make you tall; cereal gave you muscles and energy. And if you didn't have energy, you'd have to lie on a couch all day long, like the poor little boy down the street.

The energy story had the most appeal. You could visualize yourself out-prowessing the whole gang, so you manfully gulped down the oatmeal. Probably if your mother knew of what you were thinking she would have skipped the energy story, for she was

thinking of errands to the corner store swiftly done and report cards with all A's.

Nevertheless your ideas of energy were quite similar, for you were both thinking of external work. This is only one part of the energy needs of the body. It is also needed for all the internal work that is going on and for growth or repair.

Now the only source of energy we have is the food we eat. You will recall that after the food is digested and carried to the various parts of the body, it is utilized in the building and repair of tissues and in the presence of oxygen is burned to give forth energy, and as a by-product, heat.

When you stop to consider how different the various parts of your body are constructed—how hard your teeth and bones, how firm some parts of your body is in comparison to others—it is clear at once that different kinds of foods are needed for the different structures. Personal experience has proved to you, too, that certain kinds of food have very definite visible effects. Too much fat and sweet foods make you soft and flabby; too much meat seems to make you "beefy". Hence the need for a balanced diet.

Proteins, Carbohydrates and Fats

The nutritive parts of the food we eat are called the five food elements. They are the proteins, carbohydrates, fats, mineral matter and water. Recently a sixth element has been added—the vitamins. However, as they are not used directly for energy or for tissue-building they will be treated in a separate chapter.

Protein is the element of which our tissues are

made. Therefore it is absolutely necessary to eat a certain amount of foods containing protein.

The white of an egg is the purest form of protein in our ordinary foods. Naturally, since protein is the basis of all animal tissue, it is also found in meat and fish, and in dairy products such as milk and cheese. Certain vegetables contain a large amount of protein. Among such are green beans, lima beans, lentils and peas. Cereals and nuts also contain a goodly amount of protein, but fruits have only a negligible amount. Protein is absolutely essential for good health. Indeed, an adult could fare quite well on a diet exclusively protein if necessary. But he could not live on a diet composed only of fats and carbohydrates. This is because fats and starches cannot take the place of protein in the building of tissues, while protein can be used for energy.

Protein is an essential part of every cell in the body, although to be sure, it is present in relatively small amounts in bone and fat which are sometimes called the inactive tissues. On the other hand, by far the greater part of active or muscle tissue, both voluntary and involuntary are composed of protein. About twenty-five percent of the muscles is composed of solid matter. Of this about four-fifths is protein material. Thus it should be self-evident that we must eat a certain amount of protein.

Protein may also be used as fuel for muscular work if it is necessary, but at a great expense to the body, and only when other material is not available, since it is essential for the building and repair of tissues. The old idea that in some way muscular tissue is broken down when work is done is entirely erroneous.

That it is erroneous is very evident when you consider the muscles of your favorite athlete. They do not reduce, but grow in size when he is in training and doing hard muscular work regularly. The fats and carbohydrates in his balanced diet supply most of the energy; and his muscles, instead of being consumed or broken down, are in such a fine condition as a result of regular exercise that they acquire a new firmness and a somewhat larger size.

Yet, in spite of it all, the misconception still persists that foods rich in protein are "strengthening" and that an athlete or any one else doing heavy muscular work needs an extra amount of meat, especially juicy red beef, because he is doing so much muscular work and consuming so much energy. Without exercise, regardless of the amount of protein eaten, muscles remain soft and flabby.

Yet the fact is, as we have said, that although protein may be used as fuel when absolutely necessary, it is a disadvantageous and uneconomical form of fuel. This is immediately clear when you understand the fate of protein in your body. One part of the digested protein is taken from the bloodstream and built up into tissue protein material, that is it is used for the building and repair of tissues. For this use the amino acids into which the proteins are broken down in the process of digestion are kept whole and their distinguishing element, called nitrogen, is not separated from them but is incorporated in the new tissue. The protein so used represents the actual protein requirement of the body.

Now this only represents a part of the protein consumed, which is generally considerably in excess of the

protein needed for building and repair of tissues. The body must be rid of the excess protein for it cannot store protein. It must be burned up and the products of this burning or oxidation as it is called, must be excreted. But first it must be converted into a form that can be burned. The nitrogen is split off or separated from the excess protein and is changed into certain nitrogen-containing substances which are thrown off by the kidneys. The fragments which contain no nitrogen are then oxidized just as the carbohydrates and fats are. Thus the nitrogen, which was indispensable to tissue-building, becomes the very opposite when it is necessary to use protein as fuel. This is one of the reasons why protein is an expensive form of fuel. Another reason is that when protein is burned it leaves an acid ash. In another chapter we shall learn that the reaction of the body tissues should be almost neutral, with a slight inclination towards the alkaline side. Serious disturbances are likely to result if the alkaline reserve is lowered because it has been used to neutralize the excess acid.

But even if protein is an expensive form of fuel, the fact remains that a certain amount is absolutely necessary for the life of the tissues and consequently for life itself.

Carbohydrate is the general term for all starches and sugars. Indeed, the starches are nothing but many sugar groups linked together which when digested, separate into simple sugars again because the links or bonds which hold them together are broken.

Most people think there is only one sugar, the ordinary sugar, made from cane or beets, and scientifically

called sucrose. There are, however, four other sugars commonly consumed.

Glucose, also known as dextrose or grape sugar, is found abundantly in fruits and plant juices. It is especially abundant in grapes, and among the vegetables is found in large quantities in sweet corn, onions and unripe potatoes.

Fructose or fruit sugar is found in plant juices, fruits and especially in honey of which nearly one-half of the solid matter is fructose.

Lactose is the name given to the sugar found in the milk of all animals. It is less sweet than sucrose and has been found less irritating to the lining of the stomach. Many people have found it an important aid in maintaining a healthy intestinal condition.

Maltose or malt sugar is an important constituent of germinating cereals, malt and malt products.

Sucrose is not only derived from the sugar beet and sugar cane, but also from sorghum and the sugar maple. Many of the common vegetables and fruits, too, contain noticeable amounts. It is said to constitute, for example, at least half the solid portion of pineapples and of some roots such as carrots.

Starch is the form in which most plants store by far the greatest part of their carbohydrate material. It is found stored in seeds, roots, tubers, bulbs and sometimes the leaves and stalks of plants. Fully one-half to three-fourths of the solid portion of the ordinary cereal grains such as wheat, oats and rye, is composed of starch. At least three-fourths of the solids of mature potatoes is starch, but don't let that stop you from eating them even if you are overweight. Potatoes are at least seventy-five percent water so the three-

fourths starch content has little significance. Besides potatoes are highly valuable for their mineral and vitamin content.

Unripe fruits such as apples and bananas contain much starch, but as they ripen most of the starch is changed into the simpler sugars. On the other hand, young, tender corn or maize and peas contain sugar which is changed into starch as these seeds, which they really are, although we are not apt to think of them as such, ripen.

Glycogen serves much the same purpose in animals that starch plays in plants and it is therefore frequently called animal starch. It occurs in the lower as well as the higher animals, in all parts of the body, but especially in the liver which serves as a storehouse for glycogen.

The carbohydrates constitute the largest portion of our food because they are the most economical source of energy. They contain a large percentage of carbon (hence carbo-hydrates) which unites readily with oxygen, forming carbon dioxide among other elements in burning.

In the process of digestion the more complex forms of starches and sugars are broken down into the simplest form—glucose.

It is this glucose which is the fuel of the body. However, it is not used in the body exactly in this form. After it has been absorbed into the blood stream from the intestines, nearly all the glucose is carried to the liver. Here it is converted into glycogen or animal starch of which we spoke of before. Then, when any of the body tissues, the muscles, for example, need energy, the liver sends out the glycogen which it has stored.

In the muscles the glycogen is changed back into glucose, and then burned. Some glycogen, you will recall, can be stored in the muscles themselves.

In addition to serving as fuel, carbohydrates may form fatty tissue. Evidence of this is given by overweight persons who all too freely partake of candy, cereals, bread and cake and other foods rich in carbohydrates.

Fats are liberally distributed in nature and are found in both the animal and vegetable foods. They are in milk, cream, butter, whole-milk cheeses, egg yolk, nuts, and vegetable oils such as olive, peanut, cottonseed and corn oils. The fatty portions of meat and fish, of course, are largely composed of fat.

After the fat has been digested, the end-products are absorbed into the lymph vessels and then are eventually emptied into the blood stream. After a fat-rich meal tiny particles of fat may be seen in the blood.

The blood stream carries the fat to the tissues of the body. There, if necessary, it may be burned at once as energy. The same amount of fat gives forth more than twice as much energy as an equal amount of carbohydrate. However, it is not as economical for this purpose as the carbohydrate foods, and is only burned when the supply of the latter is not sufficient.

If the fat is not needed at once for energy, some of it may be converted into glycogen and stored for future use, but far the greater portion is transformed into fatty tissue and deposited about the internal organs or under the skin. These fat deposits not only act as a reserve fuel supply, but they protect the organs and hold them in place. In this way the organs

can perform their functions to the best advantage and without strain. This is particularly true of the abdominal organs—the kidneys, the intestines and the other organs are largely held in place by fatty tissue. If you need any proof of the importance of this function, just contrast the jolly disposition and good digestion of the fat man with the miserableness of the thin, nervous, highly irritable man who frequently is suffering from indigestion and sagging abdominal organs.

Fat also acts as a buffer against external jarring and injury of the organs, particularly the nerve centers. Here again is a reason for the proverbial good nature of the fat man. His large nerve centers are protected from mechanical irritation with fat.

Fat offers still another service to the nerves. Some of it enters into combination with the proteins, phosphorus and other substances to form complex compounds which are used to build nerve tissue.

The temperature of the body, as you know, is pretty constant unless one is ill. Fat tissue helps to maintain this constant temperature. It is a poor conductor of heat, and so acts as an insulator, preventing the loss of heat from the body in cold weather and preventing the rise of body temperature when the temperature of the surrounding atmosphere is above normal body temperature. You doubtlessly remember the days when your mother piled heavy, fatty foods into you when you had to brave a blizzard to get to school. She probably didn't think of fat as an insulator, but she knew that fat was heating and "stuck to your ribs".

This brings us to the last and yet one of the most important services that fat renders us, a service that every good cook knows, whether she prefer the butter

of the French, the olive oil of the Italians or the lard of the Germans. Fat both imparts flavor to and brings out or intensifies the flavor of our food. It gives pastry its delectable, tender flakiness; it imparts that delicate, fine texture to cake that makes it impossible to resist a second helping; and to everything fried or baked, it gives a crispy, golden brown crust that is a delight to the eye as well as the palate. Indeed, it is no exaggeration to say that fat is the basis of all palatable cooking. And palatability is all-essential to good digestion, as we shall soon see.

Thus we see that a certain amount of fat is absolutely necessary for good health. An excess of fat in the body, to be sure, carries serious disadvantages, but a normal amount of fatty tissue is a great safety factor. The person who is a *little* above what is considered his normal weight usually has a more stable nervous system and is less susceptible to infectious diseases than one who is underweight. Therefore the absurd reducing craze, which, fortunately, seems to be on the wane, is to be lamented. It has been responsible for a great deal of ill-health and unhappiness. The movies have been largely responsible for the craze, for our favorite stars appear to be so "willowy". This is largely a trick of photography and skillful dressing. If you don't believe it, the next time you go to the movies, carefully observe the anatomy of the actors. I'm willing to wager that even among the most sylph-like heroines, you won't see a row of buttons down her spine, or a Venetian-blind effect across her chest. A layer of fat is as necessary for beauty as for health; it is fat that gives the beautiful rounded contours and the soft, smooth, youthful skin.

Minerals

In addition to the elements derived from the proteins, carbohydrates and fats, the body is composed of mineral elements. The bones, for example, are made up of calcium and phosphorus. The brain, too, has a large amount of phosphorus. The blood contains iron and copper and the thyroid gland, iodine. All the tissues contain common salt which is known scientifically as sodium chloride.

Just like the other elements, these are constantly being broken down and excreted. Naturally they must be replaced. Therefore our food must contain them in appreciable amounts. This is imperative not only because they are needed for the building of bone, brain, blood and other tissue, but because they are necessary for other functions. They influence the irritability of the muscles, that is their power to react to stimuli. They also influence the acidity or alkalinity of the digestive juices, and maintain the neutrality of the body tissues—the acid-alkali balance to which we alluded when discussing the proteins.

Usually our diet contains enough of these elements for all purposes. Sometimes, however, as in the case of iodine in regions such as Switzerland where iodine is scarce in the water and soil, they are insufficient and cause serious bodily disturbances. The lack of iodine, for example, causes the simple goiter.

Most of our sodium chloride comes from the common table salt which we add to our food to make it more palatable, usually not realizing that our desire for it has a physiological foundation. It is particularly needed when doing severe muscular work or living in

a hot climate. This is because a large amount of the body's supply of salt is given off in perspiration. English miners may lose a gallon of perspiration containing a quarter of a pound of salt during a day's work. They know from experience that they must eat raw salt as well as drink abundant water if they wish to feel comfortable. Most of them, however, prefer to take their supply of water and salt in form of beer and ale and usually rush off to a pub as soon as their work is finished.

Babies and growing children need more calcium than adults, but it is always needed. Foods vary considerably in their calcium content, although most vegetables contain calcium. The best source of calcium, however, is milk, and of course, cheese. The table of food values gives the amount of calcium, as well as the other minerals, in our common foods.

Phosphorus is very widely distributed in the normally healthy body. Indeed, it forms a part of the nuclei of the cells and is present in the bones and nervous system. It is found in such foods as egg-yolk, brain, lean beef, cheese, wheat, oatmeal, dried beans and nuts.

It is estimated that there is only about three grams of iron in the average adult and by far the largest part of it is in the hemoglobin of the blood. As small as this amount is, it is imperative that it be maintained because there is no reserve of iron in the body as there is a reserve of calcium in our bones. It is found in appreciable amounts in egg-yolk, dried beans, peas, oatmeal, wheat, prunes and many other common foods.

Iodine is found in every part of the body, but most

of it—65 per cent, to be exact—is found in the secretion of the thyroid gland. The amount of iodine in water and food varies, we said, from region to region. When the water is poor in iodine, it naturally is reflected in the food which was nourished by that water. This deficiency results in the enlargement of the thyroid gland. This is probably a compensation on the part of the gland, an effort to increase the number of cells that it may have enough cells to extract every bit of iodine from the food.

Iodine is found in grains such as wheat, oats, corn, barley, in carrots, salmon and in a highly nutritious food not eaten very much in this country—goat's milk.

Water

Contrary to most person's belief, the amount of water in the tissues proper of the body remains quite constant. Moreover, any deviation from the total amount, no matter how slight, is very serious and may result in death if the condition is not remedied.

We all know stories of the agonies of men lost on a desert when their water supply has given out. We have seen them depicted in the movies, too, dying a slow, tortuous death. Such exhaustion and death is due principally to the decrease in the water content of the tissues. While occasionally we hear fantastic tales of persons who have gone nearly three weeks without water, ordinarily a man cannot survive more than three days at the most without water.

To increase the amount of water in the tissues, you will recall, is almost impossible. Observe that we say, *in the tissues*, and not in the body, which is an entirely different matter. The total amount of water that enters

the body through the alimentary canal has nothing to do with the amount within the tissues. Whatever water is not needed by the tissues is either immediately cast off in the kidneys or is cast off by the skin or in respiration. Tissue water is not concerned with this excess water in the blood or excretory organs.

The amount of water we need depends upon a number of factors—physical activity, external temperature, the amount of perspiration given off and the depletion of the tissue water by salty foods and saline cathartics. If you have ever tried to shake salt from a salt cellar on a damp summer's day you know what a great attraction salt has to water.

Ordinarily it is not necessary to pay much heed to the tissues' need for water as this need is most delicately regulated by the sensation of thirst. Thirst is the best indicator that Nature has given us of the water content of our tissues. And it is a far more reliable indicator than hunger is for food. Hunger pangs soon pass away in an adult, leaving only disagreeable sensations scarcely recognized as originating in the body's need for food. On the other hand, thirst becomes ever more persistent and uncomfortable, and is always recognized as a need for water.

We have three sources of water. All our foods contain water in a greater or less amount. Cucumbers, for example, contain about 95 per cent water and meat is about half water. The oxidation of food material for energy produces some water. But our greatest source is from beverages, and first and foremost among them is water itself.

Climate is an important factor, you will recall, in determining the daily intake of water. In a temperate

climate the average adult consumes from one and one-half to three quarts of water daily. Or to put it in terms of the usual way of drinking water itself—from six to twelve full glasses a day. In the tropics, or working under conditions similar to the English miners we mentioned, this amount may go up to thirteen or fourteen quarts a day.

The question of drinking water with meals and the influence of water on digestion has not been settled as yet. Some people drink a great deal of water with their meals without any apparent ill effect and others, equally healthy, drink very little. Europeans drink very little water if at all, with their meals, but their food is inclined to be moister than much of ours, and besides, they do drink plenty of wine and beer. Here in America observation seems to point to the fact that the majority drink water with their meals, or perhaps coffee or tea; and the minority shun water at such times as if it were a poison and look upon water drinkers as dissipators who will justly come to an early end.

Much of this attitude is due to a misconception of the fate of water in the alimentary canal. Water leaves the stomach almost immediately upon entering it. It goes in the upper end and out the lower almost as if it were running down a trough. The stomach may be empty or it may be full—no matter what its condition this rapid emptying of water takes place. And, moreover, when the stomach has food in it, the other foods do not leave it with the water. In other words, the water has no influence on the passage of food from the stomach to the intestines.

Therefore, it would seem that water has no influence

upon the rate or completeness of digestion. Such is the case: experiments by eminent scientists on digestion have proved that water has no influence.

When one stops to think of the meals which non-water drinkers consume, the inconsistency of their arguments that water hinders digestion by diluting the digestive juices, that it hastens the food through the stomach and out through the intestines, etc. is evident. An advocate of waterless meals will probably preach against the evils of water with meals while eating a bowl of soup which he follows with a meat course with plenty of gravy and tender vegetables floating in their own juice and tops off with a dish of ice cream. All of these foods contain a large amount of water and your stomach certainly isn't going to say to itself, "Ah-ha! This water surely comes from a glass that held nothing else. I refuse to work under such circumstances. Come, all you other members of the Alimentary Union, we are going to strike for only soup and gravy water."

No, indeed! The stomach continues to work, water or no water, and in all probability will work all the better for a little drink.

In addition to supplying the tissues with their quota of water, water helps the absorption of foods after they have been digested. It also helps to keep the bowels toned and the feces soft, thereby rendering evacuation easier. Many mildly constipated persons find that drinking one or two glasses of water upon rising helps to remedy the condition.

Water also helps the kidneys to eliminate the excess nitrogen in the body.

Therefore, we believe that you can safely drink a

moderate amount with your meals, the amount depending upon the dryness of the food. But, of course, the water should never be used to actually wash down the food that has not been thoroughly masticated, and moreover, it should not be iced.

Calories

In the course of our discussion on food, we have pointed out the necessity of eating a certain amount of each element. It is only in this way that you can achieve a "balanced diet", that is, a diet that meets all the requirements of the body.

A balanced diet is one that (a) furnishes enough energy to keep the various functions of the body going, (b) that furnishes material for the building and repair of tissue, (c) that furnishes enough water, (d) that furnishes enough mineral matter, (e) that furnishes vitamins, (f) that furnishes sufficient bulk and (g) that helps to maintain the acid-base balance of the body by furnishing the right amount of alkali-ash and acid ash.

From what we have said on the food elements, it is obvious that the body does not require an equal amount of the different food substances. It is also clear that a growing child needs a larger amount of tissue-building foods than an adult and that a laboring man needs more energy-producing foods than a man working in an office.

Thus it would seem that individually we could arrive at a diet, with a little experimenting, perhaps, that would meet the demands of our own particular systems. Such is not the case, however. If it were, there would be no overweight persons, no underweight

ones, no easily-fatigued ones and a much smaller number of cases of diseases due to malnutrition.

Fortunately, we now can scientifically calculate the amount of each food element necessary to maintain the body in good health at all ages and in every environment.

Now, no matter how varied the functions or activities of the different cells, they all use up energy. And this consumption of energy is constantly going on, simultaneously with the other functions, including the building and repair of tissues. Indeed energy is needed just as much for tissue building as it is for external and internal work. In the introductory chapter of this book, you will recall, we said that Energy is the basic principle of Life.

What could be more logical, then, than to measure the body's requirement of protein, carbohydrate and fat than by the amount of energy these elements can produce when burned with oxygen? This is exactly how we do determine the amount of food needed.

Now in the creation of energy, heat is given off and it is the amount of heat given off which gives us the measurement of the energy consumed. The unit of measurement is called the calorie. A calorie is the amount of heat required to raise one gram of water one degree centigrade. In measuring the heat-energy of the body the large calorie is used—that is, the amount of heat required to raise the temperature of one kilogram of water one degree centigrade, or one pound of water four degrees Fahrenheit.

The different food elements yield each its own number of calories when burned with oxygen. The number of calories is slightly less than the number yielded in

a laboratory test because there is some loss through digestion, incomplete combustion and other factors. So, for all practical purposes we can calculate that:

Protein	yields 4 Calories per gram
Carbohydrate	yields 4 Calories per gram
Fat	yields 9 Calories per gram

The number of calories a body needs a day varies with age, sex, activity and weight. All these factors affect what we know as metabolism. Metabolism is a general term used to cover all the physical and chemical activities of the body. Energy metabolism—the kind of metabolism we are now concerned with—refers to those chemical changes which take place when energy substances are burned in the body.

More calories are required by younger people than by old, more by larger than small, more by men than women (although the rate of metabolism is greater for women) and more by physically active persons than those leading sedentary lives. It is estimated that the average sized man uses up about 1700 calories when he sleeps, and the average sized woman, 1400 calories. Work done sitting increases the man's consumption of calories to between 2200 and 2800; a woman's between 1800 and 2200 calories a day. In moderate exercise a man consumes between 2700 and 3000 calories a day, and a woman, between 2200 and 2500 calories. In work requiring great muscular exertion a man may use up between 4000 and 6000 calories.

Generally speaking, we may say that man requires about 2800 to 3000 calories a day and a woman about 2200 to 2500 calories, this amount varying, of course, with the output of work, and with size and age.

That the number of calories should be apportioned among the three food elements—protein, fats and carbohydrates—is evident from what we said of the other uses these foods are put to in the body, as well as the processes which finally lead to their burning. No fast rule can be made as to the amount of each food consumed. It depends upon the amount of energy expended, the climate, one's digestive powers and many other factors.

The largest number of calories, of course, should be taken in the form of carbohydrates since they are the most economical form of energy. About 60 to 70 per cent of the calories should be in the form of carbohydrates.

Most of us eat too much protein, the average American diet being composed of almost as much protein as carbohydrate. Protein, you will recall, cannot be stored in the body, but the excess must be burned and the nitrogen excreted by the kidneys. This, of course, is done at great expense to the body. Too much protein may also upset the acid-alkali balance of the body, and in addition, frequently causes putrefaction of the intestinal contents. Therefore proteins should compose only 10 to 15 per cent of the diet of an adult in average health.

Fat may compose 15 to 20 per cent of the caloric intake, and except under normal circumstances it is not wise to consume more than this amount, for as necessary as fat is, in excessive amounts it is exceedingly disadvantageous. Too much fat leads to overweight—and it is much more difficult to get rid of those extra pounds than it is to put them on. Fat takes a longer time to digest than either proteins or carbo-

hydrates. Thus it naturally causes a slowing down of the emptying of the stomach and the digestion of other foods. This sometimes is of advantage as it insures more complete digestion and staves off hunger pangs. Frequently, however, it may cause indigestion. Moreover, foods heavily coated or permeated with fat may escape digestion and ferment or putrefy in the intestines. Few cooks have mastered the art of frying foods that will be digestible. All too often the fat is heated to such a high temperature that a substance is formed that is irritating to the lining of the digestive tract. It is this irritating substance formed when a fat is overheated that causes most of the cases of indigestion from fried foods, and not the fat itself.

It should be remembered, too, that fat is lacking in minerals, fiber that gives the necessary bulk to the feces, and in most of the vitamins. Therefore, if an excessive amount is eaten you are more than likely depriving your system of these elements so necessary for life and health.

The minerals do not give forth heat and energy and therefore the body's need of them is not measured in calories, but simply by weight, usually in grams or milligrams, and the daily requirement is determined by the amount excreted. Of course the amount varies with many factors. For example a growing child needs more calcium than an adult and a person who is "sensibly" perspiring more than one whose perspiration is not visible.

It is estimated that the average person requires about 5 grams of salt a day, one-half gram calcium, about one and one-half grams of phosphorus, between 6 and 16 milligrams of iron and .00014 milligrams of

iodine. Taking them as a whole, and using 100 parts of carbohydrates as a basis of calculation, we require about six parts of mineral matter.

However, there is little need to worry about the mineral matter, provided you are in average good health and are eating a well-balanced diet as far as the other elements are concerned. You're then bound to get your quota of minerals.

But remember this—no matter how careful you are about your diet, no matter how fresh the food you eat, no matter how carefully you prepare it, if your intestinal tract is not regularly cleaned of clogging, poisonous waste, you will not get the full value of your food. It will not be properly digested and assimilated and as a result your whole system—not only your digestive tract, will function poorly.

Animal or Vegetable?

Human nature isn't happy without fads. Fads are after all nothing but glorified hobbies and everybody now and then likes to ride a hobby. In the beginning of the century it was the fad for women to be plump; during and immediately after the war, thin and without any suggestion of anatomy; now anatomy is very much in evidence but the too-plump silhouette is taboo. A few years ago calories were the talk of the town, but of late they have been supplanted by vitamins.

Vegetarianism is a fad that regularly sweeps the country—indeed, so strong was it a few years ago that one of the largest restaurant chains in America ventured to go vegetarian. But in spite of the variety of dishes offered, the reasonableness of price and the

beautifully printed arguments on behalf of vegetarianism placed at each table, patronage dwindled down to such an extent that meat once more appeared on the menus. Which all goes to prove that while we might try anything once, we are at heart flesh-eaters.

With those of you whose religion forbids the eating of meat and for those of you who find that meat "disagrees" with you, we are not concerned, but to you enjoying average health and whose religion permits meat eating, we should like to say that it is our own conscientious conviction that the true solution of the question of the source of food is to be found in the happy medium. A mixed diet, that is, one of both animal and vegetable food is the best for mankind under existing conditions.

Meat is a most palatable form of protein. It insures meals against monotony, and monotony can be just as harmful as an unbalanced meal. We shall see later that palatability is an important factor in good digestion and general well-being. Moreover extractives of meat in the form of soups have a soothing, relaxing effect on the digestive system and tend to promote the flow of digestive juices. Certain kinds of meat, such as liver, have a value greater than their mere caloric value in their content of iron, copper, vitamins and other accessory food factors. Liver contains a substance which stimulates and regulates blood formation in the marrow of the bones and is therefore a specific cure for pernicious anemia. Generally speaking, too, the protein of meat is easier to digest than vegetable protein. Therefore we believe—and we feel sure that you agree—that meat is a most wholesome form of food. The only objection to it can be found

in its excess consumption, for the reasons given before. But the same objections hold true for an excessive amount of *vegetable* protein. Protein in the correct amount is absolutely essential for life and health. Indeed, you will recall that men can live on a diet consisting wholly of protein, but not one consisting wholly of fats or carbohydrates.

We feel sure that you must be convinced that a diet containing some meat is the better one, but to be on the safe side, let us examine the arguments of our vegetarian faddists.

The main argument against flesh-eating is the humanitarian one. You are familiar with all the objections—the brutalizing effect upon the human mind of so much ruthless bloodshed—of the sacredness of life, and of man's presumption in daring to deprive a living creature of existence. But with all due respect to the sensibilities of these worthy people, we are inclined to think that the argument is scarcely tenable.

First of all, at least in this country, the animals are well taken care of during their existence—far better than many human beings. Their death is immediate and therefore practically painless—which is more than can be said of most humans' death.

In the second place, the taking of life is inseparable from existence. It is simply a question of degree. There is a sect in India, the members of which are so scrupulous regarding the sanctity of life that they carefully brush every step of the path in front of them, lest they should inadvertently step upon any creeping thing. In doing this they lift the burden of responsibility from themselves for any wanton injury; but the

microscope has shown us that there is a countless world of infinitesimal life all around us, and that it is practically impossible to draw a breath, or drink a mouthful of water, without destroying some living thing. Knowing this, and still persisting in the avoidance of flesh foods, vegetarians are inconsistent, to put it mildly.

Their inconsistency is evidenced in other directions, too. Many a vegetarian will solemnly lecture you on the brutality of killing animals for foods, all the while wearing shoes made of leather, keeping his money in a leather wallet, holding his trousers up with a leather belt, and sitting on a leather-covered chair. We'd be willing to wager, too, that he wouldn't hesitate an instant to grab the leather hanger if he were standing in a speedy street car or bus that suddenly swerved around a corner. Surely, on a basis of humanitarianism, using animals as food is far more justifiable than using them for easily substituted articles of apparel and furniture.

The purely health angle has already been discussed, so that there is no need here to refute the arguments of the vegetarians. But it should be pointed out that here again they reveal an inconsistency. It would be difficult indeed to find a vegetarian so-called who did not drink milk or eat butter, cheese, eggs or dishes which contained them. Milk and eggs are just as much *animal* foods as pork, beef and lamb; and eggs, it will be recalled, are our purest form of food protein. If milk, milk products and eggs may be eaten there surely is no reason why the diet cannot be varied by the flesh of animals that produce them.

Coffee, Tea, Cocoa and Alcohol

Probably all your life you have been lectured on the evils of these beverages and unless you have personally experienced the harm they may have wrought, you have dismissed the subject with a shrug and kept on drinking your coffee, tea or whatever be your favorite beverage.

Leaving aside the question of their effects on the morals of the nation—we make no claim to be moralists—and considering the subject in the light of science, we may sum up the status of the problem as follows: Human beings would be far better off without tea, coffee, cocoa, chocolate and alcohol as they all may have serious effect upon the system; however, our lives are so conditioned that we frequently welcome the friendly stimulation of these beverages. It is more than likely therefore that we shall have them with us as long as we inhabit this earth.

Physiologists, chemists and other scientists have been—and still are—studying the effect of these so-called stimulants (coffee, tea and cocoa), both in the laboratory and on human beings. The results are most contradictory, but there are certain facts that are acknowledged as true by both the pros and cons. None of these beverages—with the possible exception of cocoa because it has a high caloric value, should be given to children. None of them have a permanent good effect, granted that they may be temporarily beneficial. And none of them, with the exception of cocoa (and chocolate) have any real food value.

It would be impossible to give the argument for and against this group of beverages—to do so would fill

volumes, so we shall have to content ourselves with a brief view of their general effect.

Coffee, tea, cocoa and chocolate have much the same action. They act by increasing the strength of the heart beat, and the output of the heart and by increasing the circulation, particularly in the brain and kidneys. The improved circulation in the brain is probably the cause of the wakefulness and intellectual activity that they produce. When taken in moderate amounts by adults, they probably do some good in improving the circulation through the heart and other vital organs. It is easy to see, however, that if the imbiber had a weak heart or kidneys or suffered from an impaired circulatory system or unstable nerves, these beverages could only be harmful.

In addition to the stimulating drug element, tea, and to a less extent, coffee, contain tannin, a powerful astringent which is strongly provocative of constipation. Its action upon the mucous surface of the stomach may be highly detrimental to that organ, as it arrests the excretion of the gastric juice by its contractile effect upon the glands. Constant, immoderate use of tea and coffee will almost invariably result in digestive disturbances, and will certainly aggravate such troubles, if previously existing.

The vast majority of you who are reading this book have seen "Prohibition" come and go and are interested bystanders or participants in the effect of "Repeal". You have listened to and given arguments on every phase of the alcohol problem—physiological, moral, sociological and economical. You have read or heard of statistics and experiments proving that alcohol increases mortality, that it decreases mental and

physical efficiency, etc.; or, on the other hand, that alcohol, provided it is taken in moderation, does no harm and moreover, that moderate drinkers are more likely to live longer than total abstainers or heavy drinkers. As a result you have either become very skeptical or so confused that you don't know what to think.

We would like to explain to you why there is so much contradictory evidence and to discuss in detail some of the most outstanding arguments of each side. We shall have to forego the pleasure, however, for to do so would fill volumes and volumes.

We have, nevertheless, made a thorough study of the question and have come to the conclusion that the human race would be far better off without alcohol in any form or any amount whatsoever. We should like to stop with this statement, but in all fairness we believe that a few, generally recognized facts should be pointed out.

Unlike coffee and tea when taken in their pure form, alcohol has a fuel value and therefore may be considered a food. It yields 7 calories per gram which is more than proteins or carbohydrates and a little less than fat. Since it is burned in the body as soon as it is absorbed, it serves as a protein-sparer, just as carbohydrates and fats do. Because of its energy value and its protein-sparing action, doctors have sometimes found it advisable to prescribe it in certain forms of serious illness.

But it must be remembered that alcohol cannot build or repair tissues and contains no vitamins or minerals. Therefore it can never serve as a substitute for food. We are, of course, referring to alcohol alone. Malt

beverages have a food value almost equal to that of milk and contain valuable mineral salts. Some of the other alcoholic beverages may have a food value beyond that of the alcohol itself, but in such negligible quantities that they could not possibly be considered real foods.

When taken in moderate quantities alcoholic beverages stimulate the flow of gastric juice, thus arousing the appetite and promoting good digestion. Hence for those who are used to it and are connoisseurs, they considerably heighten the enjoyment of a meal. Few people in this country, however, know how or what to drink, so that if they do try it, the result is only harm.

Alcohol is not a stimulant, as most people believe, it is just the opposite—a depressant. Whatever "stimulation" a person may feel at the outset of drinking is false. It is merely an impression, caused by the fact that alcohol breaks down inhibitions. The warm glow that it seems to send over the body is due to the fact that the blood vessels are relaxed or dilated thereby permitting the blood to flow through them freely, radiating heat. There may be times when it might seem wise to take advantage of these properties of alcohol, particularly since it requires no digestion, but under ordinary circumstances there is no need, and possibly harm to take advantage of them.

So much for the benefits derived from alcohol. In comparison with its evils, they seem quite insignificant. Experiments and statistics reveal that alcohol temporarily impairs memory, decreases both mental and physical efficiency and lowers resistance to disease. It has a marked effect on bodily functions, especially

those of the circulatory and nervous systems. It increases the pulse rate, but not the force of the heart beat; and since it is a depressant, it lowers the blood pressure.

It frequently seems to increase the speed of physical and mental performance, but since it reduces accuracy and uniformity or regularity, in the long run work of any kind is the poorer for it. The impression that a drinker frequently has that he has performed a task unusually well and better than he would without the aid of alcohol is entirely a delusion due to the fact that in proportion that his judgment and perspective are disturbed, his self-satisfaction is increased.

Probably the greatest harm in alcohol is its habit-forming powers, and the insidious manner in which it lays hold its victims. As the drinker becomes accustomed to the alcohol, a larger and larger quantity is necessary to produce the desired effect. The aftermath of the larger quantities is naturally worse—headache, burning stomach, dry mouth, loss of appetite, racing heart, tremors, mental depression and all the other "hangover" effects become so unbearable that the unfortunate victim resorts to more drinking to temporarily mask the effects. A vicious circle is set up which is almost impossible to break. There is no need to dwell upon ultimate damage done to body and soul —you all, we are sure, have known victims of alcohol.

And so we come back to our former statement: the human race would be better off without coffee, tea cocoa, chocolate and alcohol; there are times, however, when their agreeable, if temporary effect, is almost welcome. And since they are here on earth, what is needed is not prohibition, but intelligent en-

lightenment as to their effects when taken in varying amounts and under varying circumstances.

To say that they are dangerous when taken in moderate amount by healthy persons would be an exaggeration. Evidence against such a statement may be found in the tea-drinking Russians, the wine drinking French peasants, the coffee-drinking Swedes. Surely no one would deny the vigor and vitality of these peoples. Equally untrue it would be to deny that in excessive quantities the beverages are dangerous. And the danger can only be avoided if you know the how, when and why of drinking.

In addition to intelligent enlightenment, better standards of hygiene are necessary. It is our firm conviction that if you get plenty of sleep, fresh air, exercise, sunshine, well-balanced and appetizing meals, and above all if you keep your intestines cleaned of the poisonous wastes which sap your vitality, you will find that the coffee, tea or alcohol which was once an apparent necessity has become a pleasant luxury, only indulged in occasionally or if regularly, in moderate quantities, not as a stimulant or narcotic but as an adjunct of agreeable taste and aroma to your meal.