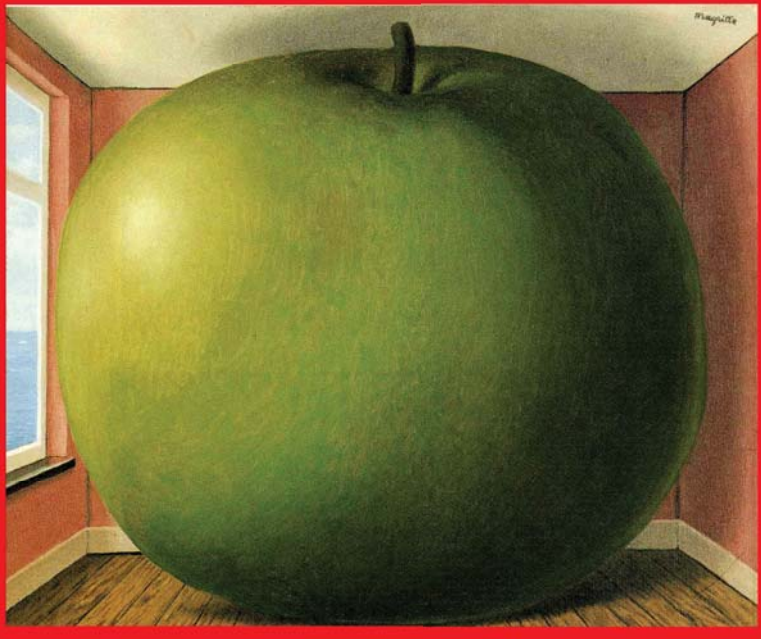
NUTRITION



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In our bodies and therefore in our foods there should be at least nineteen inorganic elements. The elements already isolated or recognized are: calcium, phosphorus, potassium, sulphur, chlorine, sodium, magnesium, iron, manganese, iodine, cobalt, silicon, aluminum, arsenic, boron, copper, fluorine, nickel, and zinc. The last nine are present only in traces or mere traces. A complete and perfect diet must contain adequate amounts of all of these nineteen inorganic materials. It must also contain all the known and unknown vitamins.

The foods we eat contain, besides the nineteen minerals and a number of known and unknown vitamins, to be discussed later, the following chemical substances: proteins, fats, carbohydrates (these latter consisting of sugars, starch, and cellulose), extractives and flavoring matter, and finally water. Not all proteins are the same, and this can also be said with respect to fats and carbohydrates. Caseinogen, albumin, gelatin, and gluten are all proteins, but each has a different molecular structure.

The fats of various animal and plant foods are different because of the nature of the fatty acids present in them. All fats have glycerin as a part of their molecular structure. A fat is composed of glycerin and acids, called fatty acids. There may be one, two, three, or more fatty acids combined chemically with glycerin to form a fat. Some samples of fatty acids are: oleic acid in olive oil; butyric acid in butter; caprylic acid in vegetable margarine; palmitic and stearic acids in mutton fat.

The carbohydrates are composed of three elements, namely carbon, hydrogen, and oxygen. The carbohydrates must all be changed by digestion into sugar, into monosaccharides, if not already in such a form, before they can be of use to the body. There are three single or simple sugars, all monosaccharides, into which all double sugars or disaccharides are converted. These three simple sugars are glucose, fructose, and galactose. Two monosaccharides united chemically make up a disaccharide, a double sugar. We have already said that a double sugar, a disaccharide, cannot be used by the body as such. It must be changed. Cane sugar, also called sucrose, is a disaccharide. Malt sugar, also called maltose, is likewise a disaccharide. Milk sugar, or lactose, is another example.

And then we have polysaccharides, these being composed of many monosaccharides all chemically linked together. Starch, glycogen, and dextrin are polysaccharides and are made up of many monosaccharides. There are more than twenty monosaccharides in starch. Of the monosaccharides, glucose and fructose are found free in nature. Galactose is not found free. Glucose is found in fruit, in vegetables, and in honey; fructose, in most fruits and also in honey. Cane sugar, a disaccharide, is found in the sugar cane, the sugar beet, in some vegetables, and in most fruits.

Starch is present in all the cereals, in peas and beans, in potatoes, and so forth. Dextrins are formed from starch containing foods as the result of strong dry heat, or the action of some digestive ferment. We find dextrin in the crusts of bread or cakes and in certain breakfast foods. Glycogen is a carbohydrate, a polysaccharide of animal origin, and is found in liver, in certain fish, and in muscles or lean meat. Besides the digestible or available carbohydrates to which we have just referred, there are also in many cereals, fruits, vegetables, and pulses, indigestible or unavailable carbohydrates, such as cellulose and pectin. These indigestible, unavailable carbohydrates serve as roughage in the bowel and stimulate bowel movements. However, in an individual who possesses a spastic, irritable colon, too much roughage can be harmful.

The fuel value of fat in the body is 9.3 calories per gramme; the fuel value of both protein and carbohydrates is 4.1 per gramme. Thus it will be seen that fat has more than double the fuel value of either carbohydrate or protein. We require all three types of food, proteins, fats, and carbohydrates. The amounts we require will depend on many factors: (1) on age; (2) on sex; (3) on the work, the amount and kind of work that one does. A child of one year will require about 600 calories per day; at six years 1500; at ten years 2000 or slightly more. A girl at fourteen to sixteen needs about 2500 calories; while a boy of the same age requires 3000. An adult male requires almost one-quarter more than an adult female. Girls from fourteen years and up require as many calories as an adult woman. Boys from fourteen years and up need as many calories as an adult male. Active or very active boys and girls between the ages of fourteen and twenty probably require even more food than most adult men and women.

It will be readily appreciated that a person doing little or no muscular work will require many less calories than one who is engaged during the day as a woodcutter or as a stonemason. A young man on the college football team may require from 5000 to 6000 calories per day; while a tailor might be well fed and satisfied on 2500 to 3000. Should the work one is engaged in be strenuous enough, an intake of 8000 to 9000 calories might be necessary. The average man's intake is 3000 calories. The average woman's intake is 2500 calories. These are approximate figures.

Growth and repair of the body need the presence of proteins in the food. Life is impossible without protein. Protoplasm, the physical basis of life, is largely made up of protein. Plants are able to build up or synthesize protein; animals, including man, cannot do this. They therefore must eat the plants or other animals, who already have preyed upon plants to obtain their protein. Proteins possess large molecules and these molecules are composed of units called amino acids. That is to say units of amino acids united chemically form a protein. An amino acid is not a protein, but a number of them united together is. There may be from two hundred to four hundred or more amino acids in a given protein. One protein will differ from another protein according to the number or order and arrangement of its amino acids. Proteins must be digested or broken down into their amino acids before they can be absorbed into the body as food.

All proteins are not of equal value to the human body. Certain amino acids are indispensable and all proteins have not all these essential acids present. The human body has the power to manufacture or synthesize some of the required amino acids, but to do this, certain amino acids must be present, and this necessitates certain kinds of proteins in which these indispensable amino acids are present. The body cannot build up every kind of amino acid required. Milk and egg proteins probably head the list with respect to value as body builders and repairers of worn-out tissues. Meat and fish follow. Next in order comes the protein of cereals, followed by that of peas and beans, and finally by nut proteins.

There should be some food with first-class proteins, or proteins of the highest biological value, in the diet every day. These can be used immediately and directly for bodybuilding with a minimum of expenditure of chemical energy, and further they are used to complete and enhance the biological value of second-class proteins. The proteins that should be eaten every day include milk, eggs, meat, fish, and cheese. All these are first-class proteins and of the highest biological value.

An adult male needs from 80 to 100 grammes of protein per day. From one-third to a half of this amount should be derived from the proteins of the highest biological value already mentioned. An adult female, requiring somewhat less than a male, would need 60 to 70 grammes of protein per day and of this amount at least one-third to a half should be in the form of first-class proteins. In some types of acute and chronic nephritis, the protein intake is restricted. If all the protein in the diet was of the first and highest class variety, the total intake could be lower, without causing harm. Poor people are apt to eat too great a proportion of second-class proteins. The middle classes usually consume balanced amounts of each.

Altogether proteins should supply ten to twelve percent of the total calories in the diet, and half of this amount, or five to six percent, should be in the form of first-class proteins. Boys and girls at the age of puberty require slightly more protein than immediately before or directly after this period in their lives. They require more protein than an adult. Infants and children up to the age of five years require more grammes of protein per kilogram of body weight than does a boy or girl at puberty or an adult male or female. Boys and girls who are properly and adequately fed will be several inches taller and many pounds heavier than an equal number of children of similar ages who have received a poorly balanced and inadequate diet.

If carbohydrates are omitted from the diet, and only proteins and fats are eaten, then not only is the total nitrogen of the protein consumed excreted but a portion of the body's nitrogen as well; this nitrogen deficit comes from the protein of the muscles. Unless protein is consumed along with carbohydrate in the diet, it is of no use in repairing the wear and tear of body protein. Proteins should be taken

in small or moderate amounts throughout the day—some with every meal, and with adequate amounts of carbohydrates at the same meal.

There is, however, little or no danger of a healthy, normal individual eating too much protein. The Eskimos thrive on a diet in which the proteins predominate. There is no evidence or proof whatsoever that a high protein diet predisposes to cancer. In the days of the caveman and during his later nomadic existence, the diet was largely protein. Cancer is on the increase today, with a mere fraction of protein consumed as compared with those much earlier times in man's history.

In choosing food for its protein content one should know that protein is found more or less in most foods, whether they be of animal, vegetable, fruit, or of nut origin. With the exception of some nuts, which have a high protein content, animal foods rank by far the highest in the percentage of protein, and animal proteins lead all others in their biological value, that is, in their ability to promote growth and repair the wear and tear of body tissues. Although nuts have a high protein content, they are not easily digestible and their protein ranks second to that of animal foods in the body's economy.

The daily requirement of protein is equal to or slightly more than one gramme of protein for each two and one-fifth pounds of body weight. This would necessitate 70 or more grammes of protein if one weighed one hundred and fifty-five pounds. Taking this amount then as a minimum requirement it would be altogether wise, desirable, and even necessary for the greatest measure of health to include about fifty percent of this amount from animal proteins, including milk, eggs, cheese, meat, and fish. It must be borne in mind, as was stated before, that carbohydrates are absolutely essential each day, along with proteins, otherwise all the protein taken is wasted.

It has already been stated that in our bodies there are at least nineteen minerals. Nine of these are either in trace or mere traces. Calcium, phosphorus, potassium, sulphur, chlorine, sodium, and magnesium are present in considerable quantity; calcium heads the list and is followed in order by the remaining six mentioned. The amount of any one mineral present will naturally depend on the size and weight

of the individual. The approximate, or even the exact quantity of the ten minerals present, in more than merely traces, is known, but it is not important to put down these quantities here. The amounts of those minerals occurring as traces have not, as far as we can learn, been measured. Certainly life would be impossible without many of these nineteen minerals, and our health and well-being may even be greatly influenced by the nine which are present in but traces.

All of these nineteen minerals must be taken into our bodies by way of our food. It perhaps is not important to know in what foods are found the mineral elements which are present in our bodies, in trace amounts. But it is important and vital that we should be familiar with the source of the first ten on the list.

These ten are: calcium, phosphorus, potassium, sulphur, chlorine, sodium, magnesium, iron, manganese, and iodine.

Foods rich in calcium are: beans, cheese, clams, egg yolk, figs, dried gelatin, ice cream, malted milk, maple syrup, milk, molasses, peas, canned salmon-bones, and green vegetables.

Foods rich in phosphorus are: beans, whole-grain cereals, cheese, dark chocolate, egg yolk, fish, gelatin, liver, malted milk, meats, milk nuts, peas, poultry, wheat germ, and dried yeast.

Foods rich in potassium are: bananas, beans, green cabbage, cereals, cocoa, endive, fish, dried fruits, honey, lettuce, limes, meats, melons, milk, molasses, nuts, olives, parsnips, peas, potatoes (both white and sweet), rutabagas, spinach, and turnips.

Foods rich in chlorine are: bacon, bread, cheese, corned beef, dates, eggs, canned fish, malted milk, canned meats, meat juices, molasses, salted foods, and sausages.

Foods rich in sodium are: lima beans, biscuits, bread, butter, carrots, cheese, clams, egg whites, endive, meat extracts, olives, oysters, raisins, spinach, water cress, wheat bran, and wheat germ.

Foods rich in sulphur are: bacon, dried beans, bran, bread, green cabbage, cauliflower, cereals, cheese, clams, cocoa, eggs, fish, macaroni,

meats, nuts, onions, oysters, peas, Brussels sprouts, Swiss chard, and water cress.

Foods rich in magnesium are: beans, dried cereals, chocolate, cocoa, dried fruits, molasses, nuts, dried peas, wheat bran, and wheat germ.

Foods rich in iron are: almonds, apricots, baked beans baked, whole-wheat bread, dark chocolate, cocoa, coconut, currants, dates, eggs, dried figs, heart, kidney, liver, molasses, Brazil nuts, oatmeal, parsley, peaches, peanuts, peas, prunes, raisins, canned sardines, and sausages.

Foods rich in iodine are: agar-agar, clams, crabmeat, eggs, fish roe, salt-water fish, Irish moss, leafy vegetables, lobster, mushrooms, mussels, fish-liver oil, oysters, salmon, and water cress.

Foods rich in manganese are: beans* (*especially lima and baked), beet tops, whole-grain cereals, cocoa, nuts, peas, fresh pineapple, and turnip tops.

Many foods contain one or more of the mineral elements, although no mention here has been made of them. Any food that one eats will add to the body some portion of one or more minerals, but if those foods listed here are eaten (those that are particularly rich in certain minerals), one will be assured of adequate amounts of each.

This chart has been prepared from the factual matter contained within the pages of this book. It is intended for your convenient reference. There are, of course, many foods other than those included in this list, which likewise contain various vitamins and inorganic elements. But this list is sufficient and representative of the foods used in the preparation of the ordinary daily meals.

Food	Vitamins						Ten of the Principal Mineral Elements of the Body									
	A	B Complex	C	D	E	K	Calcium	Phosphorus	Potassium	Sulphur	Chlorine	Sodium	Magnesium	Iron	Manganese	Iodine
Agar-Agar																X
Alfalfa Meal						X										
Almonds														X		
Apricots	X													X		
Bacon										X	X					
Bananas	X	X							X							
Beans		X			X		X	X	X	X			X		X	
Baked Beans														X	X	
Lima Beans												X			X	
Beets	X	X	X													
Beet Tops	X	X													X	
Corned Beef											X					
Biscuits												X				
Bran										X		X	X			
Bread										X	X	X				
Whole-Grain Bread		X												X		
Broccoli	X	X	X		X		X									X
Butter	X			X	X							X				
Raw Cabbage		X	X			X				X						
New Cabbage		X	X			X			X							
Cantaloupes	X		X													
Carrots	X	X										X				
Carrot Tops	X				X	X										
Cauliflower			X			X				X						
Whole-Grain Cereal	X	X			X			X	X	X			X		X	
Chard	X				X		X			X						X
Cheese	X	X					X	X		X	X	X				
Dark Chocolate								X					X	X		
Clams							X			X		X				X
Cocoa										X			X	X	X	
Coconut														X		
Corn		X														
Cream	X			X												
Crab Meat																X
Currants			X											X		
Black Currants			X											X		
Dates											X			X		
Eggs					X					X	X	X		X		X
Egg Yoks	X	X		X		X	X	X								
Endive	X								X							
Figs	X															
Dried Figs							X							X		
Roe Fish																X
Salt-Water Fish	X							X	X	X	X					X
Dried Fruits									X				X			
Gelatin							X	X								
Gooseberries			X													
Grapefurit	X	X	X													
Haddock				X												
Halibut				X												
Heart		X												X		
Herring				X												
Honey									X							
Ice Cream							X									
Irish Moss																X
Kale	X	X	X		X	X	X									X
Kidneys		X												X		
Lemons	X	X	X													
Lettuce	X	X			X		X		X							X

Food	Vitamins						Ten of the Principal Mineral Elements of the Body									
	A	B Complex	C	D	E	K	Calcium	Phosphorus	Potassium	Sulphur	Chlorine	Sodium	Magnesium	Iron	Manganese	Iodine
Limes		X	X						X							
Liver	X	X						X						X		
Lobster																X
Loganberries			X													
Macaroni										X						
Maple Syrup							X									
Meat	X	X			X			X	X	X						
Meat Extracts											X	X				
Melons									X							
Whole Milk	X			X	X		X	X	X							
Evaporated Milk	X															
Malted Milk							X	X			X					
Molasses					X		X		X		X		X	X		
Mushrooms																X
Mussels																X
Nuts		X		X				X	X	X			X		X	
Brazil Nuts														X		
Oatmeal														X		
Cottonseed Oil		X		X												
Fish-Liver Oil	X			X												X
Olive Oil		X		X												
Peanut Oil		X		X	X											
Soybean Oil		X			X	X										
Wheat Germ Oil		X			X											
Olives	X							X			X					
Onions		X							X							
Oranges		X	X													
Oysters										X		X				X
Papaya			X													
Parsley	X		X		X		X							X		X
Parsnips									X							
Peaches														X		
Peanuts		X			X									X		
Peas					X		X	X	X	X				X	X	
Dried Peas													X			
Fresh Pineapple			X												X	
Sweet Potatoes			X						X							
Irish Potatoes	X	X							X							
Poultry								X								
Prunes	X	X												X		
Radishes	X		X													
Raisins												X		X		
Raspberries			X													
Rutabagas	X								X							
Salmon				X			X									X
Red Salmon	X						X									X
Salted Foods											X					
Canned Sardines				X										X		
Sausages											X			X		
Spinach	X	X	X		X	X	X		X			X				X
Brussels Sprouts	X		X							X						
Strawberries			X													
Tomatoes	X	X	X			X										
Turnips			X						X							
Turnip Greens	X	X													X	X
Water Cress	X	X	X		X		X			X		X				X
Weat Germ		X			X			X				X	X			
Dried Yeast		X						X								

Chapter III

THE TRUTH ABOUT VITAMINS

THE VITAMINS ARE non-mineral substances. They differ from one another in chemical nature and their function in the body is different. They are required in small amounts for the maintenance of normal growth and for the function of the body's organs and tissues.

The vitamins are called *catalysts*. A catalyst or a catalyzer is a substance which modifies the velocity of a chemical or physical process. Now the vitamins modify and influence both the chemical and physical processes in the body.

Our present knowledge of vitamins had its beginning in about 1906. Certain diseases which are now known to be due to the lack or insufficiency of specific vitamins had been so recognized for a long time.

Beri-beri is a disease due to a deficiency of thiamine, a part of the B complex. This disease was known in China in 2600 B.C. The cause of the disease was not, however, known. In 1882, in Japan, beri-beri was very largely controlled by altering the diet. Before this date the diet had consisted chiefly of rice, and to the rice diet were added such foods as fish, meat, vegetables, and milk. It was recognized in Japan as early as 1882 that the disease beri-beri was due to some deficiency in the food. Vitamins at this time were not known or even suspected.

Scurvy is a disease that has been known for many centuries. It is caused by the lack or deficiency of vitamin C. It can be cured very quickly by the administration of this vitamin in foods containing the vitamin, or by the giving of vitamin C tablets. In 1601 the East India Company discovered that the disease could be controlled or cured by the juice of lemons or oranges. The curative vitamin was not known or suspected at this time. Scurvy was prevalent in Ireland in 1847 during a potato famine. The potato was the chief article of diet in Ireland then as now. The potato has a moderate amount of vitamin C, sufficient to prevent scurvy.

For more than a century the connection of rickets with a faulty diet was suspected. As early as 1824 cod-liver oil was known to cure it. Rickets, a disease of infancy and early childhood, is a common nutritional disorder. It is caused by the lack or insufficiency of vitamin D. The disease occurs more frequently in artificially fed than in breastfed infants. However, the disease may be seen in the latter, if the mother has been and is undernourished. There is vitamin D in both human and cow's milk, but the vitamin D in the cow's milk is not so well absorbed from the bowel. What is perhaps of more importance than the rather poorer absorption of the vitamin from the cow's milk, is the fact that in the late fall and winter there may be no Vitamin D whatsoever in cow's milk.

Rickets could develop, if there were not sufficient calcium and phosphorus in the diet, even in the presence of vitamin D, but without this vitamin, calcium and phosphorus alone could not prevent rickets. Human and cow's milk both have calcium and phosphorus. There is more in the latter, but cow's milk must be diluted in the early weeks and months of the infant's life. The short ultraviolet rays of the sun can also prevent rickets. The sun does not have vitamin D in its rays but because of the ability of the ultraviolet rays therein to convert precursors, such as cholesterol, in the skin into active vitamin D, the sun can prevent and cure rickets. This vitamin is absorbed when administered by massage with cod-liver oil.

Vitamin D is necessary for normal bone formation and for the normal retention of calcium and phosphorus in the body. This vitamin,

too, keeps calcium and phosphorus in normal relations, one with the other, with respect to quantity. The vitamin D requirement varies with the amount of direct exposure to the sunlight by the individual, with the amounts of calcium and phosphorus in the diet, and lastly with the proportion between calcium and phosphorus in the body. The more rapidly the child is growing, the more vitamin D and the more calcium and phosphorus it will require.

We know more about vitamin D in its relation to infants and children than we know about its value in adult people. It is probably true, however, that this vitamin is necessary for the maintenance of normal health. It is the writer's opinion that millions of adults do not get a sufficient amount of this D vitamin. This is particularly true during the late fall, winter, and early spring months, and among those millions who spend most of their lives away from the direct sunlight, in offices, basements and sub-basements, stores, great indoor factories, and among those who sleep most of the day and work at night, and the thousands of men who work all day long in mines and under the ground. In the absence of much direct sunlight all the year around, we must look to our foods, and throughout the entire year consume in our diet such foods as: butter, cream, egg yolks, haddock, halibut, herring, fish-live oil, salmon, and sardines.

Also, though not so rich in the D vitamin, the following foods should be incorporated in the diet: lard, milk, nuts, cottonseed oil, olive oil, and peanut oil.

In women, during pregnancy and lactation a considerably greater quantity of vitamin D is necessary. During this time it is more than probable that most women would be benefited by a small amount of vitamin D in tablet form over and above the quantity naturally consumed in their diet.

The time may come when the governments of the different countries will compel all those who sell and distribute milk for human consumption to irradiate such milk before offering it for sale. This particularly should be done in the wintertime, and this means from six to seven months in a large portion of the world.

It should be pointed out by way of warning that one can consume too much vitamin D. This will not happen from the food intake, but could happen by one taking too many and too concentrated pills or tablets. Medical advice should be obtained before starting to take this vitamin other than in one's food. It is, in our opinion, probable that if adults were to get a considerably greater quantity of vitamin D, along with the necessary amounts of calcium and phosphorus, that there would be among them much less of arthritic and other bony changes, and a great deal less of arthritic pains. There would be a great improvement in health and more useful living.

Pellagra was recognized as a disease entity as early as 1735. It was once common in southern and central Europe. It is not unknown in parts of the United States of America.

Pellagra presents a variety of symptoms referable to the skin, gastrointestinal tract, and the nervous system. It was not until about 1912 that the disease was thought to be due to the lack of, or a deficiency of, a vitamin. The cause of the disease has since been found to be due to a deficiency of a portion of the vitamin B complex, known as niacin. To prevent and cure pellagra, niacin is required. During the active stage of the disease and until cure is established, the concentrated vitamin should be administered, but at all other times it is possible to take and get sufficient of this vitamin in one s diet. There is a disease in some animals, for instance, in the dog and the pig, very similar to pellagra in man. And just as niacin can cure this disease in human beings, so it can cure the disease in animals.

Much is known today about vitamins. Undoubtedly there is still much to learn. Several vitamins have been discovered and isolated. The structural formula of a number is already known. Some of them can be built up, produced chemically, or, as the chemist would say, synthesized. One food may be an excellent source of one vitamin and yet be totally devoid of another. It becomes important then to know something of the vitamin content of the foods we are accustomed to eat and of the foods eaten by others in the particular land or community in which we live. Some vitamins are destroyed by heat, while others are not; some are water-soluble, while others are fat-soluble. Up to the present time, the vitamins have been chiefly labeled and designated by

the letters of the alphabet. This undoubtedly will be done away with as more is learned about them. At first the B vitamin was considered by layman and chemist alike as being just one single vitamin like A or C. But as time passed and more was discovered and learned about vitamin B, it became known that it was not a single vitamin but a complex substance and at the present moment some seventeen divisions of this vitamin have been made. Obviously it will become absurd to continue to speak of B vitamin or even B complex, for universal names will be given them, which later will become known by the rank and file of humanity as well as by the biochemist of today.

The present-known vitamin A is found in food as such, or in the form of a precursor, such as carotene, which can be converted into vitamin A by the body. This change takes place in the liver. Vitamin A is soluble in fats and fat solvents. It becomes apparent therefore when mineral oil is used as a laxative that some and perhaps much of this vitamin is unabsorbed, being held by the mineral oil and later excreted. Heat has no effect on this vitamin.

The lack or insufficiency of vitamin A produces certain eye symptoms and diseases. A marked deficiency will lead to the inability to see in the dark, which is spoken of as night blindness. This condition was described and written about as early as 1500 B.C. Following the stage of night blindness, there develop certain diseased conditions, known as Xerophthalmia and Keratomalacia. The night blindness is due to the direct absence of vitamin A whereas the Xerophthalmia and Keratomalacia are produced by bacterial or microbic invasion of the conjunctiva that has been already weakened by the lack of the vitamin. If these diseases are not arrested by vitamin A, then total blindness will follow. In India there are many blind children due to this cause. Not only is the eye affected by the absence of vitamin A but other structures are affected as well. The skin, the linings of the respiratory and urogenital tracts, and even the nervous system may be involved in disease.

Vitamin A and its precursors or, in other words, its pro-vitamins, are found in: apricots, bananas, butter, cantaloupes, carrots, cheese, cream , egg yolk, kale, liver, evaporated milk, whole milk, fish-body

oil, fish-liver oil, parsley, peaches, prunes, red salmon, tomatoes, turnip greens, green vegetables, and yellow vegetables.

And to a lesser extent in many other foods such as: beets, cereals, cranberries, figs, fish, grapefruit, grapes, lemons, meats, onions, potatoes, and radishes.

If one keeps in mind the names of the foods in which vitamin A is found, in more or less abundance, then it will be possible at all times to secure a sufficiency of this important vitamin.

Vitamin B

As we have already intimated, vitamin B is not just one vitamin. It began as such but as this manuscript goes to press there are about seventeen known B vitamins. We have also already stated that doubtless the B will be dropped and names applied that will be known and accepted throughout the world. The B vitamin, unlike A vitamin, is soluble in water and consequently much of it enters into the water or other fluid when fruits and vegetables are boiled. Fruit juices are always eaten, but as most vegetable water is thrown out much of the vitamin is lost. If potatoes are boiled or baked in their skins, there will be a great saving of the vitamin. Too high a temperature will destroy part or all of vitamin B. The vitamin B in bread is not destroyed by the baking.

Some of the foods rich in vitamin B are: alligator pear, nuts, bananas, cottonseed oil, beans, olive oil, beet tops, peanut oil, beets, wheat-germ, whole-wheat bread, onions, raw cabbage, peanuts, carrots potatoes, whole-grain cereals, prunes, cheese, soybeans, corn, tomatoes, egg yolk, leafy vegetables, citrus fruits, wheat germ, liver, dried brewer's yeast, and meats (particularly organ meats such as heart and kidney).

There are still other foods but these are sufficient to keep in mind as containing some portion of the B complex.

The whole story of vitamin B is not known. All the diseases caused by its absence are likewise not known. We have already referred

to beri-beri and pellagra as being two deficiency diseases; both caused by the lack or insufficiency of one segment or division of this very complex vitamin B substance. Beri-beri is produced by the absence of B, or thiamin. Pellagra is produced by the lack of niacin, a part of the B complex. Another one of the B vitamins, known as riboflavin, seems to be essential for normal growth. This has been found true in experimental tests with animals.

Some patients who are given the sulfa drugs develop a white blood cell anemia, which may occasionally become quite serious. It has been discovered, however, that one of the many B vitamins can prevent the onset of this unfavorable and worrisome complication.

We shall not burden you with the names of all the seventeen vitamin B substances, as it is much more important that you should be familiar with the fact of their great need in the diet, and that you should know several of the foods in which the B vitamin is present in rich, or at least in moderate, amounts. These have already been enumerated.

Vitamin C

It was mentioned in an earlier paragraph of this book that the absence of vitamin C leads to scurvy. This disease used to be common, but it is rare now, for it is so easy to cure or to prevent. There are other symptoms but we shall merely mention a few. The individual deprived of this vitamin develops sore, painful, and swollen gums; the teeth become loose; there are pains in the joints which may become very acute, and almost unbearable on movement; the skin may present bruise-like areas or patches; bleeding from the nose may occur. Vitamin C can prevent or cure all of these symptoms.

Some foods that are rich or high in vitamin C are: beets, broccoli, new cabbage, raw cabbage, cantaloupe, cauliflower, black currants, gooseberries, grapefruit, kale, lemons, limes, loganberries, young onions, oranges, papaya, parsley, fresh pineapple, sweet potatoes, radishes, raspberries, spinach, sprouts, fresh strawberries, tomatoes, turnips, and water cress.

Vitamin D

We have, we believe, said enough already in an earlier section of this book concerning vitamin D. It would now be well to reread that part. It is important that each of us knows and is familiar with a number of the food sources of this most vital and essential vitamin.

Vitamin E

This vitamin, like A and D, is fat-soluble. The knowledge concerning vitamin E is not so extensive as of some others. It is known to be essential for reproduction in certain animals. Because the vitamin is so widely distributed in nature, it is probable that most individuals get a sufficient amount. If it has anything to do with fertility and reproduction in the human, then it is obvious that most folk have or get sufficient.

Some sources of vitamin E are: beans butter cereals, whole-grain eggs leafy vegetables meat milk molasses oils, all vegetable peanuts peas wheat germ

Vitamin K

When vitamin K is absent, or is present in too small amounts, our blood does not clot normally, when bleeding for any reason occurs.

Foods rich in this vitamin are: alfalfa-leaf meal, cabbage, carrot tops, cauliflower, egg yolk, kale, soybean oil, spinach, and tomatoes.

Sometimes the results are better if vitamin K is given with vitamin C than when vitamin K is administered alone. Vitamin K is now very frequently used, especially in surgical cases.

To be certain that one is getting all the nineteen minerals along with the seventeen, or more, known vitamins, it becomes necessary to consume daily a very wide variety of foods. It is not just a matter of

calories. It is not a question of so much bulk or quantity to satisfy the appetite. The sum total of the nineteen minerals and the seventeen known vitamins must be taken in daily. This can be done only by a very wide choice and variety of foods.

It seems that it would be conservative to state that not less than twelve different kinds of foods, some cooked and some raw, should be eaten every day of the week. One should not eat the same twelve selected foods every day.

For example one might eat during any one day the following articles of food: milk, butter, cereal, cheese, eggs, meat in some form, potatoes, lettuce, raw cabbage, cooked or raw carrots, oranges, and bread.

It will be observed that this list of twelve foods is not large. One could add an additional three to six other kinds of foods and not make the daily ration too big or cause it to be too diversified.

Chapter IV

THE ALCHEMY OF DIGESTION

DIGESTION BEGINS IN the mouth. Here the food is mechanically ground by the teeth into small particles, and while this process is going on, the food is being thoroughly mixed with saliva and to some extent with mucus. Thorough chewing or mastication of the food is important lest it may bruise or traumatize the gastrointestinal tract, when it is swallowed. The finer the food is when it reaches the stomach and later the small bowel, the more complete and thorough the digestion.

In the saliva there is a digestive ferment called ptyalin which acts upon some of the starch present, converting it into sugar. Starch must be converted into sugar before it can be absorbed into the blood stream and used by the body as food.

The amount of saliva will depend largely on the appetite and upon the manner in which the food is prepared and presented. Everyone knows how dry the mouth becomes when one is very thirsty. There would be then little or no saliva to mix with, to soften and initiate the digestion of a portion of the starch. Many folks also have observed how quickly their saliva can disappear when they are about to face an audience to give an address. Plenty of saliva helps to keep the mouth clean of food particles which otherwise would remain between the teeth.

Digestion begins in the mouth and is continued in the stomach. This latter organ acts as a reservoir for the food and will hold from two to three pints. In the stomach the food is further ground, or chymified; the temperature is adjusted to that of the body, and possibly some of the bacteria is destroyed by the hydrochloric acid present. Here, too, a partial digestion of proteins takes place. A portion of the food begins to empty out of the stomach very shortly after it reaches it. Some stomachs empty rapidly; this is usually true of the obese type of person. This rapid emptying of the stomach is just one of the reasons why certain persons are and remain fat.

Individual stomachs empty in from three to nine hours. This latter figure is fortunately rare. About a year ago we were asked to investigate a gastrointestinal condition, presenting many symptoms of distress. A thorough study of the case revealed no organic disease, and all we found to cause the patient's symptoms was an extremely slow emptying time—in this case, nine hours. Our advice to the patient was to eat only two meals per day, at least nine hours apart, and with these she was instructed to take some vitamin B complex. All of the patient's distress disappeared.

The average stomach empties in from four to six hours. The rate will depend upon the size and type of meal; upon the amount of exercise taken during the digestive phase; upon the shape of the stomach; and finally, the tone of its muscular walls. An average breakfast will empty more quickly than a full-course dinner. Fatty foods will empty more slowly than vegetables, fruits, and cereals. A thin, undernourished individual will have a slower emptying time than a well-nourished or an obese person. A person who lies down for the period between two meals is apt to have a slower emptying time than he would if he were to do some work or exercise. Finally, if one's appetite is keen and one is hungry, the stomach will empty more rapidly than it otherwise would. Both appetite and hunger stimulate the free flow of the gastric juices and consequently lead to more perfect and more rapid digestion. Certain foods, such as hot, well-flavored soups, meat extracts, and so forth, will cause a greater quantity of gastric juice to be secreted. Even though the soup or the meat extract have little or no caloric or food value they do serve a good purpose in exciting a more abundant gastric secretion.

There is a small amount of starch digested in the mouth by the aid of the ptyalin in the saliva; a little more, though less, is digested in the stomach, by the ptyalin that has been swallowed with the food. A small amount of protein is also digested in the stomach but, apart from these two small portions of starch and protein, the bulk of the digestion takes place within the upper sections of the small bowel. In the stomach the food is converted into a creamy mass which we call *chyme*. It is now ready to be received by the small intestine. When it reaches there, it is received and mixed with eight digestive enzymes, three from the pancreas and five from the small bowel itself. These combined enzymes digest every type of food: carbohydrates, fats, and proteins. And they can digest them just as well when all three are there together. It is not necessary, is not advisable, nor indeed is it wise, to consume just one type of food at one time, even were this possible.

The major portion of the digestion occurs within the small intestine as stated above, and also practically all the absorption of the digested food stuffs takes place there. Possibly four fifths of the water drunk is received into the blood stream from the small bowel. The inorganic salts and vitamins are also from here absorbed into the body. The presence of vitamin D in the small bowel aids in the absorption of calcium salts, The contents of the small intestine remain fluid throughout. The intestine is from fifteen to twenty, or more, feet long. It takes from two to four hours for the food to pass through the small bowel, and begin its journey into and through the large bowel or colon. There is little or no digestion in the colon. This organ is a receptacle or reservoir for waste. The content of the beginning of the large bowel (on the right side) is mainly fluid, but as the undigested portion of the meal passes onward towards the rectum, the bowel content becomes more and more firm and solid by the further absorption of water from the bowel. From the time the food is eaten until its residue or waste reaches the rectum, about twenty to twenty-four hours have elapsed. There are some variations to this general rule. The waste might be there in ten or twelve hours, or it might be delayed for more than forty-eight hours. The rate of passage through the large intestine is normally increased by vegetables and fruits, the coarse, indigestible fibres stimulating, as they do, the bowel to contract and drive along its contents.

The bowel should move or empty itself once a day. A few people have a double habit in this connection. It is rarely that three movements take place. Usually when there are more than two movements, there is present some abnormal condition needing or demanding correction. As a general rule the stool should be formed when passed. The amount of undigested or unabsorbed food in the fecal matter is small. The bulk is made up chiefly of intestinal secretions and dead bacteria.

Chapter V

DAILY AND SEASONAL DIET

THE CUSTOM IN most parts of the world is to eat three meals a day. In some sections locally, or even nationally, a mid-forenoon and a mid-afternoon smaller meal is also taken. As we have already pointed out, only two meals may be desirable and required for health, or at least necessary to bring relief from distressing symptoms. If the meal has been light, or if the stomach has emptied rapidly, or further, if the work done was considerable, it would be wise to eat a second meal at an earlier hour than one would had the previous meal been large.

All varieties of food should be eaten with every meal; that is, carbohydrates, fats, and proteins. Particularly is it important that carbohydrates and proteins be eaten together. Some of this protein should be first-class or of the highest biological value. Protective foods containing the necessary minerals and vitamins should be consumed regularly and daily. Women should eat somewhat more iron-containing foods than men. This rule ought to apply also to adolescent girls. If the work being done is hard, or especially so, then carbohydrates and fats should be increased rather than the proteins. If the work is hard and the diet is increased, as it should be, then the vitamins B1 and C should be increased also. Pork, in the form of bacon and ham, and whole-wheat bread are sources of B1; and vitamin C is found in oranges, tomatoes, grapefruit, and so on.

The difference between the diet of a physical worker and a mental worker is essentially one of quantity. The laborer who does much work during the day may require 4500 to 6000 or more calories. The man who sits chiefly at his desk may need 2700 to 3000 calories. The laborer may need extra carbohydrates, extra fats, and an increase of vitamins Bx and C. It is important that the mental or brain worker receive food that is easily digested. Much of the blood needed for the stomach, the small bowel, and for the digestion will in his case be drawn to the brain for his mental activities. When a diet is increased it is the carbohydrates and fats that are increased; when a diet is reduced it is the same two that are reduced. The protein is kept fairly constant. The mental worker would then receive less carbohydrates and less fats than his brother who is a woodcutter.

Old people do not always do so but doubtless they would be well advised to eat somewhat less than younger and more active people. Many old people are overfed. Much of their time is spent in easy chairs or lying down, and consequently their daily requirements are just about half what they were some years previous; and yet they consume in old age almost as much food as when they were active.

Woman requires less food than man. Her output of energy is less. Her basal metabolism is not so high. We have already pointed out that she requires more iron-containing foods. She needs the same protective foods, with their minerals and vitamins. She needs a minimum of proteins and about half of these ought to be of the first-class variety. These have been repeatedly stressed and pointed out. During a woman's pregnancy and lactation period there should be an increase of iron, calcium, phosphorus, and vitamin D in her food.

It is the opinion of a few, but it has never been that of the writer, that one should eat considerably less food during the summer months. Those who believe in and follow this practice are bound to lose weight. This may be desirable in some instances, particularly if such a one has overeaten during the cold or cooler weather and is as a consequence overweight. Should your home at the moment have a temperature of 60° C, you would not run to the kitchen and consume a bowl of porridge or some ham and eggs. Instead of fueling yourself,

you would fuel the furnace. Or should you wake up one morning and find yourself in a summer climate you would not phone your grocer and ask him to take back for resale the food you had expected to use yourself, and which now, because it was July, you would not need. No, on the contrary you would clothe yourself in a light summer suit, open the windows and doors, reduce the temperature of your body by a greater loss of heat, and then proceed to eat your normal meals.

Certainly, if you are not working as hard as is your custom to do in cold weather, then it will necessarily follow that you will not require and should not eat as much food in the hot season. Granting that you are doing the same kind and amount of work, and dressing according to the temperature of the day or month, then your food requirements are essentially the same. You do not need cold salads in the summertime any more than you need them in the wintertime. You should have them all the year around. And as a matter of fact, most folks, to a more or less extent, are able to and do follow this procedure. The only time you should eat less in the summer, or in the hot season, is when you are overweight or are on your vacation, or when for any reason you are not doing the same amount of exercise or work.

During hot seasons or in hot climates, we should somewhat modify our diets by drinking more water, thus ensuring a greater amount of perspiration; by eating less of the animal proteins, which tend to increase the temperature of the blood more than do the vegetable proteins; by eating some of the proteins at every meal to distribute their heat-producing effects, throughout the day; and by eating easily digested foods to conserve the blood supply, for in hot weather both the brain and the alimentary tract are deprived of their normal quota of blood because of the dilatation of the blood vessels of the skin.

In cold weather, if it is not possible to keep the temperature of the body at a normal level by the regulation of the heat of the home or the building where one happens to be, or by adding to the amount of the clothing worn, then and only then does it become advisable to eat a greater quantity of food than one naturally does in a moderate or temperate climate. If more food is required in cold weather, then a little extra fat should be added, as this is the most concentrated form

in which food is found and this will prevent the overburdening of the stomach by the addition of more proteins and carbohydrates, which have but half the caloric value of fat.

If during hot weather hot fats are unappetizing then one can usually enjoy the same quantity of fat as is necessary by taking them in cold meats, in salads, in cream, in butter, and ice cream.

If the day is hot and the night is cool or cold, the animal proteins consumed should be eaten at the evening meal. The extra heat produced by this animal protein will serve to keep the body temperature higher during the cool hours of the night.

Insurance companies inform us that should we desire to live long lives, we should not be much, if any, overweight. Their records prove that obese, overweight individuals have a shorter expectancy of life. Definitely, underweight is more desirable than overweight, but in this direction one can go too far. There surely is a happy medium, and an effort should be made to attain that ideal. Particularly is it important not to be overweight in middle and old age. Just why folks continue to overeat is difficult to understand, when they already are obliged to come downstairs backwards; to employ someone to tie their shoelaces; and to use the mirror whenever they wish to view their feet. It is one of the great enigmas of life.

On the other hand, many people are too thin. With some, being thin is due to deliberate planning. In such cases all the arts and skill of the dressmaker cannot hide or conceal the baneful effects of the application of free will on the care of the body that was created beautiful and was meant to be so preserved. Some are too thin because they cannot get sufficient to eat; others are too thin because they lack the knowledge to select the right kind of food. Some are too thin because the amount of work they are obliged to do is too great for the amount of food consumed; some are too thin because of the presence of a wasting disease, such as tuberculosis, hyperthyroidism or diabetes; again others are too thin because of the lack of appetite—they do not eat sufficient food even when plenty of it is available; finally, some are too thin because of organic abnormalities within the gastrointestinal tract, which require correction.

In the defence of the fat man or the obese woman, one should add that their adiposity is not always of their own choosing. Sometimes it is due to a defective or under-functioning thyroid; or less frequently it is due to a defective pituitary gland, which defect has not been compensated for, or balanced, by an increase of thyroid activity.

Chapter VI

ARE YOU OVERWEIGHT—UNDERWEIGHT?

SHOULD IT BECOME desirable to reduce the weight in an obese individual, it would be best in most instances to ask the aid of the family physician, so that he might, first of all, check the glandular system of the body. He will then help you construct a diet, properly and thoroughly balanced, made up of proteins, fats, and carbohydrates, containing a sufficiency of inorganic elements and all the known vitamins. Such a diet would possess, say 1000 to 1500 calories. The first thing the physician would do would be to determine the amount of protein that you should have. This amount would depend on your ideal weight. Suppose you weighed two hundred pounds and your ideal weight was one hundred and thirty. Knowing this ideal weight, you would require one gramme of protein for each kilogramme, roughly two and one-fifth pounds of body weight a day. Consequently you would need 59 grammes of protein in the day's diet.

In making up this quantity for the day's ration, it would be necessary to select approximately half of the total from the list of the first-class proteins, that is, those having a high biological value. A gramme of protein has a caloric value of 4.1. Fifty-nine grammes would have a caloric value of 241.9. Should we desire to construct an obesity diet of 1200 calories, we would have the foundation of our diet structure in the 241.9 calories of protein.

The next step would be to choose say half of this amount—that is 120 calories—from the first-class proteins. You will recall that these are the animal proteins, such as milk, eggs, cheese, meat, and fish. The remainder could be selected from vegetable, fruit, and nut proteins. After having done this, we would still require 959 calories to complete our goal of 1200. This amount of 959 would be divided between fats and carbohydrates. The next step in the calculation would be to determine the amount of carbohydrates necessary. The amount should be not less than 0.6 gramme and might be as much as 1.0 gramme per kilogram of body weight. Should we choose the latter figure then it would be necessary to add 59 grammes of carbohydrate, and this would give us 59x4.1, or 241.9 calories. The caloric value of 1 gramme of protein and 1 gramme of carbohydrate is the same, namely 4.1. These two added together would provide 483.8 calories, thus leaving a balance of 716.2 calories to come from fats. One gramme of fat has a caloric value of 9.3. This amount divided into the 716.2 gives us 77, which represents the number of grammes of fat required. Sometimes it has been necessary to construct a diet having a combined calorie diet well below 1000 calories.

One should not permit oneself to reduce more than two pounds a week at the most. We recommend that those who are following such a strict and restricted obesity diet take from one to two drams of a vitamin B complex preparation, three or four times a day, choosing of course from a well-established and well-recommended pharmaceutical house. Your physician would be the best one to advise you in this connection.

Sample Menu for Reducing Weight 1000 to 1200 calories approximately.

BREAKFAST

One serving only of: one raw apple, one-half grapefruit, one orange, one average helping of strawberries, raspberries, melon, pear, or peach.

Bread: one slice, white or brown

Butter: one wartime helping

Beverage: coffee, tea, etc.

Sugar: one lump or one level teaspoon

LUNCH

Broth or meat extract, lean meat or fish of any kind, one serving—3 inches by 3 inches by 2/3 to 1 inch thick; or two eggs, or two to three tablespoons of cottage cheese, or one moderate serving of macaroni and cheese.

Vegetables: three tablespoons of any of the following: asparagus, spinach, beets or beet greens, celery, tomatoes, rhubarb, cauliflower, cabbage, string beans, turnips, carrots, squash, onions, rutabagas, canned beans, and as much as desired of water cress, radishes, and lettuce

Bread: one slice of any variety

Butter: one square

Fruits: one serving, either fresh or cooked

Sugar: one lump or one level teaspoon only

Beverage: coffee or tea

DINNER

A good soup of any kind, one helping; or one egg. Green vegetable salad, with mayonnaise or French dressing.

Bread: one slice, or two bran muffins

Butter: one square or the usual helping

Vegetables: three tablespoons of the same kinds of vegetables as those mentioned for lunch

Fruit: one serving, raw or cooked

Beverage: coffee or tea

Sugar: one lump or one level teaspoon

At 10 A.M., 3 P.M., and again 9 P.M., one glass of skimmed milk to be drunk.

The order of lunch and dinner may be reversed.

Underweight— What to Do

The first thing to do when underweight is to determine, if possible, the cause. Obviously one would not get very far towards adding to one's weight by forced feeding if there were present in the thin, undernourished individual a marked or definite hyperthyroidism.

A few months ago a man came to me for medical attention. He was approximately thirty-five pounds underweight. He was tall and could have carried this extra weight with ease; in fact, he would have been merely normal with these additional pounds. He had been thin for years. An X ray revealed a partial obstruction in his stomach, and instead of the meal leaving his stomach in five to six hours, it had not entirely left in twelve hours. The cause of the obstruction, in this instance, was due to scar tissue with contraction, following an ulcer which had healed, with scarring, many years previously. This man was eating and digesting just about two average adult meals a day and working hard. Other men doing similar labor were eating and digesting three meals or even more. Is it any wonder that he was keeping thin and was thirty-five pounds underweight?

Medical treatment, in this particular case, with the hope of restoring the normal stomach outlet, utterly failed. Surgery was resorted to and a new and larger outlet produced. This man will now slowly but surely gain weight and will eventually reach the normal standard. We cite this case to illustrate why it is essential to find out first why a person is thin or underweight.

We will now consider one who is underweight, but who is otherwise normal, and desires to gain five or thirty-five additional pounds. Such a person should eat his three regular meals; they may or may not be larger than those to which he is accustomed; however, they should be made up of more concentrated foods, that is, have a higher caloric value so that the stomach may not be overburdened with too great a bulk. The result of this would mean that he has consumed possibly no greater quantity as bulk, but may have taken into his body through the more concentrated food an extra 500 calories. But this is

not enough. He should space his three regular meals five or six hours apart, say 8.00 A.M., 1.00 Noon, and 6.30 to 7.00 P.M.

Now we must think about and plan for 1000 to 1500 additional calories. This extra food should be taken in three or four divided portions. It should be largely composed of a concentrated liquid, such as chocolate malted milk, with cream or ice cream, and raw eggs added. The day's supply should be or could be made up at one time and kept in the refrigerator until required. Two glasses of this very rich liquid nourishment should be taken one and one-half to two hours after each meal and again at bedtime.

I have repeatedly seen underweight individuals gain as much as a pound a day. Some years ago I had occasion to follow a similar regime, and I gained twelve pounds in the first twelve days! I do not advise such rapid increase as a routine but this does illustrate what can be done.

Water

About two thirds of the total weight of the body is made up of water. Water is added to the body: (1) by drinking, (2) by eating moist foods, and (3) by the oxidizeing or metabolizing of proteins, fats, and carbohydrates. Water is lost to the body by visible and invisible perspiration from the skin; by the expired air; by the urine; and finally by the feces. The total intake should balance the total output. If the external temperature is high or the exercise indulged in is strenuous, much more water is excreted both by way of the skin and the lungs. Additional water then should be drunk to make up the body's deficit.

When we perspire a great deal, we lose too great a quantity of sodium chloride and to replace this and establish a balance we should take a little extra salt.

As a general rule it is not harmful to drink cold water with one's meal; in some instances it may even be helpful. Drinking at meals probably facilitates the process of absorption. One should drink a minimum of one and one-half pints a day. In hot weather and during

great exercise, this amount will be naturally and voluntarily increased. If the stomach is empty, milk will often quench a thirst better than water. Water is not absorbed from the stomach, but from the small bowel chiefly. About one fifth is absorbed into the blood stream from the large bowel.

Chapter VII

CONSTIPATION AND ALLERGY

IT TAKES FROM six to ten hours on the average for a meal to travel from the mouth to the large bowel; that is, until all of it is in the colon. The head of the meal will be normally at the beginning of the colon in from three to four hours. If the total meal has not gone beyond the small bowel in ten hours, we say that there is a delay, or stasis, or even partial obstruction. The head of the meal should be in the rectum in about twenty to twenty-four hours. It may be there a little sooner, or it may, in some instances, be delayed by several hours. The rate of passage through the large intestine is increased by fruit or vegetable fibres, mainly cellulose, which is largely indigestible. Many of the foods eaten are almost entirely digested, thus leaving very little waste. The fecal matter then is composed of this small residue, really digestible foods that were not for some reason digested in transit; there may be many dead microbes, much intestinal secretions, including mucus, and finally indigestible cellulose. Too much waste is not always desirable, especially when the muscles of the bowel are weak or atonic.

Not a few cases of constipation are due to a spasticity of the colon resulting from a too pronounced nervous state. The bowel becomes spastic or contracted in certain areas, thus holding back or delaying the normal onward flow of the fecal stream. Sometimes it may be necessary to add to the meals more waste or roughage to stimulate bowel contraction. We have said that in an atonic colon this extra bulk

may be a handicap, since the muscles may not be able to force the waste along. Certainly in the group of cases of constipation due to spasm or localized contraction there are some that will be benefited by rest, relaxation, or by the application of medical antispasmodics.

We have known of infants who in the very early months of their lives had already been trained to a bowel-habit time. If this can be done in the case of infants, then surely the cultivation and establishing of a bowel-habit time in adults is possible. This will demand the going to the toilet at the same hour each day, whether the desire or call to stool seems to be present or not. Three meals and regular meals are essential. The contractions or peristalsis of the bowel are instituted or favored by the intake and presence of food. The hour for going to stool should be shortly after one of the meals. Exercise is important in the normal function of the colon. If you doubt this, compare the person who rides all day on a train, bus or motor car, with one who sleeps until noon on a Sunday. The person who drinks little water, unless he consumes much fruits and vegetables, is apt to be constipated. A greatly undernourished individual is apt to be constipated because the muscles of the bowel are weak and atonic; and because the abdominal walls are too weak to give the normal assistance to the colon within. Could each one of us look through an X-ray fluoroscope and observe the " up and down" rhythmic movements of the colon with every breath, and realize how very important this must be in the normal function and health of the bowel, few of us would ever have to be asked or encouraged to practice deep breathing. Because mineral oil may possibly prevent the absorption of some of the vitamins, for example A, D, and E, all being fat-soluble, it may be wise to restrict the taking of mineral oil in cases of constipation.

Foods that Tend to Give Rise to Excess Gas In the Bowel

Because certain foods do, or have a tendency to, give rise to considerable gas in the intestines is no reason why they should always be avoided. Many, if not all, of such foods are very valuable for their minerals, their vitamins, their proteins, and in some instances for their carbohydrates. It may be well to put down the names of a number of

these foods that have a tendency to cause flatulence, but while doing so we again repeat that they should not always be avoided. Really, some of them should be eaten every day, such as beans and peas that have been dried, cabbage, cauliflower, broccoli, Brussels sprouts, cucumbers, hardboiled eggs, or hard-fried eggs, highly sweetened mixtures, beer and all malt beverages, cantaloupes, watermelon, raisins, turnips, radishes, Swiss chard, and possibly others.

Foods Especially Helpful in Secondary Anemia

Persons suffering from secondary anemia will find it helpful to include in their diet such foods as beef heart, beef kidney, beef liver, calves' liver, lamb liver, bone-marrow, chicken liver and chicken gizzard, lamb kidney, pig kidney; and fruits, such as apples, apricots, peaches, pineapple, prunes, strawberries, and raisins.

Allergy and Allergic Diseases

Certain individuals are hypersensitive or allergic to some foods. In these individuals such foods produce allergic diseases. The less informed do not believe the condition common, but the specialist in allergy sees in many varied symptoms and diseases allergic manifestations and a disease allergic in origin. Perhaps he is right.

The majority of cases of food sensitiveness would appear to occur in infants and very young children. However, sensitiveness to food does occur in adults, so plainly at times that any one may perceive it. One may develop allergic symptoms from foods by inhalation, by eating, or drinking, and by absorption through the skin. The symptoms of food allergy may be few or many; they may be mild or very severe; or they may even simulate an acute abdomen," thus seeming to warrant immediate surgery.

I know of a lady who will quickly become violently ill if flaxseed is present in the room in which she is for the moment staying. This is allergy.

There are two foods that cause allergy in the writer: parsnips invariably cause heartburn or pyrosis and will seem to remain in the stomach for hours longer than they should; the soybean will cause my lips to swell up to two or three times their normal size. This is allergy.

Individuals may be allergic to milk, cheese, eggs, cereals, strawberries, or other fruits; meats, fish, nuts, and certain vegetables.

In most instances it is scarcely up to the individual or layman to decide whether or not he is being affected by certain foods in an allergic sense. In most cases such an individual is not qualified to judge. We have already intimated that it may be most difficult even for the physician to be certain.

Chapter VIII

DIET AND FOODS IN DISEASE

IN MANY, IF not in most diseases, certain lists of food are recommended as being best in the dietetic treatment and management of the particular disease. Certain foods will be advised as being salutary in cases of gall-bladder disease, liver disease, stomach ulcer, kidney disease, diabetes, colitis, etc., etc., but it is scarcely the province of this little book to go into this field. We shall, however, depart from this original plan and intention slightly by discussing, more or less briefly, foods in general, in relation to the normal or diseased liver. In the discussion which follows we are assuming that the gall bladder is normal. However, there would not be much change in the general advice even if the gall bladder were diseased.

Both the normal and the diseased liver require carbohydrates and proteins. These are protective foods. The combination of the two is valuable in counteracting certain poisons, which would otherwise affect the liver.

A diet low in fat is desirable in liver disease. In health the calories to be derived from fat are made up only after adequate amounts of protein and carbohydrate are included and accounted for.

In the case of liver disease, one should eat less fat than would be normal and adequate in health. To offset this reduction in fat

there would naturally be a corresponding increase in the intake of carbohydrates and proteins.

Adequate proteins and carbohydrates tend to prevent the deposit of excess fat in the liver. A fatty liver or one infiltrated with fat has a lowered resistance to disease.

The protein of the body is more valuable than either carbohydrate or fat, and the body protein, including that of the liver, is spared and conserved by the intake of plenty of carbohydrates.

Too little carbohydrate and protein, with excess of fat, would lead to liver damage.

Just as protein and carbohydrates are looked upon as protective foods for the liver, so also are the vitamins, A, B complex, and K spoken of as protective vitamins.

From fifteen to twenty-five percent of the total calorie intake, in cases of liver damage, is recommended to be composed of protein and approximately three times as much carbohydrate should be added. This leaves but a minimum of fat to make up the total caloric requirements. A moderate amount of fat makes the food or meal more palatable.

A high protein diet will bring about an increase in the production of bile.

Acid-Producing and Alkali-Producing Foods

Little is said in press advertisements, over the radio, or on public billboards, about alkali-producing foods. It apparently is assumed, and of course rightly so, that the public in general have no prejudices, no lurking and smoldering fears concerning foods that have a basic or alkaline effect when taken into the body. Whether anyone has ever attempted to create and build up a suspicion in the minds of men in regard to base-producing foods I do not know, but certainly there has been a lot of nonsense broad casted by various channels of the supposedly harmful effects and influences of acid-producing foods.

Let me say here that it matters not one jot or tittle, in the average normal individual, whether any particular food that he eats—and which may be found, after being oxidized or metabolized, within the body, and ready, as end product, to be excreted by way of the kidneys—was classified and labeled as acid-producing or alkali-producing in effect before it was ingested by a hungry individual.

No one limits his diet entirely to acid-producing foods; neither does any one consume only alkali-producing foods.

The urine will be acid on a high protein diet; it will be alkaline if the diet contains much fruit and vegetables. On a mixture of foods the reaction of the urine will alternate, or is apt to do so, each day. Especially is the urine inclined to be acid at or during the night.

If one were compelled to take a choice, and could have but one class of foods, that is either acid-forming or base-forming, then from a health point of view, the acid-forming group would be the better. The body is better adapted to handle acids than alkalies. It is believed that the kidney does its best work when the urine is acid.

In a general sense all sorts and kinds of foods should be eaten, and the thought of whether Y is acid and Z is alkaline should never enter one's mind.

Acid-producing foods: all meats, cereals, eggs, bread, fish, certain nuts (walnuts, peanuts), rice, peas, butter, and one or two fruits, including prunes.

Alkali-producing foods: all vegetables, potatoes, all fruits, with one or two exceptions, certain nuts (almonds), milk, plain chocolate, cocoa.

Tea and Coffee

Both tea and coffee contain the alkaloid caffeine. Caffeine is a stimulant, affecting the nervous system and the kidneys. It abolishes a sense of fatigue; in many, if not in most people, it induces sleeplessness; it increases the ability for mental and physical work.

Caffeine acts upon the nerve centers that control the lungs and heart, and is thus both a respiratory and cardiac stimulant. It acts directly on the kidney to increase the output of urine. Caffeine is not habit forming.

In certain diseases, such as gastric and duodenal ulcer, and in gastritis, tea and coffee should be restricted or forbidden altogether.

Too much tea and coffee may lead to an increased and abnormal excitability of the nervous system.

It will not suffice for health that we eat proteins, carbohydrates, and fats in exact proportions and amounts; that we consume daily necessary quantities of all the nineteen minerals found in our bodies; that we ingest with therapeutic exactness all the known and unknown vitamins; that we drink adequate quantities of water; and that we abstain from too much stimulants whether these be the more or less harmless tea and coffee, or beverages containing an alcoholic content. It has been said truthfully that man does not live by bread alone, and this universal truth will be made clear to the reader as he reads with discernment the chapter which follows.

Chapter IX

HOW THE PSYCHIC MIND AFFECTS DIGESTION

THE FIRST STAGES of the digestive process are normally started by the pleasurable taste, smell, and sight of food. Emotional excitement can and does greatly interfere with the starting of the digestive process or its normal continuation after it has been started. Not only does the smell, the sight, and the taste of food normally initiate the digestive process, but the hearing of frying steak, or the thought of fresh strawberries, lemons, or some particular food that one greatly enjoys will be sufficient to start the flow of the saliva. It is common knowledge that the thought, sight, smell, and even the hearing of the cooking of food will stimulate the outflow of saliva, but it is not so widely known that these same influences will initiate and cause the stomach secretions to flow. These secretions, salivary and gastric, brought about by the thought of food, the smell, the hearing of its cooking, the sight of it, or its pleasant taste, are spoken of as *psychic secretions*. These psychic secretions begin almost immediately and continue for some time even after the food or meal has been swallowed.

The presence of food in the stomach is not a prime condition for gastric secretion. Not only does the mouth "water" by every form of the psychic stimuli mentioned herein, but the stomach " waters" as well, a fact that has been repeatedly proven. The proper starting of the digestive process is conditioned by the appetite, by the satisfaction

of the palate, and the consequent flow of the digestive fluids. If the food that is masticated is pleasant to the senses it will not matter whether the food be swallowed or not; there will be an abundant flow of gastric juice. It is not just the act of chewing that causes the stomach to secrete, for when one chews gutta-percha, for example, there follows no secretion. A table well-set with pleasing, attractive, and nourishing foods will give rise to a distinct secretion of gastric juice in normal man. The sight of the same foods, poorly prepared, and poorly served will fail to bring about a like response. A grapefruit will cause a psychic secretion in the mouth and stomach, but it will not do so if presented to the same individual in a dirty, filthy condition. Pleasant and agreeable odors will produce an outflow of saliva and gastric juice, whereas unpleasant and offensive odors have been shown to depress these secretions.

The first digestive juices, both salivary and gastric, are psychic in origin and nature. They are favored and influenced by the pleasurable feelings which accompany the taste, the smell and sight of the food during mastication, or the feelings which are roused and stimulated in the anticipation of eating when pleasant foods are seen or smelled.

The conditions favorable to proper digestion are nullified and abolished when unpleasant emotions such as worry, anxiety, anger, and fear are introduced and allowed to prevail. These unpleasant and harmful emotions will dry up or inhibit the flow of both the gastric juices and the salivary secretions.

The "ordeal of rice" as employed in India, was a practical utilization of the knowledge that certain excitement is capable of inhibiting the salivary flow. When several persons were suspected of crime, the consecrated rice was given to all of them to chew, and after a short interval it was spat out upon the leaf of the sacred fig tree. If any one spat it out dry, this was taken as proof that fear of being discovered had stopped the secretion, and consequently he was adjudged guilty.

Fear and anger will inhibit gastric secretion in man as well as in animals. This has been experimentally proven. If an animal is made angry after he has eaten, gastric digestion stops. The same thing holds true in human beings. A normal gastric flow or secretion, well

established, can be stopped by a psychic upset. Nor is the harmful effect of an emotional upset fleeting in character, for it persists long after the removal of the deleterious exciting condition. The psychic secretion has been proven to exist not only before eating and during the meal, but for a long time after the swallowing of the food. Harmful emotions will affect unfavorably the psychic secretions of mouth and stomach before, during, and long after the food has been consumed.

If a child has just experienced an outburst of passion, it is well not to urge the taking of nourishment soon afterwards. Food compelled to be eaten by a child as the result of the parent's stronger will, or of the child's fear of being whipped, is most likely to be vomited before the child leaves the table.

In our work, in the field of gastroenterology, over a period of many years, we have repeatedly observed that psychic or emotional upsets not only suppress the salivary secretions, the gastric juices, but also check the flow of bile. Other observers claim that the pancreatic juice is likewise inhibited or suppressed. Is it not apparent then to the reader that such a suppression of all these secretions— namely, saliva, gastric juice, pancreatic juice, and the bile —temporarily abolishes all the means normally available for the bringing about of chemical changes in the food constituting its digestion?

Just as the secretory activities of the stomach are unfavorably influenced by strong emotions, so also are the movements of the stomach. Anger or fear in animals is accompanied by a total abolition of the movements of the stomach. This has been demonstrated in the case of dogs, cats, rabbits, and guinea pigs. Just as the secretory activity of the stomach is affected in a similar fashion in man and in the lower animals, so likewise gastric peristaltic waves are stopped in men, as they are stopped in lower animals, by worry, anxiety, and the stronger emotional states.

We have repeatedly observed a duodenal tube lying for hours near the pyloric canal and outlet of the stomach, and during this time there would not be a sufficient peristaltic action to propel the tube on into the duodenum or even to expel the liquid given at the same time as the

duodenal tube. Fear, anxiety, and worry in the patient had completely checked the movements of the stomach.

Pain will suppress gastric secretions and abolish the peristaltic contractions of the stomach. We have repeatedly observed the retention of food in a stomach long after it should have been digested, following a painful accident, such as a fractured arm or leg. This is particularly true in children. If an anesthetic must be administered before the reduction of a fracture, then twice or more than the usual time should be allowed for the emptying of the meal taken prior to the accident.

All gastric secretion is not the result of salutary psychic stimuli. Perhaps two thirds of it is. The remaining third is due to a combination of factors, including the mechanical and chemical stimuli due to the presence of food in the stomach, and possibly a hormone stimulation resulting from certain chemical activities in the small bowel. If it is true that about two thirds of the gastric secretion is the result of favorable psychic stimuli or influences, then it is of the utmost importance that unfavorable psychic influences be not permitted to exert their deleterious effects immediately before, during, and for some hours after a meal. Unfavorable psychic stimuli suppress and stop the flow of the gastric juice. Such unfavorable psychic stimuli may be grouped under the headings of anxiety, worry, fear, annoyance, and anger.

We have done gastric analyses in patients who have had considerable anxiety and fear of the test and found an almost complete suppression of the gastric juice. We have repeated the same test soon after, when the fear emotion had been removed, and found a normal gastric secretion response.

The work of the stomach is the reduction of food to *chyme*, the changing of markedly dissimilar substances into one homogeneous mass. Anxiety and mental strain, by the lessening or suppressing of the gastric secretion and by reducing or stopping altogether the movements or peristaltic action of the stomach, markedly delays gastric digestion and the normal work of the stomach.

Many individuals who complain of digestive disturbances in the upper abdomen show no X-ray evidence of disease, and in this large group of cases the only changes which can be demonstrated are those which have to do with the function of the organ. It takes from four to six hours for the stomach to complete its share of the digestive process. A little of the starch is converted to sugar by the ptyalin of the saliva that has been swallowed, and a small portion of the protein is partially broken down; then the whole heterogeneous mass of food is ground up, mixed with the stomach juices, and the resulting homogeneous mixture, or chyme, is ready to be expelled from the stomach.

Upon the completion of the active phase of the stomach there normally follows a resting phase. This is true of every organ in the body. When one organ is active another organ may be resting. The active phase and the resting phase of one organ differ greatly in length from those of another organ. After the stomach has finished its active phase and has started on its resting phase, the accessory organs of digestion, such as the small bowel and the pancreas, continue for some time in their active period. In disease, as well as in emotional and psychic disharmony, there is often a disturbance in the normal sequence of the digestive or active phase and the inter-digestive or rest periods. The digestive period may continue over into the inter-digestive period through a prolongation of the active digestive phase and a delay in the emptying time. This may occur in organic disease and also in psychic upsets. Severe emotional excitement or shock can practically arrest gastric digestion.

High gastric acidity is the invariable finding in duodenal ulcers, less commonly in stomach ulcers, and is usually high in patients who are emotionally and psychically unstable. And in both of these groups the high or hyper acidity is caused by an abnormal tonus and sustained contraction of the pylorus or outlet of the stomach, interfering with the normal alkaline regurgitation from the duodenum into the stomach. High gastric acidity does not in and of itself cause pain or distress, but in the presence of an ulcer will cause pain; it is part of the complex picture that one finds in a distress the cause of which has been entirely psychic.

Emotionally or psychically unstable individuals are frequent air-swallowers; they are aerophagists. This swallowing of air by these nervous people gives rise to much abdominal distress which can be cured only by the breaking of the vicious habit. The aerophagist has a feeling of fullness, or the abdomen may actually be distended, the appetite is poor, he becomes quickly filled up and satisfied upon eating, he belches frequently or at times almost constantly throughout the waking hours. An originally nervous and emotionally and psychically unstable individual, because of the added distress due to air swallowing, becomes worse.

Pylorospasm is a term used to imply Atonic contraction of the pyloric sphincter. The pyloric sphincter is a circular-like muscle which guards and controls the extreme outlet of the stomach at the point where the stomach joins the duodenum or first portion of the small intestine. By far the most common cause of spasm, or abnormal contraction of the pylorus, leading to what is known and described as pylorospasm, is an emotional and psychic upset which may be classified and grouped under such headings as fear, worry, anxiety, and anger.

Pylorospasm interferes with and stops the normal process of emptying of the stomach into the small bowel. The delay may be anywhere from brief seconds to minutes and hours. One case is recorded where a pylorospasm, in a stomach which was otherwise normal, prevented the stomach from emptying for twenty-four hours and at the end of this time the patient vomited the meal eaten twenty-four hours previously. The emotional upset in this instance was caused by the sudden death of a near relative. Pylorospasm may give rise to pain, a feeling of fullness, belching, heartburn, nausea, vomiting, and not infrequently to headache. In an individual with an empty stomach the usual and normal hunger feelings and contractions will be greatly reduced and delayed by a pylorospasm.

From twenty-five to fifty percent of the adult individuals who seek advice and help because of abdominal trouble have their distress on a nervous basis. There is no exaggeration in stating that in North America, and on any one day, there would be several million people suffering from abdominal distress due to a psychic and emotional

cause. The symptoms complained of by such individuals would include: a feeling of fullness, bloating, belching, loss of appetite, heartburn, headache, nausea, vomiting, general abdominal pains, flatulence, and constipation, which latter may alternate with diarrhea.

It may be helpful and of interest to cite a number of typical cases of pylorospasm and of indigestion of a nervous origin that have come under the writer's care and observation.

A hardware merchant loses $80,000 on the stock market. He is sixty-five years of age. Perhaps because of his age and the great difficulty anticipated in making up his losses he begins to worry. Symptoms of indigestion quickly make their appearance, a pylorospasm almost immediately develops, and then in quick succession there are added practically all the possible symptoms relative to the gastrointestinal tract. The appetite is poor, less food is eaten and this in turn leaves the stomach much more slowly than normal. Insufficient food begins to cause a weight loss from the first day. Loss of weight and undernourishment is followed by anemia and a deficiency in vitamins.

It is interesting to recall that in this case of the hardware merchant, after his many symptoms had been well developed and had persisted for some weeks, he began to wonder and later to fear and worry lest he might possibly have a cancer. He had not related his symptoms and distress to the original fear, worry, and anxiety cause. He argued with himself that he must have a cancer for nothing else could possibly and so quickly lead to his present situation. The cancer fear, now added to his financial worries, was the last straw that broke the health of our patient so completely that giving up he sought medical advice.

I shall never forget this man's look of relief and gratitude when in reply to his direct question I told him, at the time of our first interview, that I did not believe he had a cancer. Within a few days, following a complete and thorough survey, we physicians proved to ourselves and to our patient that all of his symptoms and suffering were on a nervous basis, and were due to anxiety, fear, and worry. Some few simple medicines were prescribed, psychological advice understandingly given, as well as suitable directions as to his diet, and the patient was told to report back in two weeks.

He kept his appointment to the hour and as he entered the office he broke down into tears. Then quickly recovering himself our patient said: " Every symptom and all distress for which I sought your help have disappeared, and I have gained ten pounds in weight. I had, before coming to you, taken the first steps to transfer all my business and property over to my sons, believing I would not live long. I have, during the past two weeks, given up all thought and idea of the need of such transfer at the present and believe it best that my sons should still work for me as they long have been doing. I am now perfectly well and have no thought of dying." The soul of this man was manifesting to me through his words and tears.

We were once asked to advise and prescribe for a patient who for many days had been vomiting until it was feared that her life was in danger. She had been completely and thoroughly investigated and there was no organic reason found for her chief complaint, namely persistent vomiting. She was being kept alive by intravenous glucose. Even this method of feeding did not entirely stop the symptoms of which she complained. Careful questioning on our part convinced us that the vomiting was entirely due to an obscure emotional and psychic cause. I was unable to determine the exact cause but believing I was on the right track I said: "A very complete investigation, including X-ray studies, has been done for you and nothing has been discovered that should cause your vomiting. Your body is organically sound. Your vomiting is purely of a nervous origin. You are bringing it on by and through your own thoughts, and by and through the same method you must stop. You alone can cure yourself. We have been keeping you alive for days by intravenous feedings. The moment we stop, you begin vomiting again. T his intravenous feeding cannot and will not be continued. Unless you stop vomiting you are going to die." With this I left the room.

This patient had no further intravenous feedings, no further medication, and a meal served shortly thereafter stayed quietly in her stomach and was apparently normally digested. The patient continued to eat without further symptoms or distress and soon left the hospital feeling well.

Here is another case. A patient had had a recent abdominal operation. For ten days she had been daily nourished by intravenous glucose feedings. During the latter portion of the ten-day period, she was also fed small amounts of food by mouth, in spite of the history of vomiting from the day of the operation up to the moment now under discussion. She had been given some food by mouth, for it was not believed that there was any organic cause or reason why she should continue to vomit. This conclusion reached by the physician in charge agreed with our own impressions, and our subsequent management was as follows: We told her that there was no reason, insofar as her stomach or bowel or the operation recently performed were concerned, that she should vomit at all. As she had vomited nearly everything thus far given to her since her operation, I asked her whether any food appealed to her or whether she desired any particular food. She replied that she would like some fried beefsteak. Instructions were given that a goodly portion of a tender, well-flavored sirloin, mediumly well cooked, be served at once. No other food was to be offered. The instructions were carried out. The patient ate and relished her sirloin meal; she did not vomit and never vomited again during the remainder of her stay in the hospital.

We believe these two cases just cited illustrate well the influence of thought and of the emotions on the digestion and work of the stomach.

We were once asked to determine the cause of vomiting in a man who soon after eating a meal had taken a long, rapid automobile drive. When the meal should have been digested, he appeared to vomit most, if not all, of the meal consumed. There was here no question of ptomain or food poisoning, and no suspicion of organic disease. The patient had no other symptoms apart from the vomiting, and as soon as the food had been ejected and the patient had rested, he felt well. We believe there was enough of nerve tension, anxiety, and concern in the case of this man for his own safety, while at the wheel, and the safety of the others who might possibly be injured through any mishap or carelessness on his part, to produce a pylorospasm and possibly some suppression of his digestive fluids, certainly an almost complete cessation of the normal motility of the stomach.

This writer was once irritated by a commercial traveller who, while being interviewed, persisted in pacing back and forth across the office as we endeavored to question him. I asked him to sit down and to tell me what made him behave like a caged animal. He did not and would not take a seat, but replied: " I live in constant dread and fear lest at any moment I receive a telegram from the head office that employs me in Chicago, asking me why I am not sending in more business or dismissing me altogether for not doing so." His indigestion and abdominal distress were entirely on a worry, anxiety, fear basis.

A man, representing big business, told me one day that he never goes out to interview a prospective customer or to close a deal without being keyed up, tense, and anxious, until the business in view is completed. He had an appointment at the time with an automobile manufacturer and expected and hoped to sell him more than a million dollars worth of goods. We found his indigestion to be entirely on a nervous basis.

The president of an insurance company was told by the writer that the abdominal distress and chronic indigestion which had plagued and annoyed him for months was due to emotional disturbances and not, as he suspected and feared, to any organic disease. We asked him why a man who seemingly had so much financial security, had so high and important a position and station in life, should allow fears and worries to creep into his thoughts. He replied: "I handle and invest other people's money and worry lest my judgment lead to financial loss."

Some years ago the writer was a thousand miles from home when he received a telegram stating that his two children were in the Isolation Hospital, critically ill with diphtheria. The journey home was made by automobile in less than two days. It is not difficult to imagine the fear, the anxiety, and the worry that colored and dominated every thought during the return journey. This writer, perfectly well for months previous, and apparently well during the first day of the return journey, found it impossible on the second day to tolerate food; the stomach, seemingly outraged, was rejecting and projecting the food with a force, energy and velocity, many times greater than that exercised on its downward journey.

I once had a patient, a young man, whose wife continued to teach school after they were married. After several years of married life there were still no children. This couple lived in an apartment; they both worked during the day and came home at night, weary and tired, with no supper ready and waiting. The evening meal had to be prepared, the house-dusting and cleaning for the day had to be done, and preparations made for breakfast for the next morning. At least on one or more evenings, the week's washing had to be done. There was no time left for rest, relaxation, change, or amusement after their daily routine of office and school, and the ever-present housekeeping in the evenings. Restlessness, unhappiness, and discontent gradually developed. As time went on, the husband, chafing under the unnatural home life, began to develop nervous indigestion. Months and years passed. The indigestion became deep-seated and chronic.

Why do I relate this story? Because it illustrates how the thoughts and the emotions affect the digestion. This patient did not associate his distress with the quarrels, bickerings, arguments, and the unpleasant and disturbing and emotionally upsetting thoughts constantly present in the home. A very complete investigation failed to show any organic reason for this patient's many complaints. He was not a little surprised and it took considerable argument to convince him that all of his distress was entirely functional and due to nervous, psychic, and emotional causes.

How thought and the emotions affect the digestion is illustrated frequently in the statement that one hears in such words as: " Why is it that when I go away from my home on a picnic or a holiday that I can eat anything and everything on the menu or bill-of-fare and never have any distress whatsoever, as a result? And why is it that when at home or at the office if I eat the plainest and lightest of foods I have distress?"

The correct answer is simple. When at home, or at work in the office, shop, store, or any other place, the patient carries around with him his worries and fears, which he feeds and nurses frequently, and the inevitable indigestion is the natural sequence. A pleasant holiday, the unloading of the worry, fear complex, enables the body, and, in this case, the digestive tract, to function normally and there is then no distress.

It is the nervous, the unnaturally emotional and worrying type of individual who presents himself to his physician complaining of ulcer symptoms. We believe that there would be few stomach or duodenal ulcers if all worries and fears and other such deleterious emotions could be eradicated from the human race. So often one sees an ulcer in an individual who has just passed or is passing through a crisis in his life. He may have suffered a financial loss in investments, his position or work may be insecure, or he may even have lost his means of livelihood; there may have been sickness in his home, or death may have recently removed a loved one. Besides these there are a thousand and one other lesser causes for worries which can and may creep in through an unguarded mental doorway. Even many of these lesser worries will lead to ulcer formations.

The thoughts and the emotions may have a deleterious effect on the digestion in the high, as well as in the low, the exalted as well as in the humble, the rich as well as in the poor, the learned as well as in the ignorant, the occupied as well as in the idle. There is no class, strata, cast, or division of mankind who may escape the inevitable sequence of distressing symptoms, once he has opened the portals of his mind and soul and has allowed free entree to thoughts of anxiety, worry, doubt, and fear. As truly and as surely as do wrong thoughts and wrong emotions produce indigestion and every sort of abdominal and gastrointestinal distress, so surely and truly do good thoughts and right emotions bring health, happiness, and Peace Profound.

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