

CHAPTER XXIII.

ADAPTING THE DIET TO VARIOUS CONDITIONS.

THERE is no ideal or perfect diet for all people at all times. The fundamental laws of nutrition must be adapted to the varying conditions of life. In this chapter I will discuss these varying conditions, which may be considered as normal variations, as distinct from the application of dietetic laws to actual ill-health and disease, which is considered at length in Volumes III and IV.

These normal conditions are: season and climate, growth and age, sex, pregnancy and nursing, occupation and activity, stature and weight, the influence of diet on the activity of the bowels. Between some of the above-mentioned conditions there are certain interrelations. Thus the chief distinction between the ideal diet for man and woman is merely one of adapting the quantity to the difference in size and weight of the body. The chief reason for the modification of the diet with advancing age is that of decreasing muscular activity. The mother's diet during pregnancy and nursing is a matter of adding to the normal diet of woman the essential dietary elements required for the rapid growth of the child that is being nourished from the mother.

In the adaptation of the diet for these various conditions we will have to consider both quantity and quality. Obviously, the adaptation of the diet for variations in bodily size should be a quantitative one, while the distinction in the diet required for growth compared with that of adulthood is largely qualitative. The adaptation of the diet to muscular activity, and also to old age, is a matter of the quantitative change in the energy-producing content of the food and also a qualitative change in the diet due to the change in proportions of the energy yielding food and the other dietetic essentials.

ACCORDING TO SEASON AND CLIMATE.—Many erroneous ideas commonly exist concerning the effect of climate and

season upon diet. The heat radiated from the body must be furnished by food, and this would indicate that there should be an increase in the total food intake in cold weather. But in practice, cold weather results in our wearing more clothing, staying indoors, and decreasing our exercise. Hence, we often require practically no more food in winter, and sometimes less, than in summer.

People who eat all they can in winter but worry over their summer diet have this justification for their pains—the summer diet, because of the greater danger of food contamination and decay, results in more frequent cases of ptomaine poisoning, indigestion and bowel troubles, and the death rate of children who are more subject to such troubles is greater in summer. The man who lightens his summer diet only is usually over-eating in winter, and it may not be without significance that the greatest death rate of adults is toward the end of the winter season, after people have been sitting indoors and eating “heavy foods.”

There is some justification for cutting down the meat consumption in summer, as the excessive eating of protein (lean meats) results in an increase in body temperature. There is no reason for cutting down on the so-called heating foods—fats, starches and sugars—merely because it is summer. These foods eaten in excess result not so much in an increase of body temperature, but an increase of body fatness. If a man is over-fat at any time of the year he is uncomfortable and inefficient. The fat is more uncomfortable in the summer, and there is more reason for him to reduce, but that is no excuse for his being fat in the winter—it is both cheaper and more comfortable to buy an overcoat than to grow one of blubber like a walrus.

The common, and in general the correct, belief is that the diet for growth must contain a high proportion of the protein foods. This belief originated from the chemical knowledge that the living body, with the exception of fatty tissue, is chiefly composed of protein, and hence, if rapid growth is to be expected, ample protein-building material should be supplied. This chemical reasoning had long been substantiated by the

observations that when young animals were supplied high protein diet growth was stimulated thereby.

The general truth of the necessity of protein for growth cannot be disputed either from the theoretical reasoning or practical observation. There are, however, certain dangers in the application of this general principle to the feeding of the children. In the first place, the old school of dietetic teachings laid undue emphasis on the fact that meat was the protein food par excellence. In all old-fashioned food classifications the protein foods were designated as "tissue forming" or "growing" food, and lean meat, containing little else than protein and water, was therefore ranked highest in such classification. Common-sense observations led to the recognition of milk and eggs as more wholesome and digestible protein food for children, and hence these more desirable articles of diet have generally held a high and worthy place in the feeding of children.

But even with this consideration, the danger of the old teaching lay in the fact that the typical diet of meat-eating people was unduly rich in protein, and if special efforts were made to increase the protein in the children's diet above that of the parents, the result would be a far greater proportion of protein than the actual needs of growth demanded.

The danger of error here may readily be understood by the consideration of the slower growth of the human young compared with that of the young of domestic animals. The calf reaches its full growth in two or three years, pigs and chickens in less than a year, while the child requires nearly twenty years for its growing period. Nor do we need to depend upon theoretical reasoning from the fact of the slower rate of growth to reach the conclusion that the child requires less protein than the rapidly growing young animal. The lesson is prepared for us in unmistakable form in the fact that the milk of the human mother contains but about one-half the proportion of protein that is present in the milk of a cow. This fact is well recognized in the custom of modifying cow's milk for human infants. Such modification is accomplished by taking the top

portion of a bottle of milk, adding water and milk sugar. In this manner the percentage of protein from the cow's milk is diluted, whereas the sugar content is increased, and the fat content, because the creamier portion of the milk is taken, remains about the same.

COMPOSITION OF MOTHER'S MILK.—The composition of mother's milk is indeed the best standard for the diet of early childhood; it is less rich in protein than is cow's milk, and is decidedly less rich in protein than would be a diet of cow's milk to which was added meat and eggs. On the other hand, it would not be safe to attempt to prescribe a diet for children merely by taking a proportion of protein as shown in mother's milk and using this as a standard to select an ordinary diet of vegetables or a diet of vegetables and meat which would yield the same quantity of protein foods. A proportion of protein derived from vegetables and meat that was no greater than the proportion of highly efficient protein in mother's milk, would most likely prove inadequate because of its lower availability.

The body is able to rid itself of food elements taken in excess of its needs, but it is wholly incapable of supplying elements that are deficient. Hence in childhood as in adult life when a mixed diet is used, the exact chemical content of which is unknown, it is essential that the food contain something in excess of the theoretical minimum needs of the body. The diet for childhood should therefore be moderately rich in protein food, and these should be selected from those food groups which most nearly approach the highly efficient body-building protein supplied in the mother's milk. As a source of protein for childhood we must therefore rank cow's milk as that of first quality, and eggs as a second best choice. Beyond this we have little reason to consider the problem, because when these foods are used in moderate quantities the foods added to secure other elements of the diet will contribute such further protein as is required.

But in the problem of feeding for growth protein is not the only essential consideration. The recent discoveries of science

have thoroughly established the fact that deficient diets, which have too often resulted in stunted and weakly children, are not to be explained so much by a lack of protein as by deficiencies in mineral salts and the vitamins. The highly beneficial results of the use of milk in feeding children are to be explained by the presence in a highly assimilable form of these dietetic essentials. Calcium (lime) and phosphorus are the mineral elements most likely to be deficient. These are supplied most abundantly by milk. Eggs alone are not so complete a diet for growth because of the fact that we do not eat the egg shell from which the growing chick secures a large portion of its calcium. Eggs cannot therefore be considered so complete a growing food as milk, although they are far superior to meat or vegetables as a source of protein.

By the supplying of a liberal proportion of milk to the diet of childhood the chief danger of mal-nutrition is avoided. As the quantity of milk is decreased and the proportion of energy derived from other food is increased, care should be taken that mineral salts and vitamins are supplied in like proportions. This factor of safety can be assured by the free use of green vegetables, fruits and entire grain products.

The chief dietetic danger of childhood comes from the child's fondness for confections, cakes and pastries made of white flour, sugar, starch, glucose and fats. Such denatured or super-refined foods are practically useless for supplying the elements of growth. Theoretically they are not harmful in small quantities, but in practice their use cloy the child's appetite so that he under-eats in foods containing mineral salts and vitamins, and there is grave danger that the proportion of these highly important dietetic essentials will therefore be decreased below the line of safety.

The first essential of the growing-diet of childhood is the inclusion of milk and eggs for the supply of the most efficient growing protein and for the certainty of a supply of minerals and vitamins in their safest and most utilizable form. The second most essential consideration is to include green vegetables and fruits so that as the proportion of milk is decreased

dietetic habits may be formed which will continue the supply of these essentials. Third, the inclusion of whole-wheat bread and whole grain cereal products, such as oatmeal and unpolished rice, in preference to white flour, polished rice and denatured patent cereal foods. Fourth, if the child is raised at a meat-eating table it should be taught to eat meat in very moderate quantities and not be allowed to make it the main dish of the meal. Fifth, the use of sugar and confections should be discouraged and the natural taste for sweets should be given a proper expression by permitting a free use of raisins, dates, oranges and other fruits that yield natural sugar in combination with mineral elements in an undenatured form.

DIET ACCORDING TO AGE.—Taking first the question of quantity, we find that the amount of food should be greater, considering the size of the body, in youth and slowly decrease with age. The new-born infant eats far more per pound of body weight than the full-grown man. This is true, first, because of the more rapid growth, second because of the radiation of heat relatively greater from the smaller body, and third because the general rate of organic activity is greater. The heart-beat and the breathing is faster in the child, and its activities are more constant. Small animals eat more per pound body weight than do the larger species.

The following table gives for boys a diet standard estimated on the basis of a proper amount of healthful exercise, but no constant heavy labor. The standard should be the same for girls until about the tenth year, reaching that of the mature woman (1.2 wheat pounds) at the age of 15.

| <i>Dietary Standard For Boys</i> | | | |
|----------------------------------|-----------------------|-----|-----------------------|
| AGE | WHEAT POUNDS DAILY | AGE | WHEAT POUNDS DAILY |
| 1 | .5 | 12 | 1.1 |
| 2 | .6 | 13 | 1.2 |
| 4 | .7 | 14 | 1.3 |
| 6 | .8 | 15 | 1.4 |
| 8 | .9 | 16 | 1.5 |
| 10 | 1.0 | | |

After physical maturity the quantity of food needed is fairly constant throughout adult life and is much more influenced by activity than by age. As old age approaches the quantity of food required gradually decreases, due chiefly to cessation of activity and also in part due to the shrinkage of the quantity of muscular tissue. Of all the known rules for attaining long life that of an abstemious diet is conceded to be the most important. As age increases the dangers attending overeating become greater. The old man not only fails to take the vigorous exercises of the younger, but he moves slowly, and all his bodily actions are slowed down and require less energy for their continuance. At from fifty to sixty—according to the degree of activity—the diet may be cut down one-tenth of a wheat-pound. Further age and increasing feebleness should result in further cuts to 1.2, which is about as low as the diet should go for a man who is up and about. 1.0 wheat-pounds is about right for the bed-ridden invalid.

DIET ACCORDING TO OCCUPATION AND ACTIVITY.—Muscular activity, whether of work or of play, is the greatest factor in altering the food requirement. A man doing no active muscular work and taking only light exercises, requires less than one-half the amount of food that he would need if he were working to the limit of his muscular capacity. But such extreme muscular work is comparatively rare and called for in but few occupations.

A man at heavy labor can, without apparent harm, eat foods which would wreck the digestion of a man at light labor. If the lumber-jack eats from one to two pounds of meat per day, it is his work that makes possible such eating and not the eating of the meat that makes possible his work. What is good for a man at moderate labor is still good for a man at heavy labor, but there are food elements that extra labor need not increase. The body requires practically no more protein, salts or vitamins, for heavy labor than for mere existence. Because cereal foods are cheaper, the manual laborer is fortunate in that the demands of his work do not require an increase of protein as was formerly thought to be necessary.

Extra muscular activity requires extra food for energy only, hence, cereals, sugar and fats are all that need to be added to a diet that already has enough of the other food elements to support normal life. In practice, in the poor man's home, this means a heavier consumption of the cheapest dishes. But it is well to note that the laborer's wife and children will need the same food proportions as other people, and hence the heavy worker with his workman's appetite, should partake of the low cost dishes and indulge himself in the daintier dishes only with such appetite as is expected of a man at light labor. This withholding from the head of the household the better tasting food may seem a difficult business in some instances, yet if we will stop to think it is what is commonly done in every household where bread and potatoes are piled on the table unlimited, and desserts served in limited and equal portions to all. The foods that are most needed to round out the diet made of the low cost cereal and fat dishes will be fruits, milk, eggs, and vegetables, especially the green salads. If the family is hard pressed for cash it may be well if more of these dishes are served to wife and children at the noon or afternoon lunch when the father is at work. Usually father won't mind it a bit, for he wants something "filling."

Because muscular activity stimulates the appetite there is often a tendency to allow a small increase in muscular work to result in too large an increase in food consumption. There are very few occupations in which the food intake should exceed 2 wheat-pounds. The following estimates will serve as a guide for the increasing of the diet with labor. It is, of course, only approximate, as the amount of muscular labor in any occupation varies widely.

A man of average size and weight when resting in bed (as from a broken leg) will require 1.0 wheat-pounds.

When on his feet and up and about the house taking absolutely no other exercise, 1.3 wheat-pounds.

When engaged in office work taking exercise equivalent to walking two miles a day, 1.5 wheat-pounds.

Indoor clerks on feet all day, 1.6 wheat-pounds.

Light muscular labor, as feeding printing press, 1.7 wheat-pounds.

Chauffeurs, teamsters, 1.8 wheat-pounds.

Carpenters, plumbers, expressmen, 2.0 wheat-pounds.

Walking all day as in following a plow, 2.2.

When engaged in harvest work, as shocking grain or pitching hay, including both continual working together with constant stooping or lifting for long hours, 2.5 wheat-pounds.

When lumbering, ice harvesting or engaged in similar excessively hard labor outdoors in cold weather, 2.8 wheat-pounds.

Six-day bicycle races and other deliberate efforts to utilize man's muscular abilities to the limit, 3 to 3.5 wheat-pounds.

It is to be borne in mind that such feats as six-day bicycle races usually result in the consumption of stored bodily fat. It is very difficult for the body to digest and assimilate such quantities of food even though the muscular consumption for the time demands it. In England, an experiment was once made to see how much men could eat and what would be the result of such deliberate over-eating. Healthy men taking out-door exercise were used as subjects and were able to stuff themselves with from 3 to 3.6 wheat-pounds per day. In every case they broke down in a few weeks with digestive disorders, and usually lost heavily in weight before recovery.

FOOD FOR MENTAL ACTIVITY.—To find a special diet for brain workers has long been one of the aims of science. This search has reached no definite goal. It has long been known that the brain cannot work efficiently if the general health is in any way depleted. But scientists have not been able to find any particular food that would make a man think.

A proper understanding of the physiology of thinking indicates the futility of a search for brain food. Muscular work converts matter into energy, but mental work consumes no appreciable quantity of matter. As thinking consumes nothing, there is no food that can create thought. This brain tissue is removed but slowly and its composition cannot be materially changed by particular foods.

Experiments in fasting seem to show that the physiological chemists have yet much to learn, for fasting thoroughly demonstrates that the power to perform intellectual labor not only does not depend upon the amount of food eaten, but within certain bounds, *is dependent upon the ability of man to do without food*. In other words, the longer he fasts within certain bounds, the greater becomes his intellectual power and the clearer his intellectual vision. Yet it is self-evident that if this idea is carried to the extreme and the man fasts to the point of physical exhaustion he is then unable to utilize his power of thought to any practical purpose. Hence, the "golden mean" must be observed. A sufficient quantity of food should be taken to maintain physical vigor at its highest degree of efficiency without over-loading the body in the slightest, and at the same time to get rid of unnecessary and undigested foods. Experience, then, demonstrates that the brain and nerves, when the proper degree of rest is given them, will recuperate themselves from the stores found in abundance in a healthy body, and will thus keep the organs of the mind in a condition fit for the highest intellectual manifestations.

While there is no particular food that can be eaten to aid the working of the brain, there are very many non-food materials that may be taken to injure its functions. Alcohol is a brain poison, the action of which is obvious. Nicotine, caffeine, and the various habit forming drugs also affect the brain. Any dietetic error that results in auto-intoxication destroys mental efficiency. The mere eating of excessive food produces a condition of the blood which results in dullness and drowsiness. Very many ways of eating will prevent us from thinking, and chief among these is plain gluttony.

COMPARATIVE DIETETIC NEEDS OF MEN AND WOMEN.—Except in child-bearing or nursing periods the chief distinction of woman's diet compared with man's is merely that one due to her lesser physical stature. Hence the proportionate differences would only apply in comparing a particular man and woman whose difference in size are relatively the same as the average differences of the sexes.

The dietetic requirements of women are usually placed at four-fifths those of men. If woman was engaged in as great a physical activity as man this would be a correct estimate. However, woman's smaller size and her quieter ways, together combine to make her food requirements relatively small, and in many families where the husband works in active labor the wife might overeat and the husband undereat, when she was not consuming more than half as much food as he. This is no argument to deprive woman of her fair share of food, for in practice, its application will result usually in restoring her to health, as woman suffers more frequently than man from indigestion or overweight, due to a combination of heavy eating with light muscular activities.

Woman's work may be very wearisome, literally the back-breaking sort, but the maintenance of an uncomfortable position or exhaustion from working in a hot and humid kitchen is not the sort of work that requires a heavy intake of food.

Woman's weight averages 83 per cent. of that of man, but her food requirements are not as much in comparison, because of the fact that woman's muscular system is not 83 percent that of man's. If it were, she would truly be more muscular for her size than man. The average woman carries more fatty tissue than man as shown by comparison of their statures. The weight of a body is as the cube of the dimensions and so figured woman's ideal weight should be only 77 per cent. of man's.

Under average conditions there is also a qualitative dietetic difference indicated for the sexes due to the fact that the average woman *does* carry more fatty tissue and that she does exercise relatively less, hence she will need a somewhat larger portion of the body-building and vitality-yielding elements of food and a comparatively smaller portion of the heat and energy supplying food elements. Her diet should therefore be more like that of the child when this is contrasted with that of the adult and particularly that of the hard-working man. If a woman is over-weight or especially inactive this difference should be increased, but where the weight is excessive the diet should conform more nearly to that recommended for the re-

duction of obesity, which is distinguished from that of the best growing diet of childhood by a lesser proportion of the growing protein derived from milk and eggs.

Although truly gluttonous appetites are more common among men than among women, there is probably a larger proportion of women who overeat than of men. This fact can be explained by the corresponding fact that a larger proportion of women are under-exercised. It may also be due to habits of serving food in uniform portions which particularly applies in case of dining in public restaurants. A woman of average size and activity who eats the same quantity of foods as the average man will in nine cases out of ten be over-eating. As it is often impractical, particularly in dining out, to have food portions served to individual needs, a woman will do well to omit some items from a dinner as served to the heartier eating man. Certainly such a course is in better taste than the habit of ordering the full service of food and leaving a portion uneaten. The plan of omitting some dishes from a full dinner also gives the intelligent woman a chance to exercise some selection in her food without the necessity of appearing unduly finicky or cranky. The items which she should omit from the conventional meal would ordinarily be those dishes richest in carbohydrates and fats, and this first would apply particularly in the case of the woman who is inclined to carry more weight than the laws of health and beauty demand. It should be noted here that all cases of over-eating do not result in overweight but with some individuals may cause indigestion and actually result in underweight. In either case the thing to do is to eliminate the heavy starches, meats and rich sweets and pastries.

FOR THE PREGNANT OR NURSING MOTHER.—The diet for the mother who must eat for her child as well as for herself is essentially a diet for growth. The ideal diet for the woman not doing heavy physical labor is closely akin to the ideal diet for the child, hence the primary need for the mother and the secondary needs for the growth of the child may be combined harmoniously. The additional amount of food that must be

eaten to provide for the growth of the child is relatively small as the child's growth is comparatively slow. During the nursing period the total demands will be somewhat greater than during pregnancy.

But while the additional amount of food which the child carrying or child nursing mother will require is not great, it is highly important that the diet be of the finest growing quality and amply and richly supplied with high growth protein and with mineral salts and vitamins. Milk, butter and eggs should enter in reasonable proportions into the mother's diet. Fruits and leafy vegetables are highly desirable. Sweets, preferably in the form of fruits and honey, are a desirable source, not only for supplying energy to the mother during pregnancy and nursing, but as a source of milk sugar.

The healthy and well-fleshed adult carries a reserve store of many of the food elements which will bridge over periods of dietetic deficiencies. But if the mother's diet is deficient the growth of the child will make the first demands on the lacking elements and the mother's vitality will suffer accordingly. If the deficiency is not remedied, both the mother and child will suffer, but the mother will have more opportunity to recover, whereas the child's growth may be stunted or a weakness may result in the rapidly developing young life which cannot be so easily remedied at a later date.

Starches may enter into the mother's diet more largely than they would in the diet of the young child, as her digestive powers are better able to cope with them. The same is true of meat, although there is positively no advantage of meats over milk and eggs and if the latter are available in abundance there is no occasion for the mother's becoming a heavy meat eater at this period, though less harm would result than from the feeding of meat to young children.

After childbirth, if the mother is thin, and especially if she is doing heavy housework, her diet may approach that of the male standard in quantity, but if she has retained her plumpness, or when she regains it, there would be no occasion for a heavier diet than that maintaining normal bodily weight.

Appetite may be more safely relied upon to indicate the quantity of food needed than to indicate the quality. This particularly applies to the modern civilized diet in which such natural instincts as man possesses are more or less baffled by habits of eating artificial food forms and mixtures. Scientific knowledge and intelligence are absolutely essential if modern civilized man would reach the maximum of efficiency in diet and this principle applies to the pregnant or nursing mother more especially than to other people at other times, because a deficient diet at this time is a source of greater danger.

The young child, whether in the mother's womb or nursing at her breast, is living its small life at a relatively more rapid rate than is the adult, and dietetic deficiency will therefore more quickly result in impairment of growth and vitality.

GAINING WEIGHT.—With this purpose in mind, the first thing to do is to determine whether one wants to gain muscular or fatty tissue. If the gain desired be muscular tissue, the only way to secure it is by exercising. Appetite will then usually urge one to eat sufficiently to supply all the energy this exercise involves, and the muscular tissue will be slowly built up by such exercise.

The foods required for the increase of muscular tissue are the proteins, but the actual amount needed is small and will be supplied by any normal diet. There must also be a slight surplus of wheat pounds or the heavy exercise will result in a depletion of that small, but desirable, portion of body fat which every normal individual should carry.

There may be a few instances, most notable in the case of thin women, where it is desirable, as a matter of appearance, to add a considerable amount of fatty tissue to the body. In these cases a reasonable surplus of food should be encouraged. Even to gain fat, it is often necessary to take exercise to stimulate appetite and increase the digestive and assimilative powers of the body. To gain weight, a proper balance must be struck between the exercise which will increase appetite and that which will burn up the material which might otherwise be deposited as fat.

In case of weakened digestion or poor appetite, it frequently happens that those foods which the appetite most readily accepts are low in nutritive value. Personal experiments should then be tried with foods that are high in wheat-pounds, but which also seem acceptable to the appetite and the digestion. Fat meats are frequently indigestible and are rarely advisable in large quantities. In such cases, the substitutes may be found in the form of vegetable oils, milk, cream, butter and nuts.

In case it is the starchy foods that are indigestible, the remedy may be in the larger use of fats, but this cannot be carried beyond a reasonable proportion, as fat should rarely form more than one-fourth of the total food intake. Starches may be logically replaced by the natural sweets of fruit. Likewise, the heavy cereal starches, breads, porridges, etc., may be replaced by the more diversified and usually more appetizing forms of carbohydrates found in vegetables.

HOW TO REDUCE WEIGHT.—The only scientific method of reducing the bodily weight is by lowering the food intake below the point of actual consumption in the muscle cells. A misleading notion in dietetics in the past has been the notion that some foods were fattening and others were not.

Fat people will frequently go to any trouble to avoid eating potatoes, or go without sugar in coffee, or avoid butter or some other few particular tabooed foods without making any effort to control the quantity of food as a whole. While it is true that the foods commonly avoided by those who wish to reduce are foods that yield heavily in nutriment and do make people fat, yet it gets one nowhere to avoid particular foods, if other foods are consumed that keep the total wheat-pounds up to the former figure.

The use of exercise for the reduction of fat is valuable, but its direct effect is not as great as that of food reduction. Usually a fat man who has utterly neglected the care of the body is a man half-sick and generally run-down in all bodily activities. Exercise for him is exceedingly valuable, but not alone for the reduction of fat. Fat can be reduced by exercise alone and by food alone. By far the best program is that

which involves both methods, but the main reliance should be in the reduction of the food intake as measured in wheat-pounds.

One great difficulty experienced in reduction of body weight comes from the sudden determination to reduce on the part of the person who previously made no effort to restrict the food or to take any systematic exercise. He then starts out taking a ten-mile walk, and at the same time resolves to "diet." As he has always been in the habit of eating all his appetite demanded, and as he comes home from his jaunt with the greatest appetite he ever had in his life, and the first honest one, there is an immediate conflict of purposes, and his resolutions frequently go to smash.

This discouraging result may be avoided if a little common sense is used in planning. If one has been in the habit of taking any exercise at all, he will find it advisable to increase that exercise gradually without such strenuous efforts as will stimulate his appetite. If exercise has not been among his habits, it will be better to first cut the diet, and wait until he has become accustomed to dietetic restriction, and to leaving the table a bit hungry, before he imposes upon himself the greater temptation that will come from the increased appetite due to exercise. Indeed, he will find that after a few weeks of abstemious eating he will not consider the honest appetite earned by exercise as a behest which he must obey or perish. Having accustomed himself to allowing his brain and not his palate to dictate his bill-of-fare, the appetite from exercise may be mastered without its overwhelming him.

Many books written on the reduction of fat have been innocently or intentionally deceptive. The authors have inferred that bodily weight could be reduced while still enjoying all the pleasures of eating. This is true if we confine the pleasures of eating to the genuine pleasures that come from the true epicurean test that is a part of the physical culture system of health building. But if the inference is that the fat man can continue to indulge his gluttonous appetite for conventional cookery, washed down with conventional liquors, then he is doomed to

disappointment, and selling him a book on fat reduction is taking money under false pretenses. If the fat man will not give up his pleasures of gourmandizing, let him be fat. It is Nature's penalty, and there is no way to remove the effect without removing the cause.

The practical problem of the selection of the diet for reduction is in finding a diet that will not make the subject suffer too severely from the pangs of hunger. A little hunger is a good and wholesome thing, but the fat man is of an indulgent type, and rarely has the courage, at least in the first stages of his experiment, to severely deny himself. He should not be judged too harshly for this weakness, as the very fact that he is fat would indicate that he has been long in the habit of indulging in food and there may be an abnormal craving in the stomach that will make the partial fast of the reducing diet more severe upon him than it would be upon a man whose appetite had been trained to restraint.

The foods selected for reduction should therefore be those which supply all possible elements without a high wheat-pound value. Thus, if one attempted to consume lettuce to the extent required to supply 1.5 wheat-pounds, it would take 22 pounds of that excellent food to supply the nutrition. The very idea of eating 22 pounds of lettuce would stagger even a fat man's appetite, and there would therefore be little danger of remaining fat on such a diet. Of course, it is not practical to recommend a diet of any single one of these low nutrition foods, but the diet can partake more largely of foods of this sort. Bulky vegetables of all sorts are excellent to give a sense of fullness. This includes the salad vegetables, which are taken raw, as well as all cooked vegetables, and does not need to exclude potatoes, which are composed of starch in about the same proportion as are most boiled cereals. In serving green vegetables, either raw or cooked, they should be dressed with lemon juice, not oil. One may destroy the reducing tendency of the diet by addition of oil. A green salad dressed with oil may be more fattening than a similar sized dish of potatoes. Fresh fruits have an effect similar to that of bulky vegetables.

MASTICATION RELIEVES HUNGER.—The act of mastication and the actual presence of a residue in the intestines, both serve to alleviate hunger. The usefulness of fruits for this purpose may be lost entirely if sugar is used. Excessively sour fruits like rhubarb and cranberries, require so much sugar that they become nearly as fattening as porridges. Sugar is considered to be a fat producer, and while it is no more so than starches, and decidedly less than fat, it is to be guarded against for the reason that it requires absolutely no mastication, is absorbed quickly, and leaves no bulk in the intestines, and hence it is very easy to add quantities of it to the diet without becoming aware that the diet has increased.

The third group of foods which should be called upon for reducing the diet are those which from habit are taken in small quantities. For this reason, bacon might well be put on the list of fat reducing foods. If by habit one eats a pound of fish at a meal, and this is fried in oil, he will consume a larger number of wheat-pounds than if the meat of the meal be bacon, which is usually served and eaten in small quantities. When the cook or housewife is planning a diet for one who wishes to reduce, a great deal of cleverness can be exercised in cooking and serving. Small portions should be served; bread may be cut in extra thin slices, and other means used to make a man feel that he has had his dinner without his really having consumed a large quantity of food.

The last, and perhaps the best method of all for aiding in this general effect of satisfying the appetite with less food, is increased mastication. The beneficial results achieved by Fletcherism have been largely due to the lessening quantity of food eaten. Less food was eaten because from habit the appetite became satisfied after a given amount of mastication. A similar effect is gained, both from an increased time required to eat and from the restoration of normal or true appetite as against that artificial appetite acquired from the high flavors and the mushy conditions of most conventional foods.

To summarize the general plan for the diet for reduction, we should first select bulky foods, as green vegetables and

fresh fruits; second, if meat is taken, use those meats that are habitually taken in small quantities; third, use foods that require chewing, such as very hard crackers and breads. All these foods should be eaten slowly and swallowed without the aid of liquids.

The rate of weight reduction will depend upon the number of wheat-pounds burned in the body and those taken in the diet. If the amount of exercise is sufficient to consume 1.5 wheat-pounds and if but 1 wheat-pound is eaten, the subject will obviously lose weight at the rate of .5 wheat-pounds of nutrition per day. If this loss is to come from actual body fat, it means a loss of about one-fourth of a pound per day.

If one fasts completely, the loss will be about three-fourths of a pound per day. When one begins to reduce his diet, there will be a much greater loss for the first few days, due to the emptying out of the digestive tract and the reduction of the body fluids which excessive eating increases. The rate of reduction aimed at is a matter of individual choice. From one-quarter to one-half a pound per day is entirely practical and means that the diet consumed should be from one-half to three-fourths of a normal diet.

Those who are reducing, or for any other purpose make a definite effort to decrease the diet, should guard against accessory food items, the chief of which are candy, nuts, ice cream, and soda fountain concoctions. The chief harm of eating between meals is that it usually leads to overeating. Especially in the case of candy, the number of wheat-pounds adds up quite rapidly. Candy is practically pure sugar with very little water, and is from three to ten times more filling, pound for pound, than porridges, vegetables and fruits.

The use of alcoholic liquors involves a very different question. Many serious arguments have been waged over the food value of alcohol. Beer does contain considerable non-alcoholic food material. It has been assumed that the fact that beer had a food value should be universally interpreted as a reason for the approval of beer. In reality, it is a reason for its condemnation. In the use of beer, the nutriment added to a diet

already ample may prove a source of evil only secondary to the harm done by the alcohol itself. The same thing may be said of certain sugary soda fountain drinks. Many of these are directly injurious because of harmful ingredients, but as they are taken in addition to the regular meals, they add fuel to the flames, though we rarely think of these food accessories as being the cause of our trouble.

The best way to fatten a chicken or pig is to get it to nibble and eat continuously. Beer saloons, candy stores and soda fountains will be beneficent institutions only when human efficiency is to be determined along the same lines as the hog farm.

In the problem of dieting for reduction, valuable suggestion may be derived from the teachings of modern efficiency. Whether it is a question of a workman in a machine shop or a man thinking out a big deal on the stock exchange, a fundamental rule of personal efficiency is to plan out and decide exactly what you are going to do in advance of the actual doing. A man who has planned to do a definite thing in a definite way and to quit when he is finished will invariably make a cleaner job of it than a man who goes at it blindly.

To apply this principle to dieting, one should discard the old idea of eating till one is filled, and decide either before one sits down to dinner or after one sees the bill-of-fare, just what and how much he is going to eat. This definite planning in advance of a fixed program of action always aids in the carrying out of that action. It develops will power and will power is nothing more than the ability to think out a line of action and then do it without hesitation and wavering.

A prominent New York business man who succeeded in reducing his own waist line very materially, advocates standing up to eat. Inasmuch as it makes the meal less a matter of leisure and rest, it discourages the habit of eating until satisfied. This should be well worth trying by those who find difficulty in limiting their food intake. So great is the belief of the gentleman in question in the efficiency of a restricted diet that he made a rule in his business that his buyers should not

close any deal after one o'clock. He made a second rule that they should not lunch before one. This plan effectively sidestepped the usual custom of the salesman inviting the buyer out to dinner and filling him up with good things and good cheer until, with a full belly and a sleepy head, he became exceedingly acquiescent to his host and agreed to take the goods at the other man's price.

"A full round belly with capon lined" means weakness, dullness, inefficiency and failure.

OVERWEIGHT CAUSES DISEASE AND DEATH.—One of the most striking recent changes of opinion among medical men has been due to the discovery that the statistics of life insurance companies show that fat policy holders are very much poorer insurance risks than thin ones. The overweight policy holder is shorter lived and has a higher death rate at all ages than does the normal man, whereas at all ages after 30, the overweight man has a higher death rate than the underweight man. In old age, the underweight man actually has a lower death rate than the average so-called normal man, evidently due to the fact that a large proportion of old men are so fat as to bring up the average weight to a point that is greater than the ideal weight. Hence, among old men, those who have been classed as normal are really too fat.

The diseases on next page seem to be fat man's diseases. It is more logical to say that both the disease and the fatness are caused by the same error of over-eating and under-exercise. These figures are too striking to be ignored. That four times as many middle-aged fat men should die of heart disease as thin men is a pretty obvious indication that "fat, hale and hearty" is a lying phrase.

Evidently, people who are fat are not hale and hearty, and people who are hale and hearty are not fat. This great fallacy which such popular phrases express is based upon two lines of false reasoning: First, the notion that because food is essential to life and because it is good for man to eat, that it is good to overeat and gain the resulting fat; second, because a man who is actually sick and nigh unto death is reduced to skin

and bones, the suggested remedy, to the simple mind, is to go to the other extreme and be fat.

RATIO OF DEATHS OF MEN 50 POUNDS OR MORE OVER WEIGHT AND 25 POUNDS OR MORE UNDER WEIGHT, THE NORMAL DEATH RATE IN EACH CASE BEING EXPRESSED AS 100.

| Age when insured..... | 15 to 29 | | 30 to 44 | | 45 and up | |
|---------------------------------|-------------|--------------|-------------|--------------|-------------|--------------|
| | Over weight | Under weight | Over weight | Under weight | Over weight | Under weight |
| Typhoid | 233 | 79 | 129 | 89 | 121 | 108 |
| Diabetis | 250 | 117 | 492 | 42 | 485 | 21 |
| Apoplexy | 260 | 70 | 279 | 58 | 188 | 53 |
| Heart disease | 350 | 107 | 295 | 72 | 197 | 64 |
| Appendicitis | 56 | 81 | 157 | 93 | 195 | 63 |
| Cirrhosis of liver..... | 433 | 33 | 380 | 30 | 203 | 36 |
| Bright's disease | 331 | 84 | 330 | 61 | 209 | 54 |
| Total deaths from all causes... | 115 | 121 | 163 | 104 | 133 | 88 |

In some instances, there seems to be a bit of truth in this last reasoning, so false in the main. Thus in the case of tuberculosis, fat men do not die, but this does not prove that a person with a tendency to tuberculosis may prevent the disease by fattening himself like a corn-fed hog. A more likely explanation of the low death rate from tuberculosis among fat men is that the possession of fat is an indication of ample digestive and assimilative powers, whereas tuberculosis gets a foothold only where the digestive and assimilative powers are deficient. Thus fatness and freedom from tuberculosis may come from the same cause—good digestion; but long life is due to a good digestion used and not abused.

WHY BRAN IS NEEDED.—Constipation as a disease is fully discussed in Volume IV. The foods recommended for the cure are those that have the largest proportion of cellulose of indigestible fiber. Chief among these is wheat bran. The effect of bran is similar whether it be eaten as whole wheat, whole wheat bread or taken separately as bran. The folly of separating the bran from the flour and again recombining them in the diet is obvious. Neither the flour nor the bran is as palatable when eaten alone as when eaten in the natural form of the entire grain.

If the diet contains a normal proportion of wheat and all of this is eaten in its entirety as perhaps a cereal food or bread, the activity of the bowels will usually be well regulated. But where one is forced to eat white bread products, the error can be

remedied by the separate use of bran. In such cases the bran may be mixed with other cereal dishes as oatmeal or it may simply be boiled and eaten with cream and sugar like other cereals. About three rounded tablespoonfuls a day will return to the diet the proportion of bran removed from the white bread ordinarily eaten.

While the chief reason for using bran is that of increasing the bowel activity by the presence of the indigestible cellulose, the conclusion should not be reached that bran is all waste. It is rich in salts, vitamins and protein and also contains some digestible carbohydrate, in addition to the indigestible cellulose. In its composition bran resembles leafy foods which are also excellent for increasing the food bulk and intestinal activity.

The word "indigestible" has two meanings, the one as applied to the failure to digest foods that should be digested, the other is the failure to digest inert substances that add bulk to the diet, but are not affected by the digestive juices. Indigestion of fats or carbohydrates and particularly of proteins is harmful because when not digested such material decomposes and poisons the system. Cellulose, on the contrary, though it fails to digest, does not decompose, and its presence is a benefit as the increased bulk stimulates the peristaltic action of the bowels and so hastens the removal of all food residue or bodily waste excreted by way of the bowels, the retention of which is harmful.

A general misconception is prevalent as to the source of the material passed from the bowel. With the exception of cellulose, very little of the feces, in the case of a healthy organism, is actual undigested food, but is composed of the residue of digestive juices and of material excreted from the body by way of the bowel. Man naturally lived on vegetable foods containing considerable cellulose. His intestines are made of sufficient size to accommodate this residue. If it be lacking they fail to function as rapidly as nature intended and the wastes are therefore retained over long. This same principle applies to all animals, in a varying degree, according to their diet.

The conventional foods of civilization have been denatured by the removal of the cellular outer structures. This is harmful, both for chemical and mechanical reasons. A properly balanced diet of whole grains, vegetables, fruits, nuts, milk and eggs would never cause constipation, although when the condition has become chronic some special cases will require more than a normal diet to effect a cure. On the other hand, after the system has, in a measure, become accustomed to functioning on a diet deficient in cellulose, the use of the quantity nature intended may, in some cases, bring about too rapid movement of the food through the intestine and therefore result in incomplete digestion, even of the digestible food ingredients. In extreme cases, this becomes diarrhoea.

Because of unnatural living habits in the past, certain individuals will therefore find that special care is required to regulate the bowel activity. Personal trial is the only way to solve the individual problem. In most cases varying the amount of whole wheat bread used will prove a sufficient means of regulation. If the bread alone is not sufficient, bran may be used in addition. When ample leafy greens and fibrous fruits are eaten, less whole wheat or bran may suffice. If the use of all these products results in too rapid passage of the bowel content, then the more fibrous portions should be eliminated and a larger share of the salts and vitamins secured from dairy products. While the natural foods that are rich in salts and vitamins are usually also rich in fiber, there is enough distinction in the fiber content to permit of personal adaptation of the diet in regard to the cellulose without a return to the white flour and meat diet which is deficient in all of these essentials.

Although the chief element in the regulation of bowel movement is the amount of cellulose or fiber, there is also some difference of effect in non-fibrous foods. Starches are more constipating than sugars, and proteids more constipating than fats. Milk when used in small quantities is constipating, but a full diet of milk is laxative. Sweet fruits are mild laxatives, both because of their cellulose content and because of the sugars.

Food oils are laxative if taken in excess because that portion not digested acts as a lubricant. Purified mineral oil is in no sense a food as it is wholly indigestible. Its action in preventing constipation is like that of cellulose, in that it passes through the bowels without being digested. In addition it acts as a lubricant. Its use is to be recommended only in cases that fail to yield to food treatment. It is certainly to be chosen in preference to laxative drugs, the effect of which is to cause an artificial diarrhoea.

Agar is a gelatinous form of cellulose made from seaweed. It is indigestible and acts like bran, but is smoother in texture. Where bran is found to be irritating, agar may be substituted, but it is more expensive and less easy to obtain.