WHAT TO EAT AND WHY

BY

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BOSTON, MASS.

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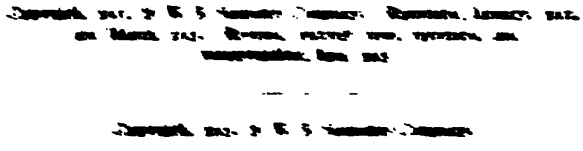

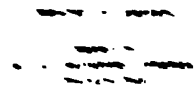

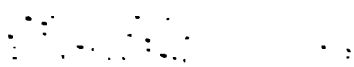

PREFACE TO THE SECOND EDITION

THE cordial reception of the first edition of this little book has not only been very gratifying to me but has stimulated me to incorporate in the second edition some accessory chapters which seem, in my consultation work, absolutely necessary to clarify the *raison d'être* of the dietetic method advocated, and therefore make secure their adoption and continuance. An entirely new chapter upon Exercise has been written, not only because of its importance in causing disease and inviting a recurrence of the same, but also because of the important rôle it plays in the restoration and maintenance of health.

A new chapter upon Rheumatism has been introduced because the last three years have added greatly to our knowledge of this subject. The different affections of the stomach have all been rewritten and greatly enlarged, and many other chapters have been increased and brought up to date. Some tables and typographical errors have been corrected.

I am pleased to acknowledge my indebtedness to Drs. Elliot P. Joslin and Nathaniel Bowditch Potter for many reliable suggestions, also to my associate Dr. William E. Preble, for rigid censorship, revision and creation of new tables, and general detail work.

GEORGE CARROLL SMITH.

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PREFACE.

No attempt is made in this volume to cover the whole subject of dietetics or to discuss all the affections which are benefited by a carefully regulated diet. Very little has been said about the chemistry of foods, as elaborate treatises, compilations and books have been written covering the minutest scientific facts, so far as yet known to the internist and research men.

The desire of the author is to place before the medical student, and particularly the active, busy practitioner, a book describing the fundamental elements of food and the principles underlying its use, the essential reasons why a change of the diet in certain diseases is desirable, and how this change may be made in the most practical, time-saving way, that there may no longer be an excuse, except in rare instances, for the country physician sending his patient to the city specialist to be dieted after an accurate diagnosis has been made.

Only the most important diseases have been discussed, as the others will be treated properly, if the principles underlying the treatment of the former are understood. Special attention has been given to these principles, "the Why," as the author has found from long, practical experience, that it is the confidence in these principles which secures their adoption by doctor and patient alike, and makes possible the brilliant results achieved.

Only a few diet lists have been given, but each one is sufficiently comprehensive to cover the many different

phases of the same disease, *e.g.*, cardiac affections with diarrhea as a symptom, if considered harmful, certain laxative foods, which would be considered useful if constipation predominated, are omitted from the diet.

I have tried to make it clear that the chief questions to be settled in arranging the proper diet for a patient are two:

1. How much protein shall be given?
2. What the proportion of the fats and carbohydrates shall be?

A study of each affection discussed will make it evident that these questions must be solved on the merits of the individual case.

A careful study has been made of the rational histories of the cases, especially with reference to the kinds of food taken in the past, as well as the diseases suffered from heretofore, which may have laid the foundation for the present trouble. A thorough investigation of their present metabolism has been made and due allowance given for personal idiosyncrasies.

The stools have been studied only in cases where the faulty digestion of meat, fat or starch was suspected or when the presence of blood, pus, mucus, parasites, eggs, etc., might aid in clearing up the diagnosis. Recently we are microscoping the stools of all patients requiring any radical change in their diet, with special search for excess of starch, muscle and fat escaping digestion, but up to this time have insufficient data to report.

Little attention has been given to artificial foods, as we have rarely had any demand for them and for obvious reasons the natural foods, when they can be secured, are preferable.

If "*What to Eat and Why*" simplifies dietetic therapy for the medical student and makes it chief among therapies for the busy practitioner, stimulating him to prescribe a dietetic therapy as readily as an electro-,

hydro-, serum or drug therapy, the gap I have observed will be filled.

I am greatly indebted to my assistant Dr. L. M. Spear for aid in arranging tables, indexing, proof reading and valuable suggestions.

GEORGE CARROLL SMITH.

THE WESTMINSTER, BOSTON, MASS.

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WHAT TO EAT AND WHY

INTRODUCTION

What enters into a man does him good or harm. This applies to food, drink, inspired air, and whatever introduced into his blood, hypodermically bites or stings of snakes, insects, mosquitoes, by inoculation—syphilis, gonorrhea, etc. It known to scientists for some time that living f various kinds, the typhoid and tubercle nd many others, and various parasites, were roduced into the body with drinking water, other food, also that food that has already ne decomposition or has been insufficiently nay set up disease, like ptomaine poisoning. ubtedly most acute diseases arise from in- which gain access to the body in some of the ıg ways and run their course in a comparatively short time. The system may completely recover or be left reduced in tone in the part affected and therefore less able to resist future bodily insults. Many chronic affections trace their origin to earlier acute infections. Moreover, there are conditions of the system, which we call diatheses, in which there is an inherent tendency to develop under favorable conditions certain diseases, *e.g.*, gout, obesity, diabetes, and arthritis. This tendency is increased by the

excessive use of alcohol, coffee and tea; also by grief, financial loss, worry, or depressing weather.

phylaxis. In the way of prophylaxis we can do much to ward off many of the acute diseases by using only pure and well-cooked food, but we can do *far more* for patients afflicted with *chronic disease*, for we have, during the past quarter of a century, learned much—thanks to the physiological chemist—concerning the physiological action of the different foods and the processes of digestion, absorption, assimilation and elimination. In fact, the food problem, in chronic disease, is now considered much more important than all the other factors combined. Good air, favorable climate, sunshine, healthy occupation, congenial companionship, right thinking (mental and moral), sound sleep, proper exercise, sufficient relaxation, rest, and amusement are required to relieve distressing symptoms, and secure the best results from the proper diet. Very few drugs are necessary.

e food blem. Medical and popular literature, from the earliest times, has discussed the food problem empirically with more or less benefit in that, comparisons of the different kinds of food eaten by peoples and races in various parts of the world showed that the food in general use has always depended upon the varying climate, environment, kind of labor performed, habit of life, and education. But the first work in the quantitative analysis of food was done in 1795 by Pearson of England, who analyzed potato, and during the first half of the nineteenth century great progress was made by physiological chemists, headed by the wise and enthusiastic Liebig. In 1864 Henneberg elaborated the Weende method of analysis and since then

Voit, Bischoff, Bidder and Schmidt, Rubner, Uffelmann, Atwater, Chittenden, and others have worked out the problem of food metabolism, and given us a scientific basis upon which to build up a system of dietetics. Another excellent system is also advocated by the French scientists, the chief exponent of which is Gautier. This in brief consists in taking an average of the daily food of the 2,800,000 inhabitants of Paris during ten years (1890 to 1900) and finding the daily quantity of the different elements of food consumed, using this as a working basis. This method, though empirical and subject to much criticism, has many advantages, which must be clearly evident to the clinician, over the more generally adopted former method. The two may be profitably studied together, always making due allowance for idiosyncrasies of the test cases, variations in different kinds of food, and uncertainty of preparation by the cook (everybody knows the fallibility of cooks), the liability of error on the part of the numerous investigators with their mechanical appliances, and last, and probably least of all, for the imperfections of the calorimeter. However, for the last thirty years, experiments made by physiological chemists all over the world have led to essentially the same results, hence, so far at least as they have pointed out the way, we are justified in following, and surely a dietetic therapy to-day rests upon a rational scientific basis.

The composition of the human body.

According to M. Rubner the human body is made up of carbon, nitrogen, oxygen and water constituting 95.6 per cent., the other 4.4 per cent. consist of chlorine, sulphur, phosphorus, potassium, sodium, calcium, iron, silicon, and fluorine.

The former, then, with the exception of water, constitute the organic, while water and the various salts make up the inorganic part of the body, and in fact the various elements are intimately associated, as the chemical formula of fat of the tissue shows C_3H_5 $(C_{16}H_{31}O_2)_3$. By virtue of the different chemical arrangement of the above elements the various tissues of the human body consist of water 59 per cent., fat 21 per cent., albumen 9 per cent., glutin, chondrin, elastin, skin, hair, etc., 6 per cent., and ash 5 per cent. The vital processes in life are set up by cellular activity actuated, it may be, by food. The different elements of food are carried, in the circulation, to the individual cells of the body, and whatever is necessary to supply the waste constantly going on in the cell protoplasm is taken up from the circulation by some innate selective power of which we know nothing. The cell structure consists chiefly of an albuminous protoplasm containing water and salts, a nucleus with 3 to 10 per cent. phosphorus, fat, and carbohydrate in the form of glycogen. We now know that every nitrogenous tissue of the body is made up from food containing nitrogen, also that the body subjected to disease (diabetes mellitus) when fed upon albumen can cause the deposition of sugar. Fat is found in all organs of the body in great masses (its chief deposits are in the mesentery, the liver and subcutaneous cellular tissue), and is widely disseminated among the other organic substances, while carbohydrate is found in the gastro-intestinal tract and as glycogen in muscle cells and liver. The various inorganic salts and water are found in the bones, cartilage, muscles, etc., and in the body fluids.

Structure of the cell.

Nitrogen, fat, carbohydrate and inorganic salts.

Now, since all the substances of the body are constantly undergoing change by chemical oxidation, the loss must be made up by a food supply which contains materials similar to these substances, and in addition a reserve must be provided which may be stored up for use when great demands are made upon the system or when, on account of illness, food cannot be taken.

Classification of foods.

Foods have been classified as proteins, carbohydrates, and fats. These constitute the organic elements, while the inorganic, water and salts, have already been mentioned. All these elements are found in the animal, vegetable and mineral world, and are utilized by mankind. It is very fortunate, however, that man can subsist largely upon vegetables, as in many parts of the world animal food is scarce and therefore expensive. However, I know of no race, tribe, or individual who are, strictly speaking, vegetarian, as they partake of milk, eggs, cheese, fish, etc., forgetting that they are animal derivatives.

Importance of protein element.

The proteins contain one very important element, *nitrogen*, which is wanting in both the carbohydrate and fat and cannot be supplied by them, and as the cell protoplasm is made up chiefly of albumen it can readily be seen that every effort must be made to keep the system well supplied with nitrogenous food. This can be obtained from carbohydrates which contain vegetable protein, but is less palatable, much more bulky, and monotonous, and more apt to lead to disturbances of digestion than animal protein. All civilized nations now accept the fact that the best brain and muscle of the world are found in men and women who partake of animal as well as vegetable food. The fat of food, though to some extent taken from vege-

Vegetable and animal protein.

Vegetable and animal fat.

table, is largely derived from the animal in the form of cream, butter, fish, and meat. It should be remembered that vegetable oil (olive) is not so well absorbed from the intestine as animal fats, and therefore much of it is lost to nutrition. The carbohydrates are given in the form of starch (bread, vegetables) and sugar, honey, fruit sugars, etc. Condiments are wisely classed by the Germans and French as food, since they enter so much into its preparation.

Carbohydrates.

Condiments.

Energy in food.

Organic food possesses a varying amount of stored up energy which is set free in the body by cleavage, decomposition and fermentation, and manifests itself in heat, energy, and muscular effort. Gautier says: "A full-grown man in good health weighing 150 pounds uses up each day about 500 grams of his flesh or of other albuminous compounds which form his blood and tissues. He burns a part of his fat, sugars and starches, and furnishes by their combustion, and by that which his food puts at his disposal, and his tissues supply him with, a quantity of energy which calculated in heat units amounts to about 2400 calories in twenty-four hours." He loses besides about 3 pints (1500 c.c.) of water by urine, nearly 1 pint (500 c.c.) by perspiration, and 7/8 pint (450 c.c.) by exhalations from the lungs. He exhales 690 grams of oxygen and 260 grams of carbon in the form of carbonic acid and by his total daily excretions he loses 23 grams of different mineral salts, more than one-half of which is formed from sea salt. Now the daily food has to equal this amount, plus a little extra for reserve. The food value of the different kinds of organic substances can be accurately measured, using the calorie as the standard unit of measurement. A

Losses from body.

Measuring value of different foods. The calorie.

calorie represents the amount of heat required to raise the temperature of 1 kilo (2.2 pounds) of water 1° C. Now it has been found by burning in a calorimeter a measured amount of protein, carbohydrate, and fat a certain amount of heat was generated and expressed in heat units or calories, and therefrom the following deductions were made:

1 gram of protein	furnishes	4.1 calories.
1 gram of carbohydrate	furnishes	4.1 calories.
1 gram of fat	furnishes	9.3 calories.

Caloric requirement of the individual.

It has also been ascertained that an average adult weighing 154 pounds (70 kilos) requires food necessary to produce 2500 calories per day or 35 calories per kilo. This varies, of course, with the conditions under which the man lives, *e.g.*, in a cold climate or under strenuous physical effort, more calories would be required than in a hot climate, at mental work, or at rest. Indeed, in the latter 1500 calories daily would be ample. It is generally conceded that the patient is better nourished by giving varying amounts of the three different kinds of food. It has been proved that the proteins are absolutely required, as neither fat nor carbohydrate contain nitrogen, the essential constituent of the living cell. The amount of protein necessary for the best of health is still a much mooted question. Since Voit did his remarkable work, the teaching of the Munich school, which allows 100 to 120 grams protein daily, has been followed. Recently Chittenden has found that well-nourished men, following different vocations, maintained good health for a period of several months on mixed diet, containing 40 to 60 grams of protein, and states his belief

Protein requirement.

that the Voit standard contains about twice the required amount. This result has been much criticized on the ground that the men tested belonged to the better class and could undergo a greater restriction than the poorer class which is not so well nourished, also that the subsequent health of the cases has not been reported. Lieutenant Colonel Melville found that his soldiers did well on 190 grams protein daily, and 3400 calories under service conditions. Some of Chittenden's soldiers lost over 18 pounds weight during his experiments (Cathcart, p. 70). Pleüger claimed that protein alone was sufficient to supply all necessary energy, and was the food par excellence (*Arch. f. ges. Physiol.*, 1891, 50, 98).

Chittenden, at most, showed the minimum requirement of protein, not the amount, that may be advantageously taken. Sufficient time, since research work was done, has not yet elapsed for clinicians to prove or disprove Chittenden's findings. Crichton Brown suggests a study of nature's method of providing protein in mother's milk. An infant one week old, weighing 8 1/2 pounds, consumes daily 400 grams of breast milk, yielding 8 grams of protein, *i.e.*, 2.07 per kilo of body weight, which is an equivalent of about 145 grams of protein for a man weighing 154 pounds or two and one-half times the Chittenden standard. After all, the physician who has to do with all classes of patients, rich and poor, can judge whether they need more or less protein than in health, and what the requirement in health should be. It is an every-day experience that the protein must occasionally be reduced even below Chittenden's and often raised above Voit's standard for many patients. Persons on

a low protein allowance are not so vigorous physically and mentally as those on a relatively high protein diet. The large amount of protein foods given in many cures, *e.g.*, the Ross and Weir Mitchell, equal several times the amount of the Voit standard, and show conclusively that persons with a variety of diseases manifest a great toleration for proteins, and apparently increase their power of digesting the same after they are restored to health. It is claimed by Chittenden and his followers that feeding protein, in excess of the normal amount, clogs the kidneys and liver with ash. This would be expected to cause bilious attacks, gastro-intestinal disturbance, gout, rheumatism, etc., whereas no such reports come from our sanatoria or from physicians of ripe experience.

Effect of feeding an increased amount of protein.

Again, we know from the different methods of treating obesity, many of which increase the protein element above the Voit standard, that no bad results occur, unless the carbohydrates and fats are too much reduced. Indeed, during the past fifteen years, in which we have treated a comparatively large number of obese men and women, we have never seen ill results from a daily allowance of 100 to 150 grams of protein. It is fair to state that we do not reduce obese nephritics by increasing their protein, and fortunately obesity is a rare complication of primary nephritis. When, however, the kidney affection is secondary to heart disease between the ages of thirty and fifty years, thereby becoming a complication because of incapacity to exercise, we have never failed to greatly improve the health of our patients by reducing their weight, while allowing them a liberal amount of albuminous food. Nephritis is compara-

tively rare among Esquimaux, who subsist mainly upon meat and fish. This subject is still further elucidated and elaborated in the chapters on obesity, cardiac affections, and nephritis, so that no more time can be given to it here, although I hope enough has been written to persuade the reader to stick to the Voit standard until stronger evidence of a better is produced. Now as to the kind of protein. Voit selected one-third animal and two-thirds vegetable, but this may be varied according to circumstances and environment. It is claimed by some that the vegetable proteins are preferable to the animal. I can conceive of this being true in hot climates and where it is difficult to obtain the latter. In the former case the appetite does not crave animal food and in the latter instance it is prohibitive on account of expense, but in temperate and frigid zones the above reasons do not obtain; again, the feeding of the large quantity of carbohydrate necessary to yield the requisite amount of protein would overtax and lead to disturbance of the digestive organs, causing obesity, diabetes, rheumatism, gout, and other metabolic affections. The balance of the daily number of calories necessary for the healthy adult is 2350, which is usually divided between the carbohydrates and fats, as follows: the former furnishes 1850 and the latter 548 calories. This plan may be modified to suit the individual case by remembering a few facts.

Kind of protein.

Carbohydrates and fats as caloric furnishers.

1. The carbohydrates may almost completely replace the fats in our food and *vice versa*.

2. The former protect the albumen of the tissues from waste better than does a similar quantity of fat and are called "albumen sparers."

3. The carbohydrates also prevent the waste of fat and favor its increase in the system.

4. It can be given in much greater variety than fats—bread of many kinds, numerous vegetables, sugars, fruits, etc., while fat is usually given in five forms, butter, cream, fat of meat, cheese, and vegetable oil.

5. Fat in some form is much more expensive (butter, cream) in some places, while in others—the polar region—the fat of animals and fish is very cheap.

6. Fat is a much more concentrated food; 1 gram yields more than double the calories of heat and energy of the same amount of carbohydrate and in cases where bulky food is contraindicated (ulcerations of the gastro-intestinal tract) fat is preferable.

7. In diabetes fat is always indicated where carbohydrate is restricted or cut entirely out.

8. There are cases of such strong repugnance to fat that good sense and considerable experience is required in preparing food to disguise it, but cream and butter can usually be given with other food in considerable quantity.

9. Carbohydrates are more completely absorbed from the intestine than fat, *i.e.*, when given in the form of starch or sugar, and *yet* in some forms—cabbage, lettuce, spinach—which contain very little carbohydrate according to their bulk, a considerable percentage escapes absorption.

10. The carbohydrates are very much more quickly oxidized in the system into carbonic acid gas and water and are therefore more desirable whenever quick energy or heat is required by the body. A practical illustration of this point is seen daily in cold weather

when enormous quantities of sugar and alcohol (which latter has a heat value of 7 calories to 1 gram) are consumed.

Hence it is not difficult to arrange a diet for a patient suffering with a wasting disease or constipation, etc., that contains more carbohydrate and less fat, or for a patient who has diabetes, where less of the former is required and more fat. Now it must be remembered that Rubner and Atwater showed that the heat value of the different elements of our food are a little less when burned in the body than in the calorimeter, as in the latter they are wholly consumed while in the body the combustion is always incomplete. The proteins are incompletely oxidized into carbonic acid (CO_2), water and urea; the fats and sugars into water and carbonic acid, *i.e.*, only 83 to 90 per cent. of the former are appropriated while 10 to 17 per cent. are converted into uric acid and hippuric acid, xanthin bodies, coloring matters and extractives, while of the sugars and fats small quantities fail of complete oxidation and we find oxalic, succinic, lactic, and benzoic acids appearing in the excretions. Therefore Atwater allowed in his more recent experiments for this loss, and estimated that in an average normal case 4 1/2 per cent. of the nourishment is unutilized by the organism and escapes into the excretions. Rubner's was a little higher, 5 to 5 1/2 per cent., hence the number of calories in the usual estimate made according to the heretofore given standard should have subtracted from it about 5 per cent. of the total, *i.e.*, if the food contains 2800 calories the actual heat energy received by the system would be 2660 calories. One should also remember that animal protein produces more calories

Utilization of the various food elements.

in the body than the same amount of vegetable protein, and the caloric value of a mixture of equal amounts of animal and vegetable protein stands about midway between the two. This fact is very important to bear in mind when the cost of a diet is to be considered.

The digestion and assimilation of the different kinds of food depends, as Pawlow showed, upon the appetite, which is psychical. A careful study should be made of the following tables, for the purpose of ascertaining the percentages of protein, fat, and starch in a food, giving due weight to the fact that a food should not always be selected which has the highest equivalent of protein or starch, as the disease we are treating and the habit of our patient regarding the different kinds of food should form the basis of our selection. Of course we should exclude morbid habits which have led to a consumption of an enormous amount of protein in a patient with the uric acid diathesis, or of starch and sugar in a person who is overweight. One would not, *e.g.*, select for the former animal protein from boiled beef with an albumen content of 38 per cent. of roast beef 32 per cent. or Swiss cheese 34 per cent., as he could find animal food with a lower per cent. albumen, such as chicken (21 per cent.), egg (12 per cent.), milk (3 1/2 per cent.); and for vegetable protein he could take instead of dried peas and beans (23 per cent. P.) wheat bread (7 per cent.), potatoes (2 per cent.), and asparagus (1 8/10 per cent.). Again, for the fat man who needs reduction, chief attention has to be centered upon the carbohydrate and fat content of his food, so it is clearly evident that the much tabooed potato, which has 0.2 per cent. fat

Selection of a diet.

and 18 to 20 per cent. carbohydrate, should be chosen instead of bread with 0.5 per cent. fat and 52 to 57 per cent. carbohydrate, or zwieback with 3.0 per cent. fat and 80.0 per cent. carbohydrate, or rice with 1.0 per cent. fat and 78 to 80 per cent. carbohydrate. To the potato might be added all the other vegetables and fruits containing from 1 to 13 per cent. carbohydrate with an insignificant amount of fat, giving the patient a liberal diet free from monotony, enjoyable and favorable to reduction of weight. It will be observed in the chapter on obesity that the proteins are often increased.

The tables as given by Atwater, Rubner, and Detweiler are essentially the same, and for convenience, in this volume, they have, for the main part, been selected from Atwater's. For one who has in his clientele many chronic patients, it is desirable to have more ample tables at hand, of several different tabulators, for reference. The task when first thought of seems forbidding and insurmountable, but after a few weeks or months the percentage equivalents of the different food stuffs are memorized in the same way that the telephone operator remembers the different call numbers. And just here I want to emphasize the importance of learning these percentages from reliable sources, and not from the teacher of hygiene, physiology or physical gymnastics in our public schools, or from a brother practitioner who perhaps got his information from very unreliable sources. Valuable scientific data in medicine are rarely obtained on the street. The charts recently published by Dr. Horace Arnold, also Dr. E. A. Locke, both of Boston, are recommended for the busy practitioner.

For the sake of brevity we introduce the following table showing the average composition of some of the common articles of diet; also a quick method of calculating the number of calories in any given article of food. Full tables showing chemical composition of food materials may be found in the last chapter of this book.

Table Showing Average Percentages of Protein (P.), Fat (F.) and Carbohydrate (C.) in Some Common Articles of Food.*

Averages	P.	F.	C.
Meat	15.	19.	
Fish	15.	1.5	
Egg—albumen	15.	0.2	
Cheese	25.	30.	2.5
Milk	3.5	4.	5.
Butter	1.0	85.	
Bread	9.	2.	52.
Potato	2.2	0.1	18.4
Vegetables	1.5	1.	8.
Pastry	7.	9.	65.
Fruit	1.	0.7	14.
Nuts	20.	25.	6.
Soup	2.5	1.5	5.

* Below is given a list of symbols and abbreviations used throughout the book. As will be noticed the same symbol has been used in different senses, the context usually showing in which sense it is used.

C.....Centigrade, Celcius when referring to temperature.
C. or Cal.....Calorie when referring to energy derived from food.
C. or CH.....Carbon, Carbohydrate when referring to food.
CO_2.....Carbon Dioxide, Carbonic Acid or Carbonic Acid Gas.
F.....Fahrenheit when referring to temperature.
F.....Fat when referring to food.
G., Gm. or Grm...Grams.
N.....Nitrogen.
P.....Proteid or protein.
Drops are used as equal to minims.

To compute the number of calories in any given article of diet from the table, move the decimal point two places to the left. This gives the value of 1 gram (the table being calculated from 100 grams). Multiply this by the number of grams of the article used to get the percentage of protein, fat, and carbohydrate; then multiply by the factors 4.1 for P. and C. and 9.3 for F. The sum-total equals the number of calories in the article of diet.

Example: White Bread	P.	F.	C.
	9.2	1.3	53.1

To find the calories in 40 grams (1 slice).

Moving the decimal point two places to the left we find that 1 gram of bread yields P. 0.092, F. 0.013, C. 0.531; multiplying by 40 gives the percentage of P., F. and C. in the quantity of bread used, P. 3.68, F. 0.520, C. 21.24; multiplying by 4.1 for P. and C. and 9.3 for F., and adding the results we have 107, the number of calories in 40 grams.

Water and its use.

As *water*, according to Rubner, comprises about 63 per cent. of the animal body and so much misunderstanding exists concerning its use, it seems wise to devote a few pages to it. After a brief reference to the preceding tables it will be seen that, aside from the fluid drunk, of which the healthy adult man takes on an average 3 pints daily, a considerable amount of water (estimated by Rubner to be about one-sixth of the total water eliminated in the urine, feces, sweat, and breath) is taken in combination with meat, fish, vegetables, fruit, etc. This amount is found in the human body in four places:

1. In the circulating blood.

2. In the lymph vessels in the connective tissue surrounding the cells of the body, and the lymph spaces. **Where found in the animal body.**

3. In the protoplasm of the cells.

4. In the various cavities or ventricles of the body.

Rubner showed that as the body takes on fat the water content of the tissues lessens, while the tissues of a lean or starving body contain more water, and yet, when a body poor in fat begins to increase in weight, the fat takes the place of the water in the cells without the system suffering any considerable loss of water. With the administration of water in increasing quantities, the amount of urine is augmented, and animals starving or taking on fat do not show any increase in amount of urine, while increasing the albumen in the diet causes an increased output of urine.

Formerly an excess of water was thought to increase the waste of the body and to cause breaking down of the body proteins, but this has been disproved. It is, however, self-evident that the continued use of large quantities of drinking water, in excess of the body requirements, would soon impair the functions of the various organs by increasing the volume of blood in circulation, thus embarrassing the heart's action, lessening the activity of the digestive juices, causing indigestion, often the first factor in the series leading to faulty metabolism. **Harmful effect of continued use of large quantity of water.**

Metabolism is a term used to represent the changes which food undergoes in the processes of digestion, absorption, assimilation, and elimination of the waste.

According to Rubner, the different organs of our bodies contain very different proportions of salts. The enamel of the tooth 96.4 per cent., the bone of the tooth 72 per cent., the bones 65.4 per cent., cartilage **The salts of the body.**

3.4 per cent., muscle 1.5 per cent., and the other organs less than 1 per cent. The skeleton contains 83 per cent. while all the other organs contain 17 per cent. of the total salts in the body. The kind of salt varies in the different tissues. The body of a child contains per kilo of its weight in salt substance.

K_2O	1.87	Mn_3O_4	0.007
NA_2O	2.04	P_2O_5	10.01
CaO	10.12	SO_3	0.54
MgO	0.38	Cl	1.76
Al_2O_3	0.03	SiO_2	0.02
F_2O_3	0.22	CO_2	0.14

"These salts exist in our bodies, in part, in the same forms under which they are eliminated in the urine, feces and epidermic scales; in part, in complex organic combinations, like sulphur in the albuminoids, phosphorus in the nucleins, lecithins, etc., magnesium in the nerves, iron in the hemoglobin of the blood." These salts are then necessary to cellular activity and our foods must contain them.

on of J. Forster showed that mice, pigeons and dogs fed on meat—made salt-free by soaking in hot water—with the addition of starch, sugar and fat, lived only twenty to thirty days.

The average adult loses every day, as shown by the appended table of Gautier's, about 26 grams of salts, about one-half of which is sodium chloride, the rest being represented chiefly by the phosphate and sulphate of potassium, sodium, lime, and magnesium. The other elements as seen by the table are excreted in very small amounts by the skin and through the loss of hair from the head and body.

Table from Gautier

	Urine during 24 hours	Fecal material during 24 hours	Perspiration during 24 hours	Average per day
	grm.	grm.	grm.	grm.
Water	1300–1350	100–119	600–750	
Total saline material	17.3–21	4.35–6	1.3–20	25.9
These saline materials contain—				
Chlorine	4.9–7.2	0.015–0.035	1.12	7.4
Phosphoric anhydride (P_2O_5).	1.6–3	0.76–0.82	Traces	3.05
Sulphuric anhydride (SO_3).	1.8–2.8	0.060–0.17	0.005	3.00
Silic anhydride (SiO_2)	0.003–0.004	0.17–0.35	.....	0.26
Carbonic anhydride (CO_2).	.....	0.05		
Potassium oxide (K_2O).	1.6–3.1	0.75–0.30	0.178	2.88
Sodium oxide (Na_2O)	4.16–5.9	0.25–0.35	0.80	5.60
Calcium oxide (CaO).	0.25–0.36	0.65–0.70	Traces	0.85
Magnesium oxide (MgO).	0.56	.....	Traces	0.56
Iron peroxide (FeO).	0.004–0.013	0.023–0.040	.....	0.004
Average weight of mineral material in 24 hours:	19.6 grm.	4.3 grm.	2.0 grm.	

The necessity of a varied diet must be evident from the foregoing table. If the reader will closely examine another instructive table of Gautier he will observe that the average adult derives about 14.81 grams of salt daily from the mixed diet outlined in the table and as a rule takes about 10 grams of table salt—sodium chloride—for seasoning and in his drinking water, which makes 24.81 grams, leaving 1 gram which the author suggests is lost in the combustion of organic sulphur and phosphorus.

Source of the salts in the body.

Mineral Matter in an Average Daily Allowance of Food

Kind of food	Weight per day	Corresponding mineral matter
	grm.	grm.
Bread and dough	420	3.10
Meats	216	2.48
Milk	213	1.33
Eggs	24	0.22
Fresh fruits	70	0.55
Fresh vegetables	250	2.70
Dry vegetables	40	1.10
Potatoes	100	1.00
Cheese	8.0	0.22
Sugar	40	0.25
Butter	29	0.02
Wine (calculated at 10 per cent.)	557	1.54
Drinking water	1 liter	0.30
	Per day	14.81 grm.

The preponderance of mineral salts of vegetable origin is quite remarkable; the proportion being nearly 70 per cent. Plants provide especially potassium, magnesium and phosphorus and a little chlorine, sodium and lime. Now, as vegetables can be served in so many different varieties, each of which has some necessary salt, we should encourage the consumption of many kinds, and a dislike to any one may be easily overcome by the substitution of another. I am often told by professional men that they never eat any vegetables aside from the potato. Like all other habits of eating, the one of liking vegetables is easily acquired. Fruits are likewise beneficial, they furnish organic acids which, after assimilation, form alkaline carbonates, thus aiding in maintaining the proper reaction of the blood.

Here it is well to call attention to the fact that many

people and especially vegetarians take, with their food and as a condiment, much more salt in the day than they require and yet it rarely does harm in health but in nephritis, as noted elsewhere, the sodium chloride may overtax and irritate insufficient kidneys. On the other hand, we often see a case of hypoacidity of the stomach pick up an appetite and the digestion improve under a liberal allowance of table salt; indeed, as Rubner suggests, all the digestive juices of the body contain salts, and the processes of digestion, absorption, assimilation, and osmosis must be greatly promoted by their presence. In the dropsy of heart disease, it is often desirable to lessen the escape of lymph from the blood-vessels, and a diet free from sodium chloride is indicated "while calcium and magnesium salts lessen the flow of lymph into the lymph spaces and are made use of in treating edema and localized lymphatic swelling" (Lauder Brunton).

Excess of salt in diet.

There is much misunderstanding as well as fear existing concerning the use of condiments or as the Germans say genussmittel. The latter is a broader and better term, since we restrict condiments to spices, like cinnamon, ginger, salt, pepper, etc., which we add to food in the stage of preparation or at the table to improve the taste. Genussmittel embraces all our term implies plus the savory element of the food itself which makes it palatable, the extract of meat, the sugar and dextrine of dry toast, fruit, the dextrine and caffeine of coffee by roasting, the jellies even when taken with meats, are included under that head, also caviar, piccalilli, and other kinds of pickles and relishes, which excite an appetite. Now many of these contain sugar, starch, and woody fiber besides; in rare

Condiments and their uses.

opportunely and satisfactorily afford the necessary prop, and I believe is less harmful to the man than giving up the struggle, which often means great financial loss and perhaps ruin, and in many cases hypochondriasis, melancholia, and even suicide.

I am well aware that a series of scientific experiments have recently been made with alcohol to ascertain its effect upon young men, with the conclusion that the use of it does not stimulate the boy to do more mental or physical work in a short period of time, neither does it prolong the time of working without fatigue. These findings go, however, a very little way toward solving the problem of whether alcohol is useful or not to the overworked business man, living under quite different conditions than the school boy or instructor. The careworn and perhaps ill business man is suffering with indigestion, constipation, insomnia, and loss of appetite, and alcohol acts with him by spurring up the appetite, which in turn calls forth the digestive juices necessary for good digestion; he eats a full meal which stimulates a bowel movement and refreshing sleep follows, thus his cerebration becomes clearer and more rapid. Again, we must not lose sight of the fact that relief from fatigue and pain, substituting therefore comfort and good humor, are *more important factors* for study than the wave energy alone; since the keen sense of fatigue, following the crest of the wave, after the stimulation from a cup of tea or coffee or the taking of food cannot be considered an argument against the moderate use of these substances. Again, later in life, after fifty, when the ability to lead a strenuous life is beginning to wane, and the appetite grows less, the need of a stimulant becomes more apparent; *then* there

seems to be some ground for the adage—"*wine is the milk of the old man.*"

It is safe to say that many persons are so constituted that alcoholic stimulants in every form disagree and should never be taken. The same rule holds with tea, coffee, and tobacco; and in other cases, where they seem to agree, extreme care should be taken to keep well within the limit of one's toleration, and there is no measure which one may use as a guide, as it is a personal equation to be individually worked out. A safe rule to follow, when possible, is to take wine or liquor on a full stomach and never strong tea or coffee after dinner if it interferes with sleep.

I recapitulate briefly to avoid being misunderstood:

Summary of uses of alcohol.

1. Alcohol except in disease is unnecessary and to be avoided in persons, male or female, under thirty years of age.

2. Its occasional use in middle adult life as a stimulant, prophylactic, and anesthetic is advisable and should be used under a doctor's direction, who knows its food value and the danger of habit.

3. After fifty it may be used in some cases with benefit, but always in moderation. Most of the disadvantages of its use now no longer obtain. At this age, however, it disagrees with many persons and should be used by such only as a medicine.

4. Alcohol should never be given in excess, except for its anesthetic effect as it weakens the will-power.

5. When alcohol is given, it should always be in the purest form. Whiskey, sherry, and Rhine wines are among the best. The strong liquors should always be well diluted with water.

Appetite.

Appetite is the desire or inclination to eat. The

mere sight or smell of food or the memory of a good-looking or tasting food awakens an appetite for it. In health we have an appetite for any food that we have learned to like, at proper intervals of time, *e.g.*, we eat a good breakfast of fruit, eggs or meat, bread and butter at 8 A. M., which requires four or five hours to digest, and if we again become hungry at 10 or 11 this means we are either convalescing from a severe illness, when digestion may go on very rapidly, or there is some temporary disturbance of digestion. It is, however, a mistake to say that a boy or girl at puberty, or a man in adult life, or even old age, is too old to acquire a liking or appetite for a kind of food that he never before tasted, or even for a food that he became disgusted with years before, because perhaps he ate too much of it. Every boy and girl should be taught to eat all kinds of food, for the following reasons: first, to make it possible for them to live in any part of the world; second, to enable them to have a greater variety of food, which gives them a better balanced ration; third, the habit of eating different foods is most readily taught in youth; fourth, to enable them to enjoy travel and sight seeing more; fifth to enhance their chance of recovery from severe illness, by being able to take all kinds of nourishment. Physicians are often baffled in the treatment of patients who cannot take this and cannot take that. Older persons as well, should cultivate an appetite for all kinds of useful foods and not be content with one method of preparation, but become familiar with all the different methods, as the greater the variety, the better the appetite and the more monotonous the fare the poorer the appetite. Bär in his report of the results of monot-

Acquiring an appetite.

Appetite dependent on variety in food.

onous feeding of prisoners says that the continual serving of one kind of food always in one way caused loss of appetite, vomiting, flatulence, diarrhea or obstinate constipation, predisposing factors to tuberculosis, dropsy, and scorbutus. "Let good digestion wait on appetite and health on both" said the great bard.

Effect upon appetite of mental condition.

Every physician knows the pernicious effect of shame, anger, trouble, worry, mental excitement, and overwork upon the appetite and digestion and, on the other hand, the good results of joy and happiness. The advantage of good comradeship at the table has been well known and written upon since the earliest times.

In diseased conditions, when anorexia becomes well marked, the doctor often asks the patient if there is anything he can think of which he could eat, and by giving this he is sometimes able to create an appetite for other things.

Keen appetite a cause of rapid eating.

In comparative health, people often have an appetite for much more food than is good for them and if gratified, they soon become surfeited, because their keen appetite leads them to eat too rapidly and therefore too much. All rapid eaters are large eaters, although they are deceived by the short time they spend at the table into believing they eat very little. Such should be taught to eat slowly and to thoroughly chew their food. When they are surfeited they should be treated by rigid fasting for twenty-four hours at least, until they have burned up and eliminated the excessive amount of food stored up in their systems. Laxatives are also often indicated to save suffering from headaches, etc., after which treatment the appetite quickly returns.

Number of meals to be taken. Proper time for largest meals.

As a rule in health three meals should be taken daily by adults and the same is true in most chronic affections, when sufficient food can be taken at three meals for proper nutrition. In some instances, as will be seen later, five or six small meals are more desirable and much more readily digested, and in rare cases of cancer of the stomach or the persistent vomiting of pernicious anemia, food in minute quantity must be given every fifteen minutes. The proper time to give the largest meals is in the early part of the day, *i.e.*, for breakfast and midday, or if the active, healthy business man cannot take sufficient time at noon for a full meal, he may take a light lunch and at 6 o'clock a dinner. No more absurd custom or fad was ever inaugurated in America than that of omitting breakfast or taking only coffee and a roll, because the dinner of the night before is out of the stomach by midnight and the digestive organs have eight hours rest before 8 A. M., when the logical time for a hearty meal occurs, and in fact, during the early morning hours, the digestive act is most easily and actively performed, as one would expect after this long rest, relaxation and sleep. The first meal, indeed, is the best meal of peasants, mechanics and others engaged in manual labor and persons who have adopted the habit of eating little or nothing for breakfast can easily acquire the habit of eating a substantial breakfast. The bad habit was introduced by people who have travelled abroad where this custom exists, and also by a delusion which some acquired that skipping breakfast would reduce their weight. *Now* they *know* that a person may become fat on two or even one meal a day and may remain lean on five, since the deposit of fat depends upon the

quality and amount of food taken, together with the condition of the body and mind at the time of digestion, beside various other coexisting circumstances mentioned elsewhere. Professional men and others who lead a sedentary life may take a light lunch and a moderate dinner at night, while elderly persons and those who are ill should always dine at noon and lunch at night.

Sleep favors digestion and allows time for its chemical processes to be completed before the next meal, so that the appetite is awakened. Any prolonged loss of sleep always causes lessening of appetite and impairs digestion, entailing loss of flesh, while prolonged sleep leads to a gain in weight providing the muscular activity remains the same. The need of sleep depends upon the physical and mental activity. It is greatest in youth and least in old age. In quiet, deep sleep the metabolic processes of the body are most active. In most patients suffering with indigestion, insomnia is common, and each may be considered a cause of the other. How often indeed do we see sound sleep disperse indigestion! During sleep the body rests, which is often quite as necessary for healthy digestion as deep mastication. Indeed, the great tax upon the digestive organs of digesting a full meal is little appreciated, judging from the physical and mental sloth that immediately after meals. For the performance of the proper physiological functions of these organs much blood and nerve energy are required, hence a brief rest after each meal ameliorates largely in its digestion, whereas active exercise calls an excess of blood immediately to the muscles and the digestion suffers. Sorrow thrives by making artificial breaks in the

various organs of digestion of dogs and other animals, that an enormous amount of blood goes from the periphery of the body to these organs and the respective juices are secreted with greater rapidity.

Climate, sunshine and open air, effect upon digestion.

Sunshine and a moderate, even temperature with a dry climate, such as allows patients to live and exercise much in the open air is productive of good metabolism. This fact is so well known by the laity now that it is taken into consideration when seeking homes, and hot, wet climates with a minimum of sunshine are avoided. People are even wisely selecting the sunny side of houses in which to live and insisting upon thorough ventilation. Since the wonderful achievement of the tuberculosis crusade has clearly demonstrated the great value of fresh air and sunshine upon the digestive function, leading to a rapid gain in weight, with corresponding cessation of the activity of the disease, people have been devising ways and means of living more out of doors, and physicians have been treating many other affections, especially diseases due to *faulty metabolism*, and the *various intoxications* and *blood affections* by means of an open-air life in tents, by walking, motoring, or active out-door occupation, with the result of better metabolism, when all their distressing symptoms disappear.

Occupation and digestion.

An agreeable occupation stimulates ambition, creates a healthy habit of thinking and study leading to self-respect, optimism and happiness, which promotes good digestion. The worst dyspeptics are the disgruntled and pessimistic who have nothing to do but to eternally seek some one to entertain them. Unhappily the physician cannot provide work for the large number of unoccupied patients who consult him.

Many of them do not work because their business do not permit it, some of them spend their time with sports, while others have not the energy left or have exhausted all the sources of pleasure. The latter class readily develop dyspepsia, hypochondria, and melancholia, while the former would be far healthier and happier if a part of their time, at least, was spent in some kind of useful work. Still others are unemployed because the compensation is inadequate, or their services are not sought, or they are unable to find the kind of work for which they are adapted. Now the reasoning physician can often suggest ways and means to help such unfortunate patients to better thoughts which may lead to a wholesome and useful life. It is therefore apparent that psychical treatment for these patients is the prelude to the necessary wholesale administration of dyspeptic and nervine remedies, which not only in a few, but in all probability do more by their chemical action in the system and by lessening and further reinforcing their unhealthy and demoralizing habits.

Enough has been said in this chapter. I hope, to convince the reader that he use of the proper quality and quantity of food needs to be supplemented by many other necessary agencies to good digestion, in order to secure the best results, and that very much depends upon the hearty and cheerful cooperation of the patient.

In the ensuing chapters, the reasons for subjecting patients suffering with different diseases to a dietetic therapy are briefly given, and illustrative tables are made large, not for the purpose of advocating a great variety at each meal, which I do not believe in, but to

make emphatic the great advantage of a non-monotonous diet and to give the reader a large list of suitable foods from which he can quickly select the proper kind without frequent repetition. In many instances it will be found advisable to arrange seven different breakfasts, lunches and dinners, but more often this can better be left to the inclination of the patients, after fully explaining to them the fundamental principles of the régime. In some instances they are requested to keep a memorandum of the daily menu, that it may be inspected and possibly modified at each visit. The apparent sameness of diet, in many affections, is not real, as would seem from the large number of foods allowed containing proteins, carbohydrates and fat, as the percentage of each element allowed in every case is not stated, because it must vary with every patient and can be safely left for each physician to prescribe after familiarizing himself with food values and studying his case. The patients for whom the methods advocated in this volume are specially adapted are seen more frequently in private than hospital clinics.

For convenience in making up diet lists, the following table of weights of normal individuals in health should be consulted.

Table of Heights and Weights

Age		35–39	Age		35–39
Feet	Inches	Pounds	Feet	Inches	Pounds
5	0	130	5	9	162
5	1	131	5	10	167
5	2	133	5	11	173
5	3	136	6	0	179
5	4	140	6	1	185
5	5	143	6	2	192
5	6	147	6	3	200
5	7	152			
5	8	157			

EXERCISE

Healthful exercise promotes good circulation, digestion, assimilation and excretion, thereby producing a feeling of well being, and since it plays such a rôle in the life of the individual from infancy to old age, and its beneficial effects are so closely connected with the taking of and digestion of food, it seems expedient to devote at least a short chapter to its discussion in a book on dietetics. Moreover, it is especially worthy of consideration, as it plays such an important part in the prophylaxis as well as the treatment of disease. The physician has the opportunity that no other man has to study the effect of exercise upon health, and I am sorry to say that it is comparatively rare that we find anything upon this subject in public print from a physician's pen. Most of the writing along this line is by athletic trainers and directors of athletics in colleges or physical culture institutions. Unfortunately such literature is valueless only when we have to consider the proper exercise for healthy individuals, and those suffering with deformities due to congenital or acquired weak or diseased muscles and, of course, nothing can be said by such writers upon the proper kind of exercise for persons who are ill from various diseases, like gout, diabetes, cardiac and renal affections, tuberculosis, chronic anemia, arteriosclerosis, etc. The physician has the best opportunity of observing the effect of exercise upon the health of the individual in childhood and old age, in the way of prophylaxis. In

childhood we meet with a large percentage of infectious diseases, which are short and usually self-limited, and yet leave the patient weak and somewhat exhausted, and unable to take, with advantage, any physical exercise until a period more or less long of recuperation has taken place otherwise he will suffer from muscular strain, from which he will recover slowly, and in some cases not completely.

Illustrative case.

To illustrate: A boy thirteen years old recently came into my office from a preparatory academy which he had just entered. He was recovering from a mild attack of tonsillitis, which had left him with a slight endocarditis, and at the time of his visit was giving him no further symptoms than rapid heart action, a mitral systolic murmur, and slight dyspnoea on exertion. The requirement of the institution was that he should take regularly two hours of active physical exercise during the day, part of which consisted in a hundred-yard dash, and practice on parallel and horizontal bars, vaulting, etc. We, of course, prohibited these exercises for a few weeks, and limited his exercise to walking slowly in the open air, confident that with this treatment he would escape cardiac dilatation, with perhaps insufficiency, and the resulting symptoms of grave heart disease which he would have experienced later had he undertaken the usual athletic routine of the academy.

We have but recently learned the seriousness of tonsillitis and other affections of the pharynx, nose, and various sinuses of the head, as etiological factors in the production of endocarditis, pyelitis, nephritis, and many other affections, hence the prevention of the latter diseases in the future will be safeguarded by

greater care and attention being given to the treatment of the initial trouble in the head, the primary source of infection, and to the proper regulation of exercise.

Again, to illustrate how the regulation of the kind of exercise on middle-aged or old men acts as prophylaxis to ward off serious consequences, we will cite a case illustrated by many men coming to our office for cardiac or renal insufficiencies, gout, rheumatism, obesity, etc. A man aged fifty comes complaining of rheumatic aches in the knees, ankles, and shoulders; twenty or more pounds overweight; slight dyspnoea on exertion; easy fatigue, with slow recovery from same upon resting; urine showing slight trace of albumen; nocturia; mild arteriosclerosis; systolic blood pressure of 150 to 180; systolic bruit, slight accent of the aortic second sound, with metallic ring; apex just outside nipple line, with slight enlargement of the left ventricle. This patient has been playing golf at irregular intervals of once or twice a week; finds he cannot play eighteen holes without a great deal of fatigue, and needs to rest after nine holes, and perhaps stimulate to play the second round. He takes this exercise because he has read in the books on golf that it is the old man's game and thinks he will become stronger if he continues to play. Now, it is needless to say that most men do this after hurrying through their work of the forenoon, partaking hastily of a hearty lunch, and then rushing through the game to complete it before the dinner hour so as to meet an engagement, not allowing any time to rest between the exercise and the evening appointment. Here we have the mental strain coupled with the physical. In such a case it is

only necessary to explain the fallacy of the statement that golf is the old man's game and convince the patient by simple logic that it is the young man's game, and that he needs no exercise until he is relieved of his symptoms by rest, diet, and other measures. Then point out to him simpler exercises, like walking, driving, horseback riding, bowling on the green, etc., and that he is to stop in each case short of fatigue. Insist upon it that any exercise causing fatigue from which he does not recover by a brief period of rest does him permanent injury. By this means we may be able to assure him of many years of activity in the enjoyment of comparatively good health, whereas if he was allowed to continue with his former mode of exercise, he would steadily grow worse, and run the risk of an untimely death.

Kinds of exercise.

The question of regulation of the kind of exercise must naturally begin in early childhood. From the time an infant is born activity begins, which may be called instinctive, and in health we may safely rely upon his natural instinct to control his activities until he enters upon school life, at seven years of age, since it is extremely difficult to regulate them as long as they are dependent upon the instincts of the child, and not the least under the control of reason. By one who is accustomed to observe the various movements of infantile life, it is easily seen that the cessation of activity begins after short periods of movement, evidently by the development of fatigue toxins in the muscles, which naturally cause the child to rest or sleep, during which time such toxins are removed from the source of formation, and on awaking activity immediately begins again. This should be allowed to go on in

Infant activities.

health, but when the child is diseased it often becomes necessary to use quieting means to secure a proper amount of rest, as otherwise the effect of the fatigue toxins would irritate the nerve centers in the brain and spinal cord to such a degree as to prolong illness or lessen the chances of recovery. At the age of seven, when the child begins to study, physical culture may be begun, and should be of such a nature as to slowly and cautiously develop the body as much as possible, such exercises as require a certain amount of concentration of the thought and attention of the child to the method of performing them, like balancing the body on one foot, certain symmetrical movements of hands, feet, arms, and legs. Muscular action which requires great endurance should be left for later years, and then the trial test should be very cautiously prolonged from day to day, and month to month. It is necessary that these exercises should be under the control of a competent instructor, who has previously conferred with the family physician, who after having made a careful physical examination has advised exercises, and kept in touch with the teacher, noting the effect upon the child. Should the test be made on a delicate child, weaknesses manifested in any special direction should be immediately noted and the child referred back to the family physician for further examination. When the child is perfectly strong and well, an examination by the physician once in three or six months, or even a year, is all that is necessary, unless some new form of exercise is undertaken, and the boy exhibits some weakness. At the age of twelve to fifteen years, new and more vigorous exercises in the way of sports are open to him, like rowing, ball playing, and more or

The child.

12 to 15 years of age.

less strenuous gymnasium work, with a little tennis, squash, and running races. These are perhaps the most crucial tests that will ever come to him, and he now needs to be more closely watched by his instructor and physician. Comparatively few boys, unless they have had earlier years of constant physical training, can stand the strain of these swift games, and they first manifest their weakness by great fatigue, slight dyspnoea, and other evidence of heart strain. Once these symptoms have become apparent, the patient should be carefully watched both by instructor and physician, and it is absolutely necessary that the physician should be a man who has had a great deal of experience with such cases, otherwise they will be lightly passed over and subsequent frequent strains will take place, until the victim is past hope of complete recovery.

Heart strain.

Quite a little has been written about this particular class of patients. It has been said that cardiac dilatation, with mild insufficiency, found after a boy has finished a 100-, 200-, or 300-yard dash, made a cross country run, or the greater Marathon race, rowed a twenty-minute boat race, or played a full four period foot-ball game, is immediately recovered from after a brief rest, and that he is competent in a few days to repeat the test. This statement is only corroborated by young medical men and athletes, who have had very little, or no, experience in following up such cases. There is no doubt that this might be repeated three or four times in some instances if the first affection was slight, provided intervals of rest elapsed between the trials, in which absolute relaxation was obtained; but further experiences of this kind, where the effect was more marked, would lead to permanent disability, and

of course should be avoided by more careful and wise medical surveillance. In this connection it is important to state that such competitive tests of strength should not be indulged in by young men who have not been previously well trained for such trials of expert skill as this will occasion. Tests of great mental and physical exactness and endurance require prolonged and thorough preparation. Young men cannot be expected, therefore, to go from business offices to an occasional exercise of this kind, and do such crucial stunts without a regular systematic course of training, and it is just this class of clerks and young business men who so often break down. They should have well ordered exercises which tax them little bodily and mentally, and which are less prolonged, or more harm than good will result. Here the great difficulty arises from the untrained trying to do the same things as an expert.

Competitive tests of strength

The occasional practice of one, two, or three hours per week, even at one kind of exercise, does not qualify for the endurance tests of the expert; one might as well expect to become a renowned singer of opera by practising one, two, or three hours per week. To do a very rare or intricate surgical operation a physician does not call a surgeon who has done such an operation two or three times, but always looks for the man who has had the largest experience in the kind of work which the case represents, as well as proficiency in general surgery.

Exercise from 30 to 50.

In prescribing exercise for men between thirty and fifty, the general health of the individual must be taken into consideration, as well as his financial condition, and his likes and dislikes. Of course, he may

already have too much active physical exercise; that is, if he is a farmer, and does the hard work himself, it may be necessary for him to abandon the more strenuous things and devote his time to the simpler work of the farm, such as gardening, orcharding, etc. If he is a member of any one of the professions, whether of law, theology, or medicine, or in business which requires office work, he should try at least to engage in some light physical open air exercise, like walking, horseback riding, hand ball, motoring, golfing, gardening, botanizing, etc., for at least one to two hours daily. Especially strong men, at this time of life, who have had considerable training may do more strenuous things, like tennis, squash, etc., although after thirty-five it is generally wise not to enter competitive tests. At this particular time of life a man's best mental energy is taxed to the utmost in his business, and we cannot too strongly emphasize the importance of mental, as well as physical, rest for such a man after leaving his business. Such rest can readily be obtained by occasionally remaining in bed for twenty-four hours, on a light diet, resting the abdominal organs as well as the nervous system; then riding in a carriage, automobile, or boat, where a little passive exercise is beneficial; later taking up some activity, like walking, fishing, gardening, or botanizing.

Mental rest.

In this connection I cannot too strongly condemn the common practice of games of poker, whist, chess, etc., which not only tax the brain, but always do it under very bad hygienic surroundings, thus further fatiguing mind and body. The family physician is always the best person for patients to consult at this time of life. Too much exercise for men at this age

lessens the mental efficiency of the individual. After fifty, one's active exercise should be comparatively little, and much simpler. The milder forms indulged in between thirty and fifty should be the kind for this class, and any activity which quickly or easily causes fatigue and shortness of breath should be looked into by the physician, and the patient carefully examined to find the cause, which is probably insufficiency in either the heart or kidneys. Our first contact with men between fifty and seventy is usually in this way: A man of fifty-five or sixty comes to us fresh from the golf field, or a little exercise at rowing, saying that he has become exhausted and has had to rest before he could go home. Upon examination we find evidence of heart strain, due perhaps to hurrying up a sharp pitch on the golf course, or energetic strokes from the tee, or in driving the ball he has held his breath and brought into exercise several muscles of his body; or in rowing he has been a little too strenuous, thinking that he could for a moment indulge in his former youthful sport. Such a patient manifests symptoms of a weak vascular system, with perhaps sclerosis of arteries, and dilated heart, and he may be 10, 20, 30 or 40 pounds overweight. The common practice among physicians of putting these patients at work to develop muscle is radically wrong, since we know that growth of muscle at this time of life is physiologically impossible. To be sure, such muscles can be strengthened by proper training in most instances, but never until the patient has first been put into proper condition. To do this he should first be put in bed and rested, reduced in weight a little below the normal weight of health, then gradually given passive exercises to be followed by mild

Exercise after fifty.

active exercises in moving the limbs, then by gentle activities, such as walking, gardening, etc., the effect being carefully watched by a competent physician. In practically all these cases a considerable degree of activity later can be allowed. Without this care, however, on the part of the physician, a worse state of health will ensue, until an early demise is brought about.

In this connection I wish to emphasize what seems to be little understood by all laymen, as well as by some physicians, namely, that mental exercise while in bed resting heart and muscles is not only allowable but advisable, because the patient is much more reconciled to his quiet life, and happier because of his mental activity; also because of financial reasons we have treated many such patients for a long time in bed, who with the telephone at the bedside were not only kept happy, but able to continue all business necessary, without even a visit from their secretary or partner. We have found that such mental exercise facilitates the recovery of the patient very materially.

Massage.

I cannot leave this subject without referring briefly to such passive exercise as may be derived from a good masseur. I cannot emphasize too strongly, however, the great necessity of using care in the selection of the masseur, as he must be not only an excellent anatomist and physiologist, but must also have had long experience. The osteopath can claim if he is a good masseur only the benefit that massage gives. He has, in the field of mechanical exercise, only to compete with the masseur, and if he benefits the patient in any other way it is solely through psychotherapeutics.

Another most useful mechanical method of exercise is through the Zander apparatus. We consider it very valuable in the treatment of many chronic joint and muscle affections, and every city should have a mechanical institution with a well equipped Zander apparatus, which should never be used without proper instruction.

At the end of this chapter it has seemed well to append some excellent tables adapted from Musser and Kelly's work, from which one may readily refresh his memory upon the best kinds of exercises for individual cases. To sum up the problem of physical exercise, which I have briefly attempted to elucidate in the foregoing chapter, I will state that it is my belief that exercise as indulged in in this country to-day does more harm than good, and strenuous physical exertion should not be attempted by any but well trained athletes, except under the advice of a competent physician, and it, as a rule, should be much lighter in character than what is usually prescribed; that any disagreeable results from even the lightest form should be immediately reported to the physician, and proper attention given to it: that after fifty or sixty years of age exercise should always be of the simplest kind and should stop short of fatigue, and the general rule observed that vacations taken at this period of life should be of a restful type, rather than that accompanied by too active physical effort.

Classification of Athletic Games and Exercises

Exercise	Chief regions of the body used	Influence on pulse, blood pressure, and respiration	Remarks
7 to 17 years. 18 to 35 yrs.			No competitive tests of endurance. The kind of exercise must be adapted to the age and strength of the individual, with reference to the principles laid down in the foregoing chapter.
Football (Rugby).	The whole muscular system.	Extreme..	The most severe field game on the heart and lungs.
Polo (pony)....	Right or left arm, abdomen, legs.	Extreme..	
Cross country running.	Thighs and legs.....	Extreme..	A severe test of the heart.
Boxing.....	All of forearm, arms, shoulders, chest, back and thighs.	Marked...	
Wrestling.....	Whole muscular system, especially neck, back, arms, shoulders and abdomen.	Marked...	Good.
Baseball.....	Right (or left) forearm, shoulder, and the whole muscular system to a lesser degree.	Moderate	Amount of exercise depends on the position played; pitcher has his pitching arm constantly overworked.
Hockey.....	The whole muscular system, especially the back and right (or left) forearm.	Extreme..	An extreme test on the heart and lungs.
Running half mile or more.	The whole muscular system except the arms.	Extreme..	A severe test on the heart and lungs.
Pole vaulting...	Forearms, arms, shoulders, abdomen, thighs, and legs.	Moderate.	
Gardening.....	Muscles of the abdomen, back, arms and legs.	Slight.	
Walking.....	Thighs, legs, and back	Moderate.	Two or four miles an hour is mild exercise, four to six miles may be exhausting if kept up very long, or if road is rough.

Classification of Athletic Games and Exercises.—*Continued*

Exercise	Chief regions of the body used	Influence on pulse, blood pressure, and respiration	Remarks
Golf.....	The whole muscular system moderately.	Moderate.	The walking interrupted by the strokes of the game make it peculiarly valuable for those living a sedentary life.
Billiards and pool.	Arms, back and legs....	Slight.....	Excellent.
36 to 50 yrs.			
Running 200 yards or less.	The whole muscular system, especially the thighs and calves.	Marked...	A typical exercise of effort.
Mountain climbing.	Thighs, legs and back...	Extreme..	A severe test on the heart and lungs, particularly in high altitudes.
Rowing.....	Muscles of chest, back, abdomen, arms, and legs.	Moderate.	Excellent, with moderation; a severe test on the heart when extreme.
Tennis.....	The whole muscular system, especially right (or left) forearm and arm.	Moderate.	Tennis-elbow is caused by constant repetition of back-hand stroke, producing strain of pronator radii teres muscle.
Jumping.....	Thighs, lower back, calves, and shoulders.	Moderate.	Jumping without a run cultivates agility only.
Dancing.....	Thighs and legs.....	Moderate.	Clog and soft shoe exercise only the legs, but many acrobatic, postural and esthetic dances bring in the trunk and arms.
Swimming.....	The whole muscular system.	Moderate.	Racing and diving are extreme tests on the heart and lungs. Swimming for distance at a moderate speed is a test of endurance and stamina.
51 and up.			
Bowling.....	Right forearm, arm, shoulder, and back.	Slight.....	
Shooting.....	The whole muscular system, especially the thighs, legs, and back.	Moderate.	Value depends on tramping over irregular ground and open air.
Horseback riding.	Back, abdomen, and thighs.	Slight.....	The mechanical shaking has a distinct therapeutic effect.

OBESITY

Under the heading of this chapter, the author would include adults who are 10 pounds overweight, because clinical experience has taught that an increase of weight beyond this retards digestive processes and ability to sustain, without fatigue, more than the usual amount of physical and mental work.

What constitutes obesity.

Whenever the function of the gastro-intestinal tract is overtaxed for a great length of time, the secretion of the digestive ferments is inhibited, motor power lessened, and constipation or diarrhea ensues. The sequel to this is absorption of imperfectly digested material, the introduction of impurities into the blood, irritation of the nerves by the toxic blood, and disarrangement of the normal interchange which goes on beween the lymphatics, blood-vessels and cellular structures of the entire body. After such a condition has existed for a certain length of time, perverted action of nerves and cells alike arises and the patient is on the verge of morbid changes in the tissues of the organs themselves. Whenever this change in the gastro-intestinal tract leads to an *accumulation of fat in the system*, the subject may be said to be *obese*.

Obesity resulting from derangement of gastro-intestinal tract.

Now the question arises, "Why do some people become obese while others do not?" For centuries this has been a much mooted question.

Factors causing obesity.

The reader will find elaborate volumes devoted exclusively to the subject which he may read at his leisure. The author will briefly state the causative

factors of obesity which are most widely accepted and which have been proven by clinical experiment.

Causes of obesity.

1. Ingestion of fat-producing food in excess, in which is included alcohol.

2. Abstinence from exercise; it has been proven that marked muscular exertion decomposes fat.

3. Rest in bed, with excessive sleep.

4. Sexual abstinence.

   a. Women become corpulent during the climacteric period.

   b. Castration in animals and man leads to obesity, due to lack of internal secretion of the testicles.

5. Residence in warm climates.

6. Drinking large quantities of water through lessening metabolic changes.

7. The presence of fat in excess accomplished in part by restriction of muscular movement, and in part by the lessened heat radiation from the fat body, thus retarding the combustive process going on in the organism. The largest muscle of respiration is the diaphragm. In fat abdomens this muscle is impeded in its downward descent during inspiration, thus lessening the capacity of the chest, which is normally considerably increased during this act. Hence, with each inspiration, less oxygen is taken into the lungs, and oxygenation in the body is thereby lessened. The effect of this is soon seen in incomplete digestion and assimilation, and further accumulation of fat.

Differences of obesity in such families.

8. An inherent or hereditary faulty cell activity. This has been worked out in estimating the oxygen intake and the carbonic oxide excretion, which often varies greatly in different members of the same

family. It is well known that some races of domestic animals are more readily fattened than others, and when cells from infancy show faulty action, rarely is this morbid condition changed in later life.

Fats, sugars, and starches as heat producers, and their storage in the body.

As has been shown in a previous chapter, fat is a great heat producer, but is very slowly burned up in the body; whereas the starches and sugars, which are also heat producers, are rapidly and readily consumed in the system. Since the furnace fires of the body are kept burning by the combustion of carbon and hydrogen of the carbohydrate foods with oxygen, so, like the kindling wood in a fireplace, which burns first, the starches and sugars are first consumed. *If sufficient heat* for the body and *energy* for the *muscles* is obtained from such combustion, *whatever fat* has been taken with the meal will *not be consumed* but deposited in the parts of the body where there is the most loose cellular tissue, such as the omentum, the pericardium, around the kidneys, and in the breasts.

Storing of excess of carbohydrate as fat.

Whenever the intake of carbohydrate is greater than the system demands, the excess is changed into fat, which is stored up. A reduction in the albumen content of food, below the normal, lessens the metabolic activity of the body cells; that is, the energy of the body is reduced. Hence, there follows less decomposition of the fat eaten, and when the latter is given freely with the carbohydrates, it must be stored in the system, and the patient becomes fat at the expense of his own albumen. He also becomes weaker. Fatty degeneration occurs more and more at the expense of the albumen on hand. This type of obesity is much more severe than the form in which

Storing fat at the expense of albumen.

albumen, as well as carbohydrate and fat, are in excess of the demand.

In entering upon the subject of the reduction of fat, we may best study the condition first in adults who come to us simply on account of obesity. These comprise about one-half of the cases presenting themselves at the offices of physicians. After considering the reduction cure in simple cases, as we call the just mentioned, the diseases complicated by obesity will naturally follow and be much more readily understood.

Method of treatment in obesity cases.

Two questions confront a physician in a simple reduction cure: First, where shall the patient be treated—in a sanatorium or in his home? Second, what method shall be used? In answer to the first question I would state that when the patient is not more than 20 to 30 pounds overweight, it is, as a rule, far better to treat him in his own home; but when he has from 40 to 60 pounds to be removed, it is often desirable that he should be placed in a sanatorium or hospital for at least one month, where he can be carefully studied as to his ability to digest different kinds of food, and he will learn to appreciate the necessity of following out carefully the sanatorium method of treatment after his return home. As to the second question, the most widely accepted view to-day is that a partial reduction of the carbohydrates, or fats, is all that is necessary to reduce an obesity case, and that it is rarely wise to restrict the amount of proteins. The number of calories need only be reduced to 1800 or 2000 daily to cause a gradual reduction in weight. Some authors withhold all fats, while others cut the carbohydrates down about one-half, giving a little fat; others still restrict the patients

Reduction of carbohydrate food.

somewhat in the carbohydrates, giving them only the vegetables and all the fat they want. In deciding the question we should remember:

1. That the carbohydrates are better albumen sparers than the fats.

2. That they are more readily burned in the system and therefore furnish quicker heat and energy than fat.

3. We should determine whether a slow or rapid reduction is necessary. If there is a serious organic heart disease present, of course a rapid reduction is compulsory, whereas, when the patient has no organic disease and is only 20 or 25 pounds overweight, he may be very slowly reduced and needs less restriction of food.

4. Attention must be given to the various symptoms from which he suffers. If an obese patient has glycosuria, we must give him more fat and less carbohydrate. If he is constipated, we should select the carbohydrates rich in cellulose and vegetable fiber. If a nephritic or arteriosclerotic, his proteins should be reduced, though not entirely cut out. If he is obese and anemic, he should have food containing a large amount of iron.

5. Due consideration should be given to the patient's habit of eating and the probable duration of the diet. If he is accustomed to a large amount of fat or carbohydrate, the predominating one must be reduced.

When the reduction is to be long continued, we should consider the hardship and make the food as varied as possible, to avoid monotony.

6. Fat satisfies hunger sooner than any other kind of food, so that much less will be taken when the meal is begun with fat. At the same time, it cannot re-

plenish the nitrogen of the worn-out body cells, and it is very apt, when given in large quantities, to upset the digestion.

The author has met with far the best results by giving his healthy patients an increase of proteins with a moderate amount of fat and a considerable reduction of carbohydrates. As a rule, food containing the low percentage starches only are given, and all cane-sugar and candy are forbidden. A small quantity of bread once a day may be allowed only to patients who have a reduction of 20 or 25 pounds to be accomplished, while those who have to lose 40 or 50 pounds are given no bread. All are allowed potatoes freely, with two or more of the vegetables below containing less than 12 per cent. starch.

Vegetables containing less than 12 per cent. carbohydrate	C. per cent.	P. per cent.	Cal. value per 100 grams
Artichokes, green	9.0	4.8	72.4
Asparagus	3.3	1.8	22.7
Beets	9.7	1.6	47.2
Beet greens	3.2	2.2	.....
Brussels sprouts	3.4	1.5	17.9
Cabbage	5.8	1.5	34.5
Carrots	7.0	0.5	39.0
Cauliflower	4.7	1.8	31.2
Celery	3.3	1.1	5.1
Chinese cabbage	.....	.....	.....
Cucumbers	0.7	0.5	4.9
Dandelion greens	10.6	2.4	52.0
Escarole	.....	.....	.....
Egg-plant	0.7	2.6	13.2
Endive	3.0	1.0	16.0
Kale	.....	.....	.....
Lettuce	0.6	0.5	4.5
Mushrooms	1.2	2.2	13.9
Okra	7.4	1.6	.....
Onions	4.8	1.5	28.4

Vegetables containing less than 12 per cent. carbohydrate	C. per cent.	P. per cent.	Cal. value per 100 grams
Parsnips	10.8	1.3	47.0
Radishes	0.7	1.2	8.7
Rhubarb	1.7	0.6	10.3
Romaine	.....	.....	.....
Sour kraut	3.8	1.7	.....
Spinach	3.2	2.1	24.4
Squash	9.0	1.4	42.0
String beans	7.4	2.3	39.7
Tomatoes	3.9	0.9	19.5
Turnips	8.1	1.3	36.1
Water-cress	3.7	0.7	17.9

Fruit, meat, fish and eggs.

We allow them meat twice daily, alternating fish and eggs once a day, insisting that plenty of fruit (raw and cooked) should be taken three times a day.

We are often asked by physicians, as well as patients, if the effect of this diet is not weakening, and if it will not further the development of rheumatism or gout, which may already have begun to show themselves? The answer to the first question is: The patient's strength depends upon the nitrogenous food which he receives, and he gets more of this than he did before he began the diet; as he loses his fat his heart has less work to do, does it better, and with every pound that he loses he becomes stronger. The answer to the second question is: Our patients, treated in this manner during the last eighteen years, have lost their rheumatic and gouty tendencies, which have not returned unless they have gone back to their carbohydrate excesses. This of course is explained by the fact that their failure to digest carbohydrates causes indigestion, with faulty metabolism, which, in turn, becomes the cause of their inability to *digest proteins*,

Results of restriction of carbohydrate food and the free allowance of proteins.

as well as the *carbohydrates* and *fats*. Incomplete combustion of proteins into uric acid and water leaves in the circulation an excess of the xanthin and nucleinic bodies. This is prevented by giving less carbohydrate. Scientifically these gouty and rheumatic tendencies are really expressions of carbohydrate indigestion. Elsewhere in this volume I have alluded to the great error which I am satisfied physicians are making to-day in the restriction of proteins in the diet of their patients. It is important to consider the method of reduction quite fully before leaving this part of our subject. Many even attempt a reduction cure for themselves, which they may have secured from some person who has succeeded in reducing his own weight through advice of a physician or by some Kissingen or Vichy plan. There are physicians, I am sorry to say, who often attempt to treat obesity according to some method published by a patent medicine or regular manufacturing drug house. Fakirs under the guise of osteopaths, professional masseurs, users of various compressing corsets, or other appliances which serve only to prevent muscular action and inhibit the normal function of underlying organs, succeed in doing a lucrative business with the unwary public. Every form of energetic or violent rubbing or massage with kneading is not only useless, but positively harmful in the treatment of obesity. I am often told by patients who come for reduction that they have had powerful rubbing and vibratory massage over the fat pads and pendulous portions of the body with the hope of reducing their prominences, but no happy change in this respect has been effected. On the other hand, much harm often results, because

[redacted]

The method used should be evolved only after a careful study of the individual case. A thorough and searching examination of each patient and a record of the findings must be made, after which the case should be sized up with especial reference to the heart, lungs, blood-vessels, kidneys, and abdominal organs.

A careful consideration of the oxygenation problem must be given; hence it is easy to see that no patient can safely be allowed to diet himself. In fact, it is better and safer for him to retain his excessive fat. Neither is it safe for him to be given a diet list by a physician and asked to report in a month or six weeks. He should be given strict rules about weighing, stripped, upon rising from the bed, or with the same suit every day, at the same hour, keeping a careful record of his weight, and bring it to the physician at least once a week until the proper diet has been ascertained.

Results of deposition of fat in abdomen, mediastinum, and pericardium.

Since fat is most commonly deposited in the abdomen, mediastinum and pericardium, the lungs and heart are most impeded in action. The abdominal organs are, therefore, primarily involved through their superincumbent fat and secondarily by inhibited pulmonary and cardiac function furnishing insufficient blood supply to the secretory glands of the stomach and intestines to induce proper digestion. The diaphragm, the most important muscle of respiration, is limited in its excursion by the underlying accumulation of fat, resulting in diminished oxygen and lessened purification of the blood; hence less oxygen will be carried into the body tissues and cell metabolism thus becomes impaired.

Effect upon the heart nutrition and action.

The heart is hampered by the overlying fat, by the increased tubing, the exertion of carrying the weight, and by the increased systemic arterial resistance, as well as by the poorer quality of the blood sent through its own arteries, the coronaries. If the cardiac walls become flabby, the mitral valves, formerly competent, may be unable to close the orifice of the

dilating ventricle, and we then have established what is sometimes called a relative insufficiency (leaking valve). Or, in the case of a preexisting valvular affection of the heart, an exaggeration of the former leakage. In other words, the valves become more incompetent (less able to close the opening) and congestion of the pulmonary system, dilatation of the right ventricle, congestion and swelling of the liver, stomach, intestines, spleen and kidneys ensue with dropsy of the feet and legs.

Pain and distress due to congestion of liver, stomach and intestines.

Impaired digestion must follow. After the liver is so swollen that its capsule is distended it causes pain in the right side and epigastrium until patients complain of so much distress in the stomach region that cancer or ulcer is feared. Not infrequently the author has seen such cases in consultation.

Results of impairment of liver function.

This impairment of liver function may lead to an accumulation of effete or toxic agents in the blood which should have been arrested in the liver. Such toxins give rise to neuralgia, rheumatic and gouty pains in various fibrous tissues of the body about joints, tendons of muscles, aponeuroses, synovial membranes, sheaths of nerves, etc. This condition constitutes a pseudo-rheumatism, to which I have referred in the chapter on rheumatism. Since these fibrous tissues are poorly supplied with blood the presence of irritating material in the circulation will cause spasm of the arterioles and will further impoverish the blood supply to the tissues. This readily leads to pain and disturbance of function. Right here it is well to recall the fact that carbohydrate indigestion is the most common cause of such disturbance of function.

The author would advise the reduction of all healthy

Desirability of reducing the weight after the age of fifty.

adults over fifty years of age who are more than 10 pounds overweight whereas the excess of 12 to 15 pounds between the ages of thirty and forty may be, in most cases, safely carried. Few fat persons between the ages of twenty and thirty need to be reduced. Young growing children rarely need reduction, except where heredity plays a rôle. Then the diet and exercise should be arranged to prevent further gain in weight, and perhaps some reduction would be advisable. Between the ages of sixty and seventy years, contrary to the experience of most authors, I have found reduction in weight not only safe but much to be desired, as such patients may, with less fat to carry, have many years added to their lives, and spend them in active work with a greater degree of physical comfort. Still, I quite agree with Von Noorden that a great reduction for such cases may be harmful, and should always be very slow, with frequent intervals of rest. At the same time, we should always remember that some of our patients are young at seventy years, and be, therefore, wise in our discrimination. The author has seen many persons between sixty-five and seventy improve by a very gradual reduction of 20 to 30 pounds. Whenever the obesity is a complication of heart, lung, kidney or joint affection (as we will study in a later chapter) the reduction diet is obligatory. The author's method of reducing healthy obese men and women between the ages of thirty and sixty, the period when such persons most often come for advice, is a slow, rather than the rapid one in vogue at the various spas like Marienbad and Carlsbad. At the various European spas there are several attractive features: first, the environment—

Obesity as a complication of other diseases.

Slow reduction cure preferable.

gorgeous bath houses, luxurious hotels, in beautifully laid out gardens, alluring walks, and superb drives, commodious and airy concert halls, where the best vocal and instrumental music in the world can be heard daily, open air cafes, where many wealthy men and women, clad in the interesting costume of their country, mingle together like old friends, and become well acquainted; second, a systemic daily routine—regularity, with respect to the patient's habits—time of rising and retiring, of meals, rest, exercise, play, entertainment, baths, etc. Thus the patients are diverted and made happy, and when not over-exercised, must be considerably improved, but at Carlsbad, Kissingen, and many other spas, there is added the pernicious obligation of drinking large amounts of the purgative waters, which embarrasses the circulation, puts an extra strain upon the heart, and carries the food through the digestive tract too quickly for good digestion and absorption, thus reducing the strength of the patients. As most of the obese patients visiting these spas for the reduction of weight have cardiac insufficiencies, and many of them arteriosclerosis, the cardio-vascular system should not be overtaxed by excess of water drunk, or by too much exercise. Again, the treatment at spas appeals only to the fashionable and rich, largely to the former, who must do everything that others of their class do, and desire to be entertained, while the much larger and lower classes can be quite as well, and much more economically treated in their own homes, while many of them still pursue their ordinary avocations, aided by proper diet and rest. In this class the best exercise, when allowed, is that with a pecuniary

reward at the end. The patient whose work is clerical is better when working. Of course the cardiac obese need a resting period in their homes or a hospital where they can have all the baths they need. For many cases a few days of change and rest in the mountains or at the seashore, where the expense is very light are quite enough, with proper living, to put them in good condition. The subject of exercise with relation to cardiac disease will be referred to later under the treatment of cardiac affections. Again, the method of reduction is much too rapid to be safe or lasting. No better evidence of this is needed than the fact that *several thousand people repeat this cure* at the multitudinous foreign and domestic spas every year. This annual rapid increase and rapid reduction of flesh is certainly not healthful nor hygienic. The slow method of reduction by slight changes of diet is far preferable, for the following reasons:

Reasons for slow reduction.

1. It is perfectly safe.
2. There is no need of cathartic or other medicine.
3. Sufficient time allows the skin to contract, avoiding wrinkling, thus improving the personal appearance.
4. The fat disappears more uniformly over the entire body, until the reduction is complete; after which, to be sure, the breasts and abdomen of women still contain, as Von Noorden says, proportionately more fat for a while than the neck and limbs. But after a short time the latter fill out at the expense of the former.
5. The slow method is permanent, as the patients have become accustomed to the change in their diet and do not return to their former fattening food.

Illustration of method of reduction and diet list.

A healthy adult male, fifty years of age, is 20 pounds overweight: What method shall we adopt to reduce him? After examination, we should ascertain what the patient lives on—and we generally find that the carbohydrates predominate. Rarely does he partake of too much protein or fat. We should, therefore, merely have him cut out his cereal and sugar, and limit his bread to a small portion twice daily with butter, substituting potatoes and other vegetables. We should allow him a moderate amount of butter, with a little cream for his coffee, as well as eggs, fish or meat twice daily; thin soups; and fruit three times a day, advising him not to drink while eating in order that the food may be more throughly masticated. The amount of liquid should be reduced to five glasses daily, counting the one cup of coffee, or tea, which he may be allowed, unless contraindicated. Regular, open-air exercise should be required, and special attention be given to the skin in the way of daily cold morning baths, with at least two warm, cleansing baths weekly. If such patients are 40 pounds overweight, the starches should be more restricted; no bread allowed save two thin slices of dry toast with very little butter, the mornings when egg breakfasts are taken. With fish and meat, potatoes are always given. The fats are more reduced and the meals made a little smaller than that of patients who have much less fat to lose. Since pressure favors the disappearance of fat we invariably have our patients with large abdomens wear a properly fitted abdominal belt. Less exercise should be ordered until one-half at least of the excessive weight has been reduced. Such patients should at first drive in the open air or walk on

level. Later some strenuous exercises may be gradually instituted. The following diet list is applicable to the patients who have 20 pounds to lose.

Rise at 7 A. M. and take a cold sponge bath. Young and middle aged persons who have no heart or kidney complications may take a cold morning plunge with water at 76°–80° F.

BREAKFAST 8 A. M.

Fruit—oranges, mangoes, cherries, currants, grape fruit, peaches, apples (baked, raw, or stewed), stewed evaporated fruits, berries of all kinds in season, Concord or Malaga grapes, melons, pineapple (without sugar). Eggs—coddled, dropped on toast, soft boiled, shirred, poached, scrambled (two or three times a week); one or two thin slices of dry toast with butter. Broiled fish—schrod, haddock, halibut, bluefish, flounders, butterfish, salmon (rarely), finnan haddie, smelts, pickerel, perch. Broiled chicken, honeycomb tripe; chops—lamb or veal; meat, fish, or vegetable hash; breakfast bacon, calves liver and bacon; one medium-sized baked potato; one cup of coffee or tea without sugar or cream, but milk and saccharine may be used, if desired, or one glass of separated milk.

LUNCHEON 1 P. M.

Fish—as above. Chops—when not taken for breakfast; boiled or roast lamb or veal; chops—lamb or veal; plain lobster. Potatoes—baked, boiled, or mashed. Salad—fruit or vegetable, with French dressing. Fruit—as for breakfast. One thin slice of bread with butter; one cup of tea, or glass of water or separated milk. Two lunches each week may be made of a bowl of separated milk and water crackers, with or without baked sweet apples, if desired.

DINNER 6 P. M.

Raw oysters or little neck clams. Fish—as for breakfast. Roasts—beef, lamb, veal, white meat of chicken or turkey, partridge, quail; beefsteak; chops—as above; corned beef or tongue (boiled six hours). Vegetables—Irish potatoes, and two or three of the vegetables in the table on page 70. Salad—as above. Dessert—crackers with cheese (Camembert, Brie, cottage, farmers' skimmed milk, old fashioned curd). Fruit—as above. One cup of tea or glass of water.

SUGGESTIONS

When soups are desired plain clam bouillon, beef consommé, strained chicken gumbo, or plain tomato without milk, may be taken.

For people over fifty years of age a dinner in the middle of the day, with a light supper, is advised.

Food put in the breakfast list may, when preferred, be taken instead for lunch or dinner.

A glass of water, hot or cold, should be drunk on rising and at bedtime, and half a glass at 11 A. M. and 4 P. M.

Buttermilk has about the same caloric value as separated milk and can be taken, if one prefers it.

Do not drink while eating, and only one glass after the meal.

Not more than one glass of fluid should be drunk at one time.

Take no bread for breakfast except with eggs; then one or two thin slices of dry toast may be eaten.

Eat a different kind of fruit at each meal.

Vary the food as much as possible from day to day.

The amount of butter at each meal should not exceed one pat or ball.

Guard against too much butter being put on vegetables in the kitchen.

Cabbage should be chopped fine and boiled eight minutes in slightly salted water.

Weigh yourself daily, and if you are not losing eat a less quantity of food at each meal.

Grape fruit may be improved with salt.

This diet table may be so arranged as to contain about 2000 calories by weighing the portions of food; however, this is wholly unnecessary, as practical experience shows the patients will lose from 1 to 2 pounds weekly upon this diet, and the custom of testing the nude weight, daily, on rising with scales, will suffice for a guide as to whether too much or too little food is taken, and the amount can be varied as indicated by the scales. It almost never happens that a patient takes too little. It is well to remember that the great loss of weight often seen during the first

week is not all loss of flesh. A large part is an excess of water which the tissues contain. This loss may often reach as high as 10 or 12 pounds. This should never lead the inexperienced physician to increase the diet the second week, as the first week's experience will not be repeated. The number of calories may be reduced a little by either reducing the size of the meat portion or selecting a kind which has less fat; substituting tongue or corned beef for steak, etc., or if more calories are needed an extra slice or two of bread, or more butter, can be ordered.

EMACIATION

Under this head I would include

Classification of cases.

a. The patients who are lean because of inherited predisposition, *i.e.*, the constitutionally lean.

b. Those who have become so through diseases of infancy, especially the affections of stomach and bowel, or both, cholera infantum, marasmus, etc.

c. Adults who have undergone some severe infectious fever like typhoid; sufferers from tuberculosis, nephritis, chronic rheumatism, anemia, some vascular or chronic affection of the gastro-intestinal tract, like ulcer. Under this class we must reckon the so-called nervous dyspepsia, whatever may be the primary cause of the latter, as well as the nervous affections and psychoses. d. Overworked girls and men, who eat insufficient food, irregularly.

Constitutional class.

Under the constitutional class should perhaps be especially mentioned those born with the habitus enteropticus and tubercular diathesis. How much can be done for this class, in a dietetic sense, is still a question, but no one will doubt that much can be done to anchor internal organs (floating kidney, gastroptosis), to prevent the pretubercular albuminuria running on into a real tuberculosis, in the under nourished patient, by increasing the fat in the system. The pretubercular albuminuria, called by Kraus a constitutional albuminuria, is seen in young patients who have the "habitus asthenicus," what American authors describe as the tubercular diathesis; the

Habitus asthenicus and pretubercular albuminuria.

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abolism, arising in much the same manner as the headache of nephritis, although differing slightly in symptoms. In either case attention given to elimination quickly relieves the patient and subsequent care of the diet and proper hygienic precautions ward off future attacks, and, in the case of migraine, often cures the affection.

Object of methods of adding weight. Plan of dietetic treatment.

There are a number of different methods of adding weight to lean people but, without enumerating them, I will state that their aim is to give the patient more food than he needs, and to prevent his using up all that he takes.

I will briefly state the plan which I have found very satisfactory. In the first place the method used takes into consideration the physical condition above mentioned and the temperament of the patient. For example, if the appetite is good we can give a kind of food that we could not give were there complete anorexia. A diabetic cannot be given the carbohydrate that a nephritic requires. One patient has been overworked and worried in business, while another has been the victim of too much society; these alike demand rest in the horizontal position, in the open air if possible, and seclusion for an indefinite time, the period, of course, depends upon how much underweight the patient is and his mental state. After a brief interval of complete rest, he sits up a little, goes to drive, and walks about on level, but has resting periods of one to two hours after regular meals. If the appetite is much impaired, six or more light meals are given daily. If complete anorexia exists, the stomach tube is used for one or more meals, rarely more than one. Should there be no special con-

Rest.

Exercise.

Dietetic treatment.

traindications—diabetes, nephritis, etc.—to any of the three principal elements of food, we begin by giving a

Protein.

mixed diet and try to increase very slowly the albumen until the patient is receiving 100 to 120 grams P. daily, on account of its easy digestion, and its value in improving metabolism generally. It is best to begin with the albumen of milk, egg and casein of cheese, as they tax the digestion least and do not lessen the appetite for other food. The next to be

Fat.

increased is fat, since in one-half the quantity it furnishes more calories than C. and is less likely to cause fermentation and disturbance of digestion in adults; in children, however, an excess of fat has been provocative of more indigestion than starch and sugar. The best fats are cream and butter (cod-liver oil for children) because of their fine emulsification, almonds, chestnuts, etc., while the fat of meat creates

Carbohydrates.

a feeling of satiety too soon. Usually we increase the C last but, on the other hand, when fats are poorly tolerated, we often begin with C and to it we can add considerable fat, without its being noticed, as with bread, vegetables, light puddings, etc., with cream, and fruit sauces. Pawlow showed that a very large amount of butter can be easily digested when given with bread. The best carbohydrates to begin with are white bread, vegetables, honey and fruit, as the sugar of the latter is easier of digestion than cane-sugar. In this manner the number of calories may in a few weeks exceed the amount required in health. In many instances I have found that a small meal, once a day, of sweets, according to Gautier, agrees well, and I often give one meal of meat and vegetables only. The lunch should consist of such

food as will not take away the appetite for the next meal. Chocolate, dry, may be given in the middle of the forenoon, as it is quickly burned up in the system and is soon out of the stomach. For similar reasons a raw egg may be given in the middle of the afternoon, and a glass of creamy milk, which takes longer to digest, at bed-time. Every effort must be made to avoid sameness in lunches as well as meals. The menu must be very elastic and the cook instructed to serve cream and fruit sauces as much as possible, as they are palatable aside from their high caloric value. To aid the digestion of fats and because of its value, we have in some cases, when indicated, used alcohol in the form of whiskey, port wine, Dublin stout, beer, malt, etc., although in this country we seem to have fewer cases requiring it than do Europeans.

Chocolate.

Raw eggs.

Variety.

Alcohol.

Of course, in our poor diabetic and tubercular cases, we increase the fats particularly, and in the former reduce or cut out the carbohydrates. Success is much more quickly and surely attained in the cases secondary to some other affection than in the constitutional forms, and when it succeeds in the latter, relapses are common, unless the patient is carefully watched and kept on a liberal diet without much active exercise. The patient must be instructed to watch his weight and to understand, in a practical way, the caloric value of foods. For class D a regular régime should be given as to the time of taking meals (three or six daily), the amount of sleep, and exercise in the open air necessary, and the necessity of eating whether they desire the food or not.

Relapses.

From the foregoing it will be easy to prepare a menu

from which a diet, adapted to either class of undernourished patients, may be selected. For the inexperienced the selection of fat or carbohydrate will be difficult at first, but a little experimenting in the matter is less harmful than giving drugs, and the cue is often acquired by discovering what kind of food the patient formerly ate with the greatest enjoyment. Remember here, also, that appetite is psychical and the result of habit, and that new habits in this regard can readily be acquired and the stomach and bowels gradually taught to functionate normally.

Exercise.

It will be noted here, as in the treatment of obesity, that no very active or vigorous exercise is advocated. In fact, I believe all the energy of the system should be spared for the use of its own functions; active exercise should be allowed only after normal vitality has been restored.

From the following table one may select a menu adapted to the peculiarities of the case, remembering that experiments have been made on animals which show that when fatted upon carbohydrates they developed fatty degeneration of the heart, and this fact led Ebstein and others to suggest using fats in excess in leanness, rather than carbohydrates. The only safe rule is to select a mixed diet containing a good quantity of protein and fat, and a moderate amount of carbohydrate, and modify it as the individual case demands.

BREAKFAST

Fruit—apples, pears, peaches, baked, raw or stewed, oranges, grape fruit, grapes, peaches, melons, pineapple, berries of all kinds, stewed apricots, cherries, currants, dates, figs, tamarinds; cereals (pop-corn, corn flakes, appetizo, shredded wheat, hominy, rice) with plenty of cream; eggs cooked in any style; fish, any kind in

season (especially mackerel, herring, bluefish, salmon, trout, eels, sardines, swordfish); chops—lamb, veal, pork or mutton; beefsteak; breakfast bacon; broiled honey-comb tripe; broiled chicken; lamb steak; sausage; broiled ham; calves' liver and bacon; baked potatoes with plenty of butter; stale bread, dry toast, crusts of rolls, johnny cake, muffins (when light) with plenty of butter; one cup of coffee, one-half cream, or chocolate.

Lunch at 10.30—Chocolate (Baker's, Peter's, Cailler's, Mehring's) or a raw egg.

Dinner

Raw oysters or little neck clams; soups; vegetable purees with cream; fish; roasts—beef, lamb, veal, pork, chicken, turkey, venison, quail, duck, goose, partridge; steaks or chops; vegetables—Irish or sweet potatoes, lettuce, spinach, celery, cauliflower, beets, squash, cabbage, cold slaw, string beans, brussels sprouts, green peas, asparagus, tomatoes, parsnips, carrots, onions, corn, rice, spaghetti, macaroni; vegetable and fruit salads; dessert—puddings (apple, tapioca, sago, rice, baked Indian), custard, bonny clabber, molasses gingerbread with plenty of butter or cream (Devonshire cream (clotted cream) can be used on puddings and fruit; the formula is found in the back of this book); angel cake, sponge cake, ice cream, crackers and cheese (brie, camembert, roquefort, imperial cream, club); one cup of tea or a glass of water.

Lunch at 4 P. M.—Chocolate or raw egg.

Supper

Soups, preferably purees, if not taken for dinner; fish as above, broiled or baked in cream; chops or steak; stews—beef, lamb, veal, chicken, mutton (with vegetables); eggs when not taken for breakfast; potatoes, baked or creamed; bread as above with plenty of butter; honey or any of the cooked fruits; nuts and raisins, one glass of milk with plenty of cream or a cup of chocolate.

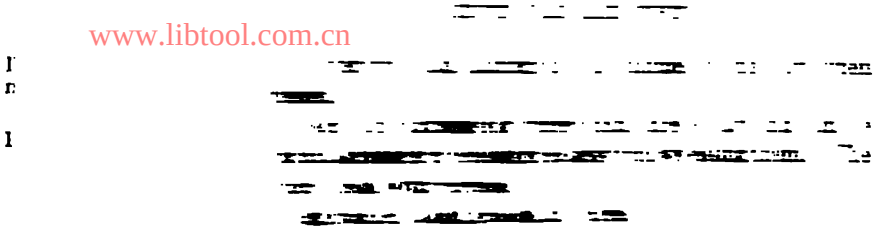
Lunch at 9 P. M.—A glass of milk with plenty of cream.

Suggestions

Use cane sugar, maple sugar and honey freely with meals.

Eat bread and butter with every meal.

When fish is chosen no meat or eggs should be taken at that meal.



DIABETES MELLITUS

Diabetes mellitus is a disease characterized by an excess of sugar in the blood—glycemia, with permanent glycosuria as its outward expression. This condition is due to faulty metabolism of the carbohydrates chiefly, but also to a slight extent of the proteins and fats. In order to understand the dietetic treatment of this affection it will be necessary to briefly review the metabolism of the carbohydrate foods. These consist of starch and various sugars, grape fruit, milk, and cane-sugar, the latter being changed into grape and fruit sugar in the intestine; the starch is changed into grape-sugar in part by the ptyalin of the saliva and completed by the pancreatic and intestinal juices. These are absorbed from the intestine, for the most part, by the radicals of the portal vein, and go directly to the liver; only a small part enters the thoracic duct and this finds its way into the blood. The liver converts the grape-sugar into glycogen and stores it up in its cells, to return it as grape-sugar again when needed for use in the economy to furnish energy and heat. Further than this, we know that the muscle cells store up a certain amount of grape-sugar, so that we have two storehouses for it, namely, the liver and the muscles. Miller, Krehl, and others have also experimentally found that the pancreas has a glycogenic function, though it does not store up sugar.

Metabolism of C foods.

Conversion and storage of sugar.

The chemical composition of carbohydrate, car-

bohydrate-glucose-$C_6H_{12}O_6$, clearly indicates the ease with which it may be oxidized in the system into carbonic acid gas and water, furnishing quick heat and energy. The carbonic acid formed from the oxidation of carbohydrates is for the most part eliminated from the body by the lungs. We can now readily see that anything which interferes with the metabolism of the carbohydrates may lead to an excess of sugar in the blood and become a cause of diabetes mellitus providing glycemia be permanent. It is well known that a temporary increase in the amount of sugar in the blood, *i.e.*, an excess of 0.1 of 1 per cent., may take place whenever more carbohydrate food is given a person than his liver can store up and his muscles use; for example, when patients are fed large quantities of sugar and take little or no exercise they may, of course, show a temporary glycosuria which readily disappears as soon as the system has had time to burn up the excess in the blood, hence this condition cannot be correctly called diabetes; more properly it is called an alimentary glycosuria. This condition is often found to occur after nervous shocks. It is well to note in this connection that an excess of sugar in the blood can be disposed of in the system, in most cases, by its conversion into fat, and it is probable, as mentioned elsewhere, that in the majority of our obesity cases the origin of their fat may be traced to sugar. This makes it clearly evident that it is easy for the obese patient to become diabetic, sooner or later, because of inability to convert his excess of starch and sugar into fat. Now one must naturally infer that any disease of the intestine, of the pancreas, especially

Excess of sugar in the blood.

Relation of sugar to obesity and diabetes.

affecting the islands of Langerhans, tumors or pathological conditions obstructing the portal vein, liver diseases like atrophy, syphilis, tumors, arteriosclerosis, and various affections of the muscles inhibiting their function will favor accumulation of sugar in the blood; and, furthermore, certain diseases of the kidney, especially arteriosclerosis and abscesses, may facilitate the escape of an excess of sugar into the urine. It has been experimentally found, also, that the glycogenic function of the liver may be influenced, through the nervous system, by puncture of the fourth ventricle, and it is well known that concussion of the brain, irritation from tumors of the medulla, as well as various other parts of the brain, may give rise to diabetes. Opie believes that more than one-half of all the cases of diabetes mellitus are of pancreatic origin. This view, however, is not general.

Conditions favoring accumulation of sugar in blood.

If faulty carbohydrate metabolism were the only cause of diabetes mellitus the treatment would be comparatively simple, as we could nourish the patients with proteins and fats, excluding the whole or a part of the carbohydrates, but unfortunately the system is, in some cases, not only unable to assimilate completely the carbohydrates, but also the proteins as well; consequently we are led to increase the fats considerably to support our patients, and by so doing the fatty acids, according to Magnus Levy et al., lead to the formation of B-oxybutyric acid, the mother substance of acetone and diacetic acid (the presence of the latter acid in the urine being brought out by the ferric chloride test); the disease then becomes much more serious, we are less able to nourish our patients and they lose flesh and weight rapidly

Formation of B-oxybutyric acid and its result.

and are in grave danger of intoxication from the organic acids just mentioned. This often leads to the well-known diabetic coma. Naunyn, Von Noorden, et al. warn against feeding diabetics too much protein, in fact advise, as a rule, not over 120 grams daily, and on the first suspicion of diacetic acid in the urine to reduce the amount of meat to 40 grams or less, and should the test for diacetic acid still be positive to omit all meat for one or two days, giving fat and some carbohydrate, constituting the so-called hunger or vegetable days. More than 100 years ago Prout pointed out the great *advantage* of *limiting* the *quantity* of food, and since then all observers of large experience confirm this view; at the same time they warn against the danger of reducing the patient much below the normal weight. Again, we have to consider the age of our patient and the other diseases, if any, from which he suffers. It is well known that any form of diabetes in youth is very serious, and the severest form is usually fatal under thirty years of age, whereas the mild form in persons over fifty is, comparatively, never a grave affection, and the prognosis in the more severe forms is better than in youth.

Protein in the diet.

Limitation of quantity of food.

Three classes of diabetics.

It is plain from the foregoing that, for clinical purposes at least, it is wise to accept the division of diabetics into three classes.

I. Patients who can digest fats and proteins and a small amount of carbohydrates, say 60 grams or more of white bread daily. These are called the mild cases.

II. The moderately severe, diabetics whose urine cannot be made sugar-free until they have been put on a pure fat-protein diet without carbohydrate, for one or two weeks.

III. Diabetics who must be restricted in their proteins, and completely deprived of carbohydrates; and perhaps then it will be impossible to make them sugar-free.

A few suggestions concerning these different classes may not be out of place in this connection. The first class may embrace patients of almost all ages, and it should always be remembered that under thirty a glycosuria is much more serious than in patients beyond fifty, for two reasons: first, they have developed their intolerance for carbohydrates earlier, and, second, they have not the other diseases pertaining to late adult life, which may have precipitated the diabetes. We must not forget, also, that some persons show greater tolerance for carbohydrates than others; some can take up to 3000 calories without excreting sugar; the excess of sugar seems to be stored up as fat. The clinician of large experience often meets with cases of obesity just on the verge of diabetes. In a similar way, we can account for the good digestion of meats possessed by some persons, who with impunity consume from 200 to 300 grams daily, or double the amount required. This is also true with regard to fats.

Prognosis in the different classes.

Van Noorden suggests we should diagnose diabetes mellitus only when our patients excrete sugar continually in the urine when they are given the usual 1500 to 2000 calories, or less, of carbohydrates. It has been found that many mild diabetics will gradually excrete less sugar as the carbohydrate ration is reduced until a point is reached when none is found in the urine. Hence it has become a rule to ascertain to which class a diabetic belongs by giving him a test

True diabetes.

diet, which consists of the ordinary animal and vegetable proteins, the usual fats (butter and cream), and a small quantity of carbohydrate. Avoid too rapid reduction of carbohydrate because of danger of acidosis and coma. Test diets should be made up from the tables at the end of this chapter. The toleration once determined, he should for a long time, at least three weeks, be kept within the limit of carbohydrate necessary to produce sugar in the urine, after which we should begin cautiously to increase the amount of carbohydrate by giving him each day the value of 15 grams (1/2 ounce) extra, until sugar reappears in the urine, when we should go back again to the original amount, which may be continued for two weeks and then increased again as before, until the limit of toleration is reached, which will be found to be higher than at the previous test. In this way the patient's ability to digest carbohydrates is increased. We find patients will digest some forms of starch much better than others, also that they differ very much in this regard. Mosse discovered that some persons will digest potato much better than other forms of starch. Von Noorden found that the same was true with regard to oatmeal, hence the potato and oatmeal diet have come to play a prominent rôle in feeding diabetics.

Procedure after toleration point is determined.

Variation of toleration point for different forms of starch.

Vegetables in the diet.

Many of the green vegetables possess so little carbohydrate that they may be added to the principal carbohydrate food that has been adopted. It is indeed usually advisable to give the coarser vegetables, containing less than 12 per cent. carbohydrate, as they are satisfying to the patient and enable him to take a good deal of butter fat which is necessary to keep up

sufficient calories. Boiling and changing the water reduces the amount of starch in vegetables.

Number of calories in the diet.

It is considered wise to give the mild cases of diabetes about 35 calories per kilogram of body weight. A patient weighing 150 pounds should have about 2500 calories daily and about 1500 calories are usually given in the form of carbohydrates. It is easy to see that diabetic patients of Class II must subsist largely upon proteins and fats, and great care must be used in regulating the amount of each of the latter ingredients, even in the mild cases. Of course, this is much more necessary in the severer types of the disease, where often considerable restriction of the proteins becomes necessary, in order to make the patient sugar-free, and in these very cases, when the administration of large quantities of fat is liable to produce an excess of diacetic acid, with its consequent train of bad symptoms, it becomes a very serious problem how much fat and how much protein should be given.

Dependence upon protein and fat.

Management of severe cases in Class II.

The more severe cases of the second class can be made sugar-free only after abstinence from carbohydrate food. For these the wise and patient physician can do much to make them again able to metabolize carbohydrate by keeping them, after becoming sugar-free, upon a strict fat-protein diet for one or two days before essaying even the smallest amounts of starch. After this, begin with vegetables containing the lowest per cent. starch (spinach, carrots, lettuce, etc.), then try a little baked potato, which I have found my patients tolerate earlier and better than bread; moreover, because of its relatively low per cent. starch (18 per cent.) they can take three times as much of it. Joslin advises beginning with vegetables because

Kinds of C which should be added to diet after patient has become sugar-free.

starch is easier of assimilation than sugar. Fruit may next be tried. Naunyn suggests oranges, currants, and cranberries as being especially good, since more than one-half of their sugar content is levulose, which is much easier to metabolize than cane-sugar. Other fruit should be given for a similar reason. These fruits are of great value to alkalinize the blood. Croftan calls attention to the value of the substitution of levulose for grape-sugar, for a time, in some cases.

This increase of carbohydrates should be very slow, keeping, if possible, below the patient's point of tolerance. According to Rubner, this point is somewhat raised by an increase in the consumption of protein. He showed that by this method the total food metabolism was increased, hence we should increase the patient's protein with this end in view, then the patient is given this amount together with sufficient fat to make up the requisite number of calories. This is often impossible, and besides our patients develop acetone bodies in the urine and emaciate so rapidly with loss of strength that we are compelled to increase the carbohydrates and perhaps to reduce the proteins while we restrict the fats, although Minkowski says the latter is unnecessary. In the third class, and often in the second as well, alcohol is very valuable to lessen the formation of acetone, probably by its aid in the digestion of fats as well as for its food value. One gram has a caloric value of 7 calories, and 30 to 60 grams (1 to 2 ounces) may be given daily in the form of whiskey or Rhine wine (105 to 210 calories).

Alcohol.

It should not be forgotten that the ease with which

different proteins are metabolized varies greatly in different persons. Some can tolerate vegetable protein better than animal; milk and egg albumens better than meat. As a rule egg albumen is least likely to produce sugar and casein the most, while meat stands between the two (Filosofof). **Protein.**

Hence we should usually depend upon these facts for the increase of the different proteins and in spite of Naunyn's restriction of them, which undoubtedly is a safe rule, many writers give 200 and even 250 grams of protein daily with impunity when for any reason fats are not well borne. The major part of the calories, however, must be made up of fat, and the best for use are butter, cream, yolks of eggs, bacon, fat of meats and fish, cream cheese, and olive oil. The number of calories from fat will need be about 2000 and great tact will be necessary to avoid disturbing the patient's digestion with such large amounts. Every two weeks at least, patients of this class should have a vegetable day with plenty of butter, broths, etc. The urine must of course be examined often for diacetic acid as well as sugar, and if the former occurs, a 1-dram dose of the sodium bicarbonate three to five times a day should be given. Patients of Class III are more often the young, and the author has yet to see a case cured, but life may be prolonged by a very rigid diet—such as would readily be inferred from a study of that of Class II. In Class III the diet should be theoretically carbohydrate-free, although most clinicians allow a little carbohydrate, as it is often impossible to make these patients sugar-free. They manufacture sugar out of the carbohydrate molecule split off from their protein, consequently this important element of the

Best fats to use.

Vegetable days.

Class III.

Sugar from protein.

diet has to be considerably reduced to reach the possible tolerance of the patient for albumen. The fats have to be still further increased and the vegetable days more frequent, and consequently emaciation is generally rapid, and acidosis is a constant menace. Tables suitable for the three classes have been arranged by my associate, Dr. W. E. Preble, and are appended at the end of this chapter.

When practicable it is well to have diabetics of the second and third class treated for a few weeks in some well equipped hospital until their toleration of carbohydrates and proteins has been sufficiently well determined to establish a proper diet, as they can be better controlled in the hospital and their excretions more accurately studied. In summing up we have a few points to keep in mind in the treatment of diabetes.

Summary.

I. Find out the patient's ability to digest carbohydrates.

II. Try to preserve or increase this power.

III. Maintain the patient's weight wholly or in large part with protein and fat.

IV. Different kinds of starches and sugars, proteins and fat are digested and assimilated with varying degree of facility and often a large quantity of one kind is much better used up in the system than a small quantity of two or more kinds and *vice versa*, and the maximum amount of carbohydrate food should be given with the first meals in the day because it is best oxidized then.

V. Occasionally the proteins must be very much restricted or entirely cut out for a day or more, vegetable or fasting days being often necessary.

List I

Strict Diet List (Practically No Carbohydrate).—Meats—beef, lamb, mutton, veal, pork, chicken, turkey, capon, duck, goose, venison, quail, partridge, pigeon, rabbit, ham, bacon, guinea-hen, fowl, lambs' tongues, fresh tripe, green turtle, terrapin, beef heart, calves' liver, beef tongue, sweetbreads, kidneys, pigs' knuckles, pigs' feet, calves' brains, Bologna sausage, smoked or pickled meats. Fish—(fresh) any kind, preferably salmon, butterfish, herring, mackerel, Spanish mackerel, bluefish, shad, lake trout, white fish, halibut, eels, anchovies, lobster, sardines, shrimps, smoked or pickled fish. Eggs.

Supplementary List (Very Low Carbohydrate).—Canned salmon, scallops, clams, oysters, crab meat, soft-shell crabs, Frankfurt sausages, pork sausages, fish roe, pickled tripe. Cheese—Roquefort, Cheshire, Camembert, Neufchatel, Swiss, Brie, Limburger, American, Cream, Port de Salut.

Vegetables.—I (5 per cent. or less carbohydrate): Endive, escarole, Romaine, string beans, lettuce, Chinese cabbage, sorrel, spinach, cucumbers, dill pickles, sour kraut, kale, Brussels sprouts, watercress, Swiss chard, boiled onions, eggplant, sour pickles, beet greens, parsley, asparagus, celery, tomatoes. II (10 per cent. or less carbohydrate): Mushrooms, beets, turnips, squash, carrots, cauliflower, oyster plant, raw onions, dandelion greens, olives, cabbage, red cabbage, okra, radishes.

Fruits and Berries.—I (below 10 per cent. carbohydrate): Watermelon, strawberries, cantaloupe, peaches, pineapple, cranberries. II (below 15 per cent. carbohydrate): Blackberries, oranges, raspberries, currants, apricots, pears, apples, grapes, grapefruit.

SUGGESTIONS

Eat a liberal amount of butter and some of the fat of meats. Avoid monotony. Vary the food as much as possible from meal to meal, and day to day, and endeavor to tempt the appetite.

Water should be taken in moderate amounts (4 to 6 glasses daily) on the empty stomach. If very thirsty, more may be taken.

No thickened gravies, sauces, or stuffing of any kind are allowed. Dish gravy is allowed with roasts and French dressing on salads.

All of the carbohydrate food ordered on "special list" must be eaten, or accurate record made of amount refused.

Caution.—*Absolutely no food or drink not on list may be taken.*

List II

	Carbohydrates.
Vegetables	10 gm. (approximately).
Bread, 3 oz. at 18	54 "
Potato, 4 oz. at 6	24 "
Oatmeal, 1 gill (measured dry)	24 "
Milk, 8 oz. (1.5)	12 "
Cream, 8 oz. at ¾ gm.	6 "
Apple, 1 small (baked)	10 "
Orange, 1 small	10 "
	150 "

Breakfast

Eggs, meat, or fish (from Strict Diet List), and
Orange, 1 small.
Oatmeal, 1 gill (measured dry).
Cream, 3 oz.
Bread, 1 oz.
Coffee.
Butter, freely. (54)

Lunch

Meat, fish, or eggs, and
Potato, 4 oz.
Milk, 4 oz.
Butter, freely.
Coffee.
Vegetables, one from each group (liberal helping).
Cream, 2 oz.
Baked apple, 1 small. (52)

Dinner

Fish, eggs, or meat, and
Bread, 2 oz.
Vegetable salad with French dressing.
Milk, 4 oz.
Cream, 3 oz.
Butter, freely.
Tea. (44)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List III

	Carbohydrates.
Vegetables	10 gm.
Bread, 2 oz.	36 "
Potato, 3 oz.	18 "
Oatmeal, 1 gill (measured dry)	24 "
Milk, 8 oz.	12 "
Cream, 8 oz.	6 "
Apple, 1 small	10 "
Orange, 1 small	10 "
	126 "

Breakfast

Eggs, meat, or fish, and
Orange.
Oatmeal, ½ gill (measured dry).
Cream, 3 oz.
Bread, 1 oz.
Bacon.
Milk, 4 oz.
Butter, freely.
Coffee. (48)

Lunch

Meat, fish, or eggs, and
Potato, 3 oz.
Vegetables, liberal helping of one from each group.
Cream, 2 oz.
Butter, freely.
Baked apple.
Coffee or tea. (40)

Dinner

Fish, eggs, or meat, and
Oatmeal, ½ gill (measured dry).
Bread, 1 oz.
Vegetable salad with French dressing.
Milk, 4 oz.
Cream, 3 oz.
Butter, freely.
Tea. (38)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List IV

	Carbohydrates.
Vegetables	10 gm.
Bread, 1 oz.	18 "
Potato, 2 oz.	12 "
Oatmeal, ½ gill (measured dry)	24 "
Milk, 8 oz.	12 "
Cream, 8 oz.	6 "
Apple, 1 small	10 "
Orange, 1 small	10 "
	102 "

Breakfast

Eggs, meat, or fish (from Strict Diet List), and
Apple, 1 small.
Oatmeal, ½ gill.
Cream, 3 oz.
Potato, 1 oz.
Bacon.
Coffee.
Milk, 4 oz.
Butter, freely. (36)

Lunch

Meat, fish, or eggs, and
Potato, 1 oz.
Vegetables, liberal helping of one from Group I and one from Group II.
Milk, 4 oz.
Cream, 2 oz.
Orange, 1 small.
Tea or coffee.
Butter, freely. (34)

Dinner

Fish, eggs, or meat, and
Bread, 1 oz.
Oatmeal, ½ gill.
Cream, 3 oz.
Vegetable salad.
Tea, coffee, or cocoa shells.
Butter, freely. (32)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List V

	Carbohydrates.
Vegetables	10 gm.
Potato, 2 oz	12 "
Oatmeal, 1 gill (measured dry)	24 "
Milk, 6 oz	9 "
Cream, 8 oz	6 "
Apple, 1 small	10 "
Orange, 1 small	10 "
	81 "

BREAKFAST

Eggs, meat, or fish (from Strict Diet List), and
Orange, 1 small.
Oatmeal, ½ gill.
Cream, 3 oz.
Milk, 3 oz.
Bacon.
Coffee.
Butter, freely. (29)

LUNCH

Meat, fish, or eggs, and
Vegetables, liberal helping of two from Group I and one from Group II.
Milk, 3 oz.
Cream, 2 oz.
Apple (baked without sugar).
Tea or coffee.
Butter, freely. (26)

DINNER

Fish, eggs, or meat, and
Potato, 2 oz.
Oatmeal, ½ gill.
Cream, 3 oz.
Vegetable salad or cooked vegetable from Group I, and a little cheese.
Tea or coffee, or cocoa shells.
Butter, freely. (26)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List VI

	Carbohydrates.
Vegetables	10 gm.
Oatmeal, 1 gill (measured dry)	24 "
Milk, 8 oz.	12 "
Cream, 8 oz.	6 "
Orange, 1 small	10 "
	62 "

BREAKFAST

Eggs, meat, or fish (from Strict Diet List), and
Orange.
Oatmeal, ½ gill.
Cream, 3 oz.
Bacon.
Coffee.
Butter (on eggs and oatmeal). (24)

LUNCH

Meat, fish, or eggs, and
Vegetables, liberal helping of two from Group I and one from Group II.
Milk, 4 oz.
Cream, 2 oz.
Tea or coffee.
Butter (freely on vegetables). (18)

DINNER

Fish, eggs, or meat, and
Oatmeal, ½ gill.
Cream, 3 oz.
Milk, 4 oz.
Vegetable salad (with French dressing), or cooked vegetables from Group I, and a little cheese.
Butter.
Tea or coffee, or cocoa shells. (20)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List VII

	Carbohydrates.
Vegetables	10 gm.
Oatmeal, ½ gill (measured dry)	12 "
Milk, 8 oz.	12 "
Cream, 8 oz.	6 "
½ grapefruit (small and ripe)	10 "
	50 "

BREAKFAST

Eggs, meat, or fish (from Strict Diet List), and
Oatmeal, ½ gill.
Cream, 3 oz.
Milk, 4 oz.
One vegetable from Group I.
Bacon.
Coffee.
Butter. (20)

LUNCH

Meat, fish, or eggs, and
Milk, 4 oz.
Cream, 3 oz.
Vegetables, liberal helping of two from Group I and one from Group II.
Tea or coffee.
Butter (on vegetables). (18)

DINNER

Fish, eggs, or meat, and
One vegetable from Group I or II.
½ grapefruit (small and ripe).
Cream, 3 oz.
Tea or cocoa shells.
Butter. (12)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List VIII

	Carbohydrates.
Vegetables	10 gm.
Oatmeal, ½ gill (measured dry)	12 "
Milk, 8 oz.	12 "
Cream, 8 oz.	6 "
	40 "

BREAKFAST

Eggs, meat, or fish (from Strict Diet List), and
Oatmeal, ½ gill.
Cream, 3 oz.
One vegetable from Group I.
Bacon.
Coffee.
Butter. (14)

LUNCH

Meat, fish, or eggs, and
Vegetables, liberal helping of two from Group I and one from Group II.
Milk, 4 oz.
Cream, 2 oz.
Coffee or tea. (18)

DINNER

Fish, eggs, or meat, and
One vegetable from Group I and one from Group II.
Milk, 4 oz.
Cream, 3 oz.
Tea or coffee, or cocoa shells. (8)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List IX

	Carbohydrates.
Vegetables	12 gm.
Oatmeal, ½ gill (measured dry)	12 "
Cream, 8 oz.	6 "
	30 "

BREAKFAST

Eggs, meat, or fish (from Strict Diet List), and
Oatmeal, ½ gill.
Cream, 3 oz.
One vegetable from Group I.
Bacon.
Coffee.
Butter (8)

LUNCH

Meat, fish, or eggs, and
Vegetables, liberal helping of two from Group I and one from Group II.
Cream, 2 oz.
Tea or coffee.
Butter. (14)

DINNER

Fish, eggs, or meat, and
Oatmeal, ½ gill.
Cream, 3 oz.
One vegetable from Group I and one from Group II.
Tea, coffee, or cocoa shells.
Butter. (8)

N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List X

	Carbohydrates.
Vegetables	12 gm.
Cream, 8 oz.	6 "
	18 "

BREAKFAST

Eggs, meat, or fish (from Strict Diet List), and
One vegetable from Group I.
Cream, 2 oz.
Bacon.
Coffee.
Butter.

LUNCH

Meat, fish, or eggs, and
Vegetables, liberal helping of two from Group I and one from Group II.
Cream, 3 oz.
Tea or coffee.
Butter.

DINNER

Fish, eggs, or meat, and
Vegetables, one from Group I and one from Group II.
Cream, 3 oz.
Tea, coffee, or cocoa shells.
Butter.
N. B.—Give large helpings of meat, fish, and vegetables, and give 1 oz. of olive oil three times a day.
N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List XI

	Carbohydrates.
Vegetables	10 gm.
Cream, 3 oz.	2 "
	12 "

BREAKFAST

Eggs, meat, or fish (from Strict Diet List), and
One vegetable from Group I.
Cream, 1 oz.
Bacon.
Coffee.
Butter.

LUNCH

Meat, fish, or eggs, and
Vegetables, liberal helping of two from Group I and one from Group II.
Cream, 1 oz.
Tea or coffee.
Butter.

DINNER

Fish, eggs, or meat, and
Vegetables, two from Group I.
Cream, 1 oz.
Tea, coffee, or cocoa shells.
Butter.
N. B.—Give large helpings of vegetables from Group I and small helpings of vegetables from Group II, and give 1 oz. of olive oil three times a day.
N. B.—Consult List I for meats, vegetables, etc., and suggestions.

List XII

	Carbohydrates.
Vegetables	10 gm.
Cream, 3 oz.	2 "
	12 "

Breakfast

Eggs, meat, or fish (from Meat Diet List), and
One vegetable from Group I.
Cream, 1 oz.
Bacon.
Coffee.
Butter.

Lunch

Meat, fish, or eggs, and
Vegetables, three, helping of two from Group I and one from Group II.
Cream, 1 oz.
Tea or coffee.
Butter.

Dinner

Fish, eggs, or meat, and
Vegetables, two from Group I.
Cream, 1 oz.
Tea, coffee, or cocoa shells.
Butter.

N. B.—*Give* large helpings of vegetables from Group I and small helpings of vegetables from Group II and give 1 oz. of olive oil three times a day.

N. B.—*Consult* List I for meats, vegetables, etc., and suggestions.

List XIII

Vegetable Day

Breakfast—8 A. M.: Spinach or boiled onions, radishes or celery, bacon, one cup of coffee with two teaspoonfuls of cream.

10.30 A. M.: Whisky, 1 oz. or less. One Akoll biscuit, butter.

Lunch—1 P. M.: Cup of broth (without thickening). Cabbage or cauliflower, lettuce salad with French dressing (3 parts oil and 1 part vinegar, with salt and pepper to suit), bacon, cup of tea with two teaspoonfuls of cream.

3.30 P. M.: Whisky, 1 oz. or less. One Akoll biscuit, butter.

Dinner—6 P. M.: Cup of broth, boiled onions or stewed tomatoes, string beans, celery or radishes, very small piece of cheese, 1 cup of cocoa shells with two teaspoonfuls of cream.

SUGGESTIONS

Serve the cooked vegetables *hot*, and give liberal helpings.
Take the whisky with twice as much water.
Use butter freely on the cooked vegetables.
Change the water twice when cooking the vegetables.
Take very little exercise.

VI. The urine must be kept free of sugar and diacetic acid if possible.

Below are shown a few carbohydrate equivalents of 100 grams of white bread:

1100 c.c. of milk or buttermilk.
100 grams of rye or Graham bread.
180 grams of chocolate (unsweetened).
70 grams of rice (uncooked).
80 grams of oatmeal.
90 grams of dried peas or beans.
360 grams of green peas (boiled).
305 grams of potatoes.
390 grams of fresh apples, pears, apricots, grapes.
700 grams of strawberries, cranberries, peaches, cantaloupe, watermelon.

GOUT

As in diabetes mellitus we have an excess of sugar in the blood, and in obesity an excess of fat in the system by virtue of a defective metabolism of the carbohydrates, so in gout we have an excess of uric acid compounds in the blood, by some perversion of the metabolism of the purin bodies. The fact that uric acid is found in excess in the blood of patients suffering with gout does not prove that uric acid is the cause of gout. There is some other factor, perhaps a ferment not yet known, which would easily explain the origin of the disease, and the existence of an excess of uric acid. Until such a discovery has been made we shall remain ignorant of the etiology of gout.

Sources of uric acid.

How does uric acid reach the blood? Its presence there is due, first, to the taking of protein food; second, through the breaking down of the animal nucleins of the body; third, to faulty elimination of uric acid from the blood. The protein element of food, as we have remarked elsewhere, undergoes a cleavage in digestion, and a carbohydrate molecule is broken off in this process, leaving the nitrogenous element with sulphuric and phosphoric acid to be further oxidized. This nitrogenous element is carried by the serum of the blood to the individual cells of the body, for their repair, and constitutes an essential part of the protoplasmic structure of the cell. Now it has been found that nucleins are the chief constituents of all cell nuclei, and that they are the origin of the uric acid which forms the discrasia in gout, and it has been

Nucleinic origin of gout.

proven by artificially feeding animals with pure carbohydrate food and fat—that is, total abstinence from nucleinic food—that they have excreted uric acid in the urine; therefore we have the excessive wear and tear of the cell structure of the body to reckon with as one of the causes of the presence of an excess of uric acid in the blood. Unfortunately, however, this recent theory of nucleins being the cause of gout is not worthy of our entire confidence, as it is subject to the following criticism. The food experimented with was not absolutely free of nucleins, as it contained bread and vegetables, and no allowance was made for the other purin bodies which may be causative factors.

However, as treatment based on the nucleinic origin of the excess of uric acid in the blood gives better results than when based on any of the earlier theories, it will be wise to continue it until physiological chemists or empiricists blaze a new trail. After protein metabolism becomes better understood we may be able to select such forms of protein as will be metabolized without any inconvenience; until then we must give quite as much attention to the digestion of the carbohydrates and fats, for we know, clinically, that when given in excess or in such a form as to create excessive fermentation, they often cause an attack of gout.

The presence of an excess of uric acid in the blood may also be caused by anything which prevents its elimination, either by the bowels or more frequently by the kidneys, hence any affection which causes indigestion or impairment of kidney function may be a common cause.

Two classes of gouty cases: 1. hereditary; 2. secondary to or complicated by other affections.

As obesity, diabetes and nephritis are such common *complications* if not *causes* of gout, we divide for convenience of study and treatment all gouty cases into two classes: first, the primary or idiopathic—those which are inherited; second, those due to or complicated by other affections, chiefly diseases of faulty metabolism in other respects. Every clinician comes occasionally in contact with a patient who has a distinct family history of gout; he is, as the Germans say, "hereditaire belastet," and is as a rule in middle or late adult life poor in flesh and arteriosclerotic; to be sure he frequently has a contracted kidney when first seen, but the affection of the kidney, in such instances, is due to faulty metabolism from gout and not to alcohol or previous infection. Such a patient suffers with indigestion on the slightest indiscretion in eating or drinking. He cannot, as he says, dissipate in the least without suffering with more or less gouty manifestations, but is especially affected when he eats certain kinds of meat, more particularly sweetbreads, thymus gland, calves' brains, kidney, various meat extractives and old cheese, all of which foods are rich in nucleins.

In fact he says that he cannot eat red meat and thinks perhaps meat of all kinds does not agree with him. It has been found clinically *that such a patient can take boiled meats better than roasted or fried because boiling removes the extractive*, though it increases the ratio of albumen.

This patient belongs to the first class and is, when compared with the other, less commonly met with in this country than in England and Germany. He is for some reason unable to completely metabolize pro-

teins as well as a normal individual, probably in part due to inherent peculiarities of cell structure, of protoplasmic ferments in the blood, and to some perversion of the nervous system of which we are still ignorant; but this theory is at least substantiated by the fact that any indiscretion in eating too much fat or too much carbohydrate, or undergoing a certain amount of physical or mental fatigue, may, by interfering with digestion, readily precipitate an attack of gout in a person of this diathesis. To this class belong the worst cases of gout the physician is ever called upon to treat. It requires large clinical experience, coupled with the greatest care and attention to details of diet, and other hygienic treatment, to ward off acute attacks, and enable these patients to maintain a fairly comfortable existence. The restrictions in diet are, in some respects, very much more exacting in this than in the second class, and for fear of confusion I will state the essential facts which should enable one to decide on the proper diet for such cases before going on to the next class.

Failure to metabolize in cases of the first class.

The old idea that gouty patients should not partake of any uric-acid-making food has been abandoned, for the very good reason that it cannot be carried out literally in practice, although the amount taken can become practically very slight if a patient is fed on a strictly carbohydrate diet. As Croftan says: "It is a quite noteworthy fact that people who live on such a diet rarely have gout." This cannot, however, be considered an argument of great value, as we do not know that these individuals would have gout if they partook of animal foods. Since the new idea is now generally accepted, that it is the nucleinic food from

Principles of dietetic treatment in cases of the first class.

which gout originates, we do not restrict the use of meat as formerly, but still believe, however, that it is wise to give a part of the albumen in some other form than meat, for instance, egg and milk albumen. Especially is this advisable when a patient is found to have kidney complications, with a high blood pressure, even though, as Strauss says, there may be no albuminuria.

Meat. The question of red or white meat is now no longer taken into consideration further than this, that the red meats may contain a little more extractive than the white, which may be ignored. Practically both kinds should be considerably restricted in the cases complicated by kidney trouble, whereas in the uncomplicated cases they should be given at first in small amounts, and then cautiously increased.

Milk. As these patients frequently cannot tolerate milk we should never give a large quantity of it for the ration, but fill out the requisite protein for the day

Fat. with egg albumen and the vegetable proteins; they should be given fat in the form of cream, butter, and bacon, very freely; egg yolk should be given in moderate quantities, notwithstanding it contains nuclein, it is not, *however*, of the kind that gives rise to an undesirable amount of uric acid in the blood. We try, in fact, to make up as high a percentage of the number of calories as is necessary for these underfed gouty cases, from fats instead of carbohydrates, since they cause much less disturbance of digestion.

Carbohydrate. With regard to the carbohydrates, those most easily digested are the best, and they consist, first, of the starches among which are potatoes and the green vegetables, which are best taken in purees. Of the sugars, the levulose contained in fruits is easily assimi-

lated and should always be chosen in preference to cane-sugar. I make it a rule never to allow gouty patients anything sweetened with cane-sugar; and I rarely allow meat oftener than once a day, and then only in very small quantities, and such as contain only a little of the nucleins. Below is a menu for patients belonging to the second class, which with proper modifications will be suitable for the above. The second class is by far the more important, because it embraces at least nine-tenths of all the cases of gout which the general practitioner sees; moreover it is susceptible of cure in most instances, and of great amelioration in all.

The second class of gouty patients.

These patients may have slight predisposition to gout, but the chief causes of the disease are very numerous, in short, they are referable more often to disturbances of digestion arising in the gastro-intestinal tract, perhaps beginning with faulty elimination from the bowels, in the way of obstinate constipation, or preceded by migraine, which is regarded by some as a frequent preliminary manifestation of gout. Another very common cause is kidney disease, which prevents elimination of uric acid from the blood. Other causes are arteriosclerosis, obesity and diabetes. In many instances, it is true, we cannot tell whether obesity and diabetes are causes or mere complications. Probably in some the faulty metabolism of the carbohydrate molecule upsets the digestion and indirectly becomes the causative agent in provoking the incomplete metabolism of the protein, while in others the decomposition and faulty assimilation of the proteins, together with a morbid waste of the cell structure of the body, interferes with the digestion

Causes of gout in cases of the second class.

Faulty metabolism as a cause.

and assimilation of the carbohydrates, while in a third series, the digestion of both proteins and carbohydrates may become impaired at the same time by some disturbance of the nervous system or toxemia of the blood.

Dietetic treatment of cases of the second class.

The treatment of the second class must take cognizance of the fundamental as well as the complicating diseases, which necessitates more restriction in one sense and much more latitude in another, according to the prevailing conditions, and here again, as in the other disorders of metabolism, diabetes, obesity, emaciation, etc., we have to treat the patient with more consideration even than the disease. It may be

Gout and obesity.

briefly stated that if obesity is the fundamental cause, or a coexisting condition, the proteins should be given above the amount required in health, but should be restricted to the proteins poor in nucleins; fats in moderate quantity should be allowed, and carbohydrates reduced to a minimum, that is, carbohydrate of low percentage starch be given, like potatoes and

Gout and diabetes.

green vegetables, also fruits. If diabetes precedes or coexists with gout, the proteins should not be increased but considerably restricted; the fats should be greatly increased and the carbohydrates reduced to a minimum or cut entirely out for a few days. It should be observed here on account of the great similarity of diet in the two latter conditions that there is an essential difference, in that the gouty patient who is diabetic receives much less protein and more fat with much less carbohydrate than when the com-

Gout and nephritis.

plication is obesity. If gout develops in a nephritic the proteins should be greatly reduced, very little meat allowed each day, and most of the proteins given in

the form of milk and egg albumen. The daily diet should comprise at least 1 quart of whole milk, the albumen of four eggs, and a generous amount of fat, with a moderate amount of carbohydrate. The kidneys should be especially spared in their function, avoiding an excess of liquid; not over six glasses, including broth, milk and water, should be given in a day; cooked fruit, as in all other cases of gout, should be given twice or three times daily.

Gout and gastrointestinal catarrh.

When gout is preceded or accompanied by gastro-intestinal catarrh, every effort should be made to relieve the digestive tract of all sources of irritation, no coarse vegetable food should be given, or anything that leaves much residue in the bowel; all condiments and spices be avoided, the food be concentrated and nutritious, and should consist of as near a normal mixed diet as possible. Here, as in the gouty obese, the fat is increased rather than the carbohydrate, and considerable study of the relative power of digestion of the different carbohydrates will be necessary; as in nephritics, this power shows great variation. Even carbohydrates of 80 per cent. starch are not infrequently better digested than potato of 18 per cent. Considerable carbohydrate may be given in the form of gruel, and the patient's taste for the different kinds may be safely relied upon in such cases.

Glycosuria in obese, gouty cases.

In looking over my cards I am surprised to find to what an extent obese, gouty patients predominate and very often they come with the history that sugar has, at different times, been found in the urine, but rarely has this finding been constant. The patients often complain also of pain about the articulation of bones, simulating gout, and indeed it is often called by this

name, and they are sent to us with the diagnosis of gout or diabetes, but, as a rule, they need to be treated only for obesity. After they have been reduced 10 or more pounds, the sugar disappears entirely, notwithstanding they frequently have to be reduced 40 to 50 pounds.

I often hear it remarked by men who are engaged in the treatment of chronic diseases, and read from authors upon this subject, that once sugar has been found in the urine we must always keep a sharp lookout for it in after years. Whereas this may be a wise admonition for the medical man, I think it decidedly unwise for the patient, as it makes him unnecessarily nervous. I take this occasion to state that, barring a return of obesity, I regard such a patient as no more likely to a return of glycosuria than if he had never had sugar appear in the urine; in other words, he had a purely alimentary glycosuria caused by obesity. The above applies to persons past thirty years of age.

Protein in gout.

Aside from the gouty cases complicated by or coexisting with nephritis, diabetes, arteriosclerosis, we find that our patients do better when allowed meat and other proteins freely than when on the Voit allowance of 120 grams daily; indeed, we have frequently given 150 grams apparently with great advantage. We find, if we get a good rational history, that the patient has been accustomed to an excessive amount of carbohydrate food, especially such as is sweetened with cane-sugar. This has upset digestion, and he has been unable to digest what little protein he has taken, and in some instances all meat, eggs and fish have been stricken from his menu for months or years before he comes to us, and he is living mainly upon a

diet of vegetables with some fat. Of course the treatment of such a case requires, first, a period of rest for the gastro-intestinal tract, together with laxatives, then a properly arranged diet, which must always be very simple at first, milk with an alkaline water, egg albumen, gruels, etc., to be daily increased until a proper diet for gout can be begun. With regard to liquids, gouty patients have often been told to drink all the water possible. This is a mistake. The total quantity of fluid taken daily should be limited to 3 pints if there is present cardiac or renal complication, arteriosclerosis or other vascular affection, and in other cases to 2 quarts. The best kinds of liquid for gouty patients are pure spring water, the alkaline non-effervescing water, Celestin's vichy, and milk. Coffee, cocoa and tea being rich in purin should be omitted as a rule, but when weak and well diluted with milk or cream will do no harm. Strong coffee in excess often causes an attack of gout. Alcohol is only indicated in the habitué and the very infirm, and it is then best given in the form of whiskey or some tart Rhine wine. Malt liquors, Burgundy, and champagne are pernicious, even in very small amounts, and often precipitate an attack. The number of daily meals for this class should be three, and the largest should be breakfast and dinner, while the supper should be light. The digestion, in health and disease, is always best in the morning, as the patient's stomach has been empty for eight hours between supper and breakfast and, contrary to the usual custom, the patient should have a very generous breakfast between 7 and 8 A. M. and a similar dinner at 1 P. M., and at 6 P. M. a small, simpler meal should be given,

Liquids in gout.

Alcohol in gout.

Arrangement of meals.

except in the chronic and obstinate cases and in *patients past middle life, who will do better when allowed small and frequent meals* of simpler foods—milk, eggs, cooked fruits, and the carbohydrates.

Avoidance of foods rich in oxalates.

The following table represents a suitable list for the common gouty patient of the second class. Great latitude is allowed in this list to avoid monotony, but the physician must be careful that the patient does not overeat, and a careful daily record of his weight is the best guide, as in some cases he is underweight and should gain, while far oftener he is overweight and should be reduced. Here, as elsewhere, the use of the scales saves a great amount of time in figuring calories, which is very important for the busy practitioner.

List for Class II. Gouty Patients

BREAKFAST

Cooked fruit—apples, peaches, pears, bananas, grapes, berries, plums (without sugar), pineapples, ripe melons, cherries, oranges, lemons. Eggs—soft boiled, poached, or coddled (every second morning). Fish—schrod, brook trout, perch, pickerel, flounders, sole, etc. Baked potatoes with butter; stale bread or toast; one glass of milk.

DINNER

Little neck clams or raw oysters; steamed clams; vegetable purees without meat stock; clam boullion. Boiled tongue, mutton, ham, or fresh beef; roast beef (once a week). Vegetables—potatoes, lettuce, spinach, cabbage (chopped fine and boiled eight minutes), string beans, carrots, parsnips, beets, turnips, onions (boiled or raw), artichokes, water-cress, endive, escarole, Chinese cabbage. Dessert—cooked fruit; water crackers and cheese (cottage, cream, curd); light puddings (custards, blanc mange, junket, apple tapioca, etc.). One cup of weak tea or glass of water.

SUPPER

Soup—when not taken for dinner; clam bouillon, oyster broth, vegetable puree; raw oysters. Eggs—when not taken for

breakfast; baked potato and a small portion of light fish or meat; dry toast or stale bread (black, rye, whole wheat or fine white bread), not more than one or two thin slices; cooked fruit; one glass of whole or skimmed milk, or water may be drunk.

Suggestions

Take a glass of hot water on rising.
Potato should be taken baked, boiled, mashed, or creamed.
Eat no meat soups or vegetable purees with meat stock.
Take beefsteak or roast beef only once a week.
Avoid salted meats and fish because of their indigestibility.
If the patient is lean give more fat in the form of butter and cream, and increase the bread and allow bees' honey and milk sugar.
Give one glass of water at 11 A. M., 4 and 9 P. M.

Sweet-bread and kidney are quite rich in purin, and should not be eaten, and as veal, lamb, and fowl are richer in purin than beef and mutton the two latter are preferable.

A Table Arranged to Show the Relative Amount of Purin in Some of the Common Foods

I Class. Foods richest in purin	II Class. Moderate amount of purin	III Class. Little purin
Sweet-breads	Fowl	Beef
Kidney	Lamb	Mutton
Liver	Veal	Fish
Brain	Chicken	Bread
Peas		Milk
Beans		Vegetables
Malt liquors		Fruit
Coffee		Whiskey
Cocoa		Eggs
Tea		

ACUTE GOUT

The treatment of an acute attack of gout naturally divides itself into that of the paroxysm and that in the way of prophylaxis. The wine of colchicum, in 15- to 20-drop doses every two or three hours, is almost a specific for an acute attack of gout. As its duration is only a few hours, the patient naturally requires very little nourishment and if he is young much less than if he is past middle life or in old age. In the former case he should be given milk, diluted with lime water or Celestins vichy. A *still* alkaline water favors its digestion and makes it more palatable for those who are not fond of it. If the patient prefers, a light gruel may be made of some one of the cereals and given with milk. After two or three days egg albumen may be also added, and a little later the whole egg and a little toast or zwieback. Vegetable purees may then be added and usually in two or three weeks from the beginning of the paroxysm the patient may be getting a mild mixed diet, which contains most of its albumen in the form of milk and egg. If the patient is delicate and somewhat along in years, with a low vitality, he must be fed the simpler and more nutritious foods from the beginning, and in the way of additional protein he should have light fish and beef albumen; fats may be given in the form of cream, butter and yolk of egg, also baked potato and easily digested vegetables.

Diet in acute attack.

Diet for those who are delicate or advanced in years.

If constipation precedes an attack of course the

bowels should be thoroughly cleared out with an enema or Carlsbad salts; indeed, the latter may be profitably employed, in some cases, once daily for several weeks, and in cases where constipation seems to be constitutional. The treatment of the interval between attacks must consist in keeping the patient in the sunshine and open air as much as possible, freedom from worriment, anger, overfatigue, and excitement. The bowels should be kept free, and no large meals allowed. Midmeal lunches may be given if the patient is below normal weight. Malt liquors should never be allowed, and if alcohol is needed a good whiskey is the best. It is interesting to note that gout is comparatively unknown among people who never use malt liquors.

Prophylaxis.

RHEUMATISM

The term "rheumatism."

The term "rheumatism" has been given to a great number of affections involving bones, cartilages, aponeuroses, sheaths of nerves, tendons and muscles, as well as the muscles themselves, the serous membranes of joints, lungs, heart, brain, etc.; also rheumatism affecting nearly every organ of the body, the skin not even escaping, has been described by American, English, German, and more especially by French authors of large experience. So many different names have been given to the different parts of the organs affected, as well as the distortions of the joints involved, causing a great deal of confusion concerning the entire subject, that it seems quite important to try to make some attempt at least at a proper classification of the subject of rheumatism upon an etiological basis, as by this means diagnosis becomes more intelligible, and treatment much more logical; hence before attempting to suggest a diet in rheumatism I shall try, as far as possible, to make a new classification of all affections which we consider under the head of rheumatism.

Classification.

For a long time it has been observed frequently in the course of typhoid, tuberculosis, or gonorrhea, that one or more joints become affected with rheumatism, and finally it was discovered that the same bacillus which caused the disease had locally established itself in the joint structure, to which affection the name "infectious arthritis" of typhoid, tubercular, or gonorrheal origin was at once given. Although there is

still some doubt about the special characteristics of the diplococcus rheumaticus, the bacillus taken from the joint structure has been cultivated and injected into animals and produced the true arthritis, as well as endocarditis and pericarditis; therefore the term acute infectious arthritis has been substituted for that of acute inflammatory rheumatism.

Infectious arthritis.

A knowledge of the infectious nature of this form of rheumatism has led scientists to study with great care the rheumatic affections of joints seen in patients suffering with typhoid fever, tuberculosis, gonorrhea, etc., and now it is well known that these special joint affections are secondary infections of the original disease.

Suppurating foci and arthritis deformans.

It must also be remembered that there is a primary tubercular arthritis. Within the past three years Billings, Rosenau, and others of Chicago, have done a vast amount of creditable scientific work in tracing some cases of arthritis deformans to suppurating foci in the crypts of diseased tonsils, to ulcerating roots of teeth, alveolar abscesses, and different suppurating sinuses in the head. Also to the prostate gland, seminal vesicles, the female genitalia, chronic appendicitis and cholecystitis. Hugh H. Young has reported similar experiences in the Journal A. M. A., vol. lxi, 11. They were able to isolate various cocci in the fluids and tissues of diseased joints and muscles resembling streptococci, staphylococci, etc., found in the original suppurating foci. They believe that arthritis deformans in most instances is caused either by different strains of bacilli, or by their toxins. It is well to bear in mind that these bacilli differ very materially from the diplococcus rheumaticus just de-

scribed, in that the latter never causes suppuration, nor leads to a permanent deformity of the joint. In recent current literature a similar origin of arthritis deformans has been hinted at, although never before demonstrated.

Report of case. In a paper read less than two years ago before a Boston Medical Society, I reported a case of arthritis deformans comparatively subacute, in a physician aged fifty-six, which began with a follicular tonsillitis five months before. The tonsillitis ran a mild course of four days' duration, and apparently got well, so that he was able to resume his work for a few days, after which his fingers became painful, joints swelled and stiffened, and he found he had a slight elevation of temperature, one to three degrees, which persisted for about one week, with slight sore throat, accompanied with the usual feeling of malaise, loss of appetite and flesh. He then became fever-free, and his other symptoms improved somewhat, though he was unable to go about. After the lapse of less than a week all of the foregoing symptoms reappeared and went through a similar course, affecting, however, still other small joints, and this time the wrists and shoulders became involved. In a few days the fever abated and a slight improvement in general health was experienced, only to be shortly interrupted again by a repetition of the previous picket fence temperature, with some marked evidence of joint affection. Nature, evidently, was not able to make antitoxin fast enough to arrest permanently the growth of the pyogenic bacteria pocketed in the crypts of the diseased tonsils, and after five months of this useless struggle against a clearly suppurating focus, he was brought to me from a neighboring State, and the following day Dr. F. P. Emerson removed the small atrophied tonsils, both of which exuded pus on pressure. I regret to say that no culture was made of the pus-producing organism.

At the time the patient was operated he had one degree of fever, was 30 pounds underweight, and had stiffness and deformity of all the finger joints, with considerable stiffness of wrists and elbows, and very little use of the shoulder joints. In two weeks after the operation his joints began to show improvement, and in four weeks more he was able to resume business, and at the end of six months the joints were practically well, and there has been no recurrence.

It seems worth while to report this case somewhat at length, as it was operated before any well marked disorganization of the structures had taken place, otherwise permanent deformities would have been left.

Arrest of the disease.

The most of our cases of arthritis deformans are seen too late to prevent deformity, but even then the disease can be arrested when the source of infection is shut off. During the past three years we have had a number of cases of subacute and chronic arthritis, due to distant foci of infection, quickly cured by the surgeon. It would seem sane also to include under the head of subacute and chronic infectious arthritis, all the cases secondary to the infection of scarlet fever, typhoid fever, tuberculosis, mumps, rheumatic endocarditis, pericarditis, meningitis, chorea, etc.

Chronic fibrous rheumatism.

The chronic fibrous rheumatism, or chronic fibrositis, is differently described by different authors, as the disease affects various parts of the joints, that is, tendons, sheaths of muscles and nerves in one instance, in another the cartilage and synovial membranes, while in still another the cartilage cells may have become necrosed and replaced by bone cells, in which case the term osteoarthritis is used, and later, exostoses and eburnation of bone by long continued friction occur, and again nodular arthritis, or Heberden's nodes characterized by an enlargement of the normal nodules at the terminal phalangeal joints. All these different forms of subacute and chronic arthritis cannot with our present knowledge, be strictly classified under the head of infectious arthritis, though undoubtedly a large percentage of

them either originated in some infection or at first the joint structures became suddenly affected with an embolism or thrombosis, or stasis of circulation, only to be quickly followed by infection. In quite a percentage of these cases in old age, the starting point may be a marked arteriosclerosis of the joint, which leads first to anemia and later swelling and infection. The chronic affections of neurotic origin are extremely doubtful on account of the uncertainty of the disease underlying the neurosis.

The "rheumatic" diathesis.

There is another form of rheumatic affection which affects various organs of the body and may never attack the joints. This form has received a great deal of attention from the English and French writers, the latter under the head of abarticular rheumatism. The French authors state that there is no internal viscera that escapes, and the Germans still write a great deal about the rheumatic affections of the skin. American authors arrange this class under the head of the rheumatic diathesis, and we do not know yet whether or not the underlying cause is infection, but probably not in most cases, since heredity plays such a prominent rôle, yet in many cases a slight infection, like influenza, seems to be quite enough to activate a real cause.

Rheumatism due to cardio-vascular disease.

I wish to call the reader's attention to one other form of rheumatism which, so far as I know, has thus far escaped publication, although I am confident it must have been observed by many clinicians. This class I have called subacute and chronic rheumatism, due to cardio-vascular disease. The patients are chiefly in middle life and old age, and suffering with heart disease, quite often accompanied by

obesity, arteriosclerosis, gout, or diabetes, and very often dyspepsias, the latter being usually secondary to heart disease.

I will cite one case of this class which will enable the reader to differentiate it from all others:

Report of case.

Patient.—Male, 50. Height, 5–7. Present weight, 190 pounds (at 40 years of age 160). Occupation, banker. Family history: father died of heart disease at 60, mother alive and well at 76. Has had the children's diseases lightly, save scarlet fever, which left him with heart disease. At 45 began to gain weight, and suffer with dyspnea on exertion. For the past two years has had rheumatic aches in the back, knees, carpo-metacarpal joints, and in the deltoid and quadriceps extensor muscles above the knees, accompanied with little swelling and rarely any redness of the joints, and no fever. The attacks were of short duration at first, followed by weeks or months of freedom from rheumatism, and then it returned. Little by little the duration of the attacks became longer, still retaining their subacute character, thus restricting more and more the patient's exercise, and further favoring the accumulation of fat, thereby increasing the work of the heart and causing more dyspnea. The physical examination showed mitral insufficiency incompletely compensated, liver 1 inch below the costal margin, shins edematous, urine—a slight trace of albumen. After reducing his weight 30 pounds he was completely well, and has remained so six years. With similar rheumatic symptoms, more or less marked, patients suffering with heart disease come to us to be treated for so-called rheumatism.

Etiology.

Now this condition, etiologically, is one of faulty metabolism due, first, to crippling of the heart's action, which has led, little by little, to insufficient blood supply to all the digestive secretory organs, thus impairing the normal chemical processes, leading to perverted metabolic function, and as a result of this derangement of function the different complications, obesity, diabetes, etc., have arisen.

As these patients suffer from so-called rheumatism, we assign them to a class by themselves, under the

head of rheumatism of cardio-vascular origin. Of course, one might think these also belonged to the infectious class, because there is the possibility of infection through absorption of the colon bacillus from the colon, especially in the cases that were accompanied by diarrhea, as well as the constipation of the obese, or that various other infectious bacteria or toxins had been absorbed from the alimentary tract, or gained access, through the blood perhaps, from some hidden local suppurating focus in the head, or other part of the body. Still there is left undoubtedly a large percentage of my cardiac cases which could not be considered infectious from the beginning, or during the process of treatment, and it is highly improbable that there could have been a suppurating focus at any distant point, especially as the patient got well as soon as the heart symptoms were relieved; hence I am compelled to believe that the local muscular and joint involvement was purely circulatory in origin in most of these cases, and I think it is very important that this class of patients should be recognized by the general practitioner, and the proper measures for treatment on an etiological basis be instituted.

Summary.

Briefly, then, to recapitulate, our attempt to classify rheumatic affections upon the basis of their etiological origin results in four classes.

1. Acute Infectious Arthritis, due to a specific infection—the diplococcus rheumaticus.

2. Subacute and Chronic Infectious Arthritis, secondary to a primary infection elsewhere.

(A) Arthritis deformans.

(B) Joint rheumatism, secondary to pneumonia,

gonorrhea, suppurating foci in a sinus of the head, diseased tonsils, etc.

(C) Certain other cases of subacute and chronic arthritis, described under the caption of "chronic nodular rheumatism," chronic hypertrophic and atrophic arthritis, osteoarthritis, have not yet been clearly traced to any infectious source. They probably are, however, in part at least, of infective origin, and must therefore be regarded as borderline cases, so I venture to include them in this class.

3. Rheumatic Diathesis, affecting the viscera of the body.

4. Subacute and Chronic Arthritis, of cardiovascular origin.

With this very imperfect classification we can at least have a rational basis on which to proceed, not only with diagnosis but with prognosis and treatment.

TREATMENT

Class I. Acute infectious arthritis.

Class I. This disease involves, as a rule, many joints which are red, swollen, and very painful, and is usually accompanied with a high fever, but differs from the other forms of the subacute and chronic rheumatism in that the joints are not left deformed. After the disease runs its course of three to six weeks, and when chronic infiltrations of the sheaths of tendons, etc., are left for a long time, they ultimately clear up and leave no trace, quite a contrast to the ankylosis of gonorrhea and other kinds of rheumatism. Moreover the joints show no tendency to suppurate, differing in this particular respect from the joint involvement of scarlet fever.

The treatment is local and internal. The joints

should be kept covered with cotton to exclude the air, and all pressure upon them avoided. In some instances splints may be necessary to mobilize the joints, and even then the pain may be so great as to require an opiate. To cut short the duration of the disease and mitigate the symptoms, we have an excellent remedy in salicylic acid, best given as sodium salicylate, 5- to 20-grain doses (according to the symptoms) repeated every four hours. If this causes cardiac depression it must be reduced, abandoned, or counteracted by cardiac tonics. As this disease is very apt to extend to the heart and lungs, causing endocarditis, pericarditis, myocarditis, and pleurisy, every effort should be made to protect these organs, avoiding exposure to cold while bathing the patients, and by giving sufficient alkalis to keep the urine neutral or alkaline. If the heart becomes involved, the alkaline treatment should be continued. During the period of high temperature the diet should consist of milk and vichy, in equal parts; in mild cases the proportion of milk should be two, three, or four to one—one glass every two hours during the day and night; no other liquids will be required. Later eggs and cream, with toasted crackers and oatmeal porridge, should be added as fast as possible to maintain the strength. Fruit juices at first, and later well cooked fruits should be given two or three times daily. In very mild cases semi-solids should be given from the first, and in adynamic cases a very liberal diet of meat, eggs, fish and well cooked green vegetables and fruit should be insisted upon. I am sorry that good physicians still adhere to the old dogmas that fruit and red meats are bad for rheumatism.

The old teaching that fruit increased the acid in the blood, and that patients, therefore, suffering with rheumatism, gout, or the uric acid diathesis, should not take acids, since the blood is already too acid, was found unscientific more than twenty years ago, because the fruits and vegetables serve to keep the blood alkaline. The same is true of the red meats as a cause of gout. We now know that the nucleinic food is the active agent in precipitating an attack in a person predisposed to gout, and since the red meat contains very little nuclein it is not ruled out of the diet for this disease. For the chronic arthritic especially, as seen in arthritis deformans, and other forms with emaciation, we obtain our best results with a liberal feeding of protein, and as a rule prefer the red meats, as the general rule holds true that they are craved, and therefore better digested than the white.

Often patients come to our office complaining of rheumatic aches and pains which, they say, are due to eating a whole grape fruit three times daily. There can be no doubt that too much acid can cause indigestion, and the latter can cause the aches and pains described, in the same way that an excess of meat, sugar, or fat does. This is not an argument, however, against a moderate use of either.

When infiltration of any part of the joint structures remains after the disease has subsided they should be douched with warm water at the temperature of 100° F., for fifteen to twenty minutes, followed by a cold spray for ten seconds, when superficial massage for five minutes should be given, and later the deeper tissues must be reached by the masseur. This local

treatment must be continued until complete resolution takes place.

Treatment of Class II.

Class II. There are two indications: First, find if possible the primary disease, or suppurating focus, and cure it. If there is present a colon bacillus infection from stasis in the colon, we must cure the constipation; if a diseased tonsil or suppurating sinus is found a surgeon will immediately prevent, by operation, any further infection from that source, and we have left only the second indication, the local joint infection to treat.

Now, in the treatment of this inflammation, although similar in some respects to that of Class I, we should always bear in mind that the latter is not caused by pus-producing organisms, while the former quite often is, hence the joints should always be carefully examined for evidence of pus, and conditions favorable to the production of pus, and when found, prompt surgical treatment is necessary. Whenever in doubt as to the existence of pus call a surgeon, if one is available, if not, await further development without local applications of any kind. Avoid douching, and above everything else, *massaging a doubtful joint.* On the other hand, in the subacute and chronic joints, in which the pus-producing bacilli can be ruled out, *i.e.*, the fibrous, hypertrophic, atrophic joints, arthritis deformans, etc., the same local hydrotherapy and massage is indicated as in Class I, always omitting treatment during the often frequent recurrence of attacks. During the attack, if the joint is painful, a nicely applied splint is desirable. Medical treatment of this class consists of tonics, of which the best are arsenic and iron. Constipation may require

oil and saline laxatives, but in most cases is best treated by colon irrigation. Open air life does these patients as much good as the tubercular. The diet should be very nourishing, and well divided among the three classes of food. Each patient must be studied carefully to ascertain his ability to metabolize the different classes. I have found that the majority of my patients will do better when the proteins and fats are increased, with a moderate amount of carbohydrates, probably because the latter are so prone to cause fermentation, and thus upset the digestion. On the other hand, not infrequently, from long custom of taking a diet rich in carbohydrate, a patient has raised his toleration of this kind of food, and we should take our cue from this fact. These patients do well with a liberal amount of fruit.

A note of warning when treating Class II. Whenever possible turn your patients over to, or frequently consult, an orthopedic surgeon, as he can do more for them than you can.

Class III. Visceral rheumatism must be treated by antirheumatic remedies, and for this class the salicylic acid preparations are as specific as quinine for malaria, and on account of this fact the salicylates are very useful to settle the diagnosis in doubtful cases when gout may be suspected, as rheumatics react much more favorably to full doses of this drug. This class is also greatly benefited by alkaline treatment.

There seems to be no doubt that such patients should wear very thin woolen garments next to the skin, though many physicians scoff at this idea. Theoretically I believe, and clinically I am confident, this is a fact. Great care should be taken of the

When a diabetic, gouty, or neurotic element is present, the diet therapy should be directed to correct this perverted metabolism, and the proper diet is given under the chapters devoted to these subjects. The most obstinate cases of this class to cure are those which are complicated by arteriosclerosis, as the difficulty is in getting enough arterial blood into the fibrous tissues, which comprise the joints, through the constantly diminishing size of the arteries. Here our chief reliance is upon the local dilating effect of warm effusions, coupled with persistent use of the sodium iodide, and the diet for the arteriosclerotic.

Differentiation between chronic gout and chronic rheumatic arthritis.

Gout and rheumatism are so often confused in diagnosis, the kind of treatment adopted obviously fails, and a few differentiating points between the two affections seem not out of place before closing this chapter. They may be seen at a glance in the following table:

	Chronic gouty arthritis	Chronic rheumatic arthritis.
Age.....	Old age.....	Quite common in youth, adults and old age.
Heredity.	Frequently.....	Never.
Diathesis.	An early history of migraine, hemorrhoids, diabetes, gravel, asthma, and eczema.	No diathesis. Often a history of a foregoing infection, also an extreme sensitiveness to cold.
Cause....	Heredity and imperfect metabolism of nucleins. Excess of uric acid in the blood.	Infection or primary faulty metabolism of carbohydrates and fats, plus infection. Uric acid not in excess.
Onset....	Polyarticular (old age). Monarticular (first attack).	Polyarticular from the beginning; most frequent in the joints of the upper extremities.
Course...	Several joints attacked at the same time, and intervals between attacks are short; joint swellings persist with crippling.	Many joints at first involved. Intervals between attacks long.
Pain.....	Elicited by pressure transversely through the ends of the bones involved, and is most intense.	Most pain along the tendons and very slight, unless the joint is moved.
Tophi....	Often present in the joints and elsewhere in skin, ears, eyelids, and alæ nasi.	Wanting.
Affection of kidneys.	Common. It is estimated that three-quarters of the patients suffering with gout have had attacks of gravel.	Never primary, always secondary to infection.
Affection of heart.	Never a primary, always secondary to kidney.	Very common both primarily and secondarily.
Anchylosis.	Complete.	Often incomplete.
Desquamation.	As inflammation subsides skin peels.	No peeling.
Fever....	Usually absent.....	Present, though often slight.
Uric acid in urine.	Increased during attacks; diminished in the intervals.	Not abnormal.
Complications.	Iritis, eczema, and bronchitis common.	Quite rare.

HEART DISEASES

There is probably no class of invalids that physicians can benefit so much as those suffering from the various forms of heart disease. They are nearly all above normal weight and steadily growing more obese because of inability to take exercise, and, as a rule, they have a good appetite and gratify it with palatable and fattening foods. After a few months or years the large amount of extra piping necessary to convey blood to the surplus fat, together with the excessive volume of blood in circulation, has enormously increased the work of the heart at a time when it is usually growing weaker (this change is oftenest seen in patients above fifty years of age), and it begins to show evidence of failure in slight dyspnea, nocturia, etc. This period will, of course, be reached much sooner by those who have had a cardiac affection left over from childhood. In the not remote past, these patients were indiscriminately treated with digitalis and cathartics, and because many of them recovered, digitalis readily became *the* sheet anchor in the treatment of all forms of cardiac disease, whereas the credit of cure should have been given to rest in bed and the cathartic used. At the present time we substitute reduction cure for digitalis; we give the heart less work to do instead of stimulating it to do more.

Tendency to obesity in cardiac cases.

Effect upon heart of increased number of blood-vessels.

Reduction cure, with rest and cathartics, a substitute for digitalis.

We shall consider the dietetic treatment of the different heart diseases under the two stages in which they are always seen.

1. The stage of compensation.
2. The stage of uncompensation or decompensation.

Differentiation between compensation and uncompensation.

It is very necessary to differentiate clearly between these two conditions, and to perceive the first slight evidence of failure of compensation, like a prolongation or muffling of the first sound of the heart, or, as Strauss says, frequent nocturnal micturition. I am confident that this suggestion of Strauss' is worthy of special attention, as nocturia is often misinterpreted by physicians as a symptom of kidney disease *per se*, while as the above author states it gives us our first suspicion of broken cardiac compensation, the condition of the kidney being that of passive congestion only. Whenever there exists doubt, as in many obese patients, it is better practice to class them under the second head and treat them accordingly, because, after removing considerable fat from the thorax as well as elsewhere, the result of the physical examination of the heart is much more satisfactory and the inferences drawn more conclusive, and in most cases the ground for suspicion will be found well founded. In the event of the result showing that compensation is either complete or incomplete, much time is saved by this method, and the removal of the excessive weight will very much expedite improvement or recovery. Hence the dietetic treatment of the one may some time become the same as that of the other, *e.g.*, whenever a condition like the foregoing exists, or when a well compensated valvular lesion is insidiously complicated by an interstitial nephritis, a pneumonia, or typhoid fever. It is of course absolutely necessary in all cases, so far as possible, to determine the *cause* and *nature* of the cardiac affection—that our

Reduction in weight an aid in physical examination.

Necessity for determining cause and nature of cardiac affection.

therapy may embrace the fundamental disease, as well as the present conditions and future prospects of a case. In this volume no time will be given to the acute affections of the heart which occur oftenest in youth in the form of endocarditis, due to the infections of scarlet fever, acute articular rheumatism, pharyngitis, tonsillitis, sinusitis, etc., leaving in their wake impairment of one or more of the cardiac valves, as well as a morbid hypersensitive condition of the cardiac nerves and muscles, which may remain during the rest of the patient's life, and seriously handicap him for the strenuous duties of a manual laborer, or an arduous sportsman.

Dependence of cardiac affection upon some early infection.

In fact, by far the largest number of chronic cardiac cases coming to the physician's office for treatment can be traced to some infection of childhood or early adult life. These patients often go through middle life very comfortably, providing their labor and sport are not too strenuous, as the symptoms of their acute infection years before have entirely disappeared, and it requires very careful physical examination to elicit any of the early symptoms of the affection. At the age of forty or fifty a fast game of tennis, or the lifting of a heavy weight may lead to cardiac strain, and sometimes dilatation may follow. This accident enforces rest which may be the beginning of the accumulation of fat, and further handicaps the already enfeebled heart by increasing the volume of blood in circulation and imposing an extra amount of work upon that organ, or the onset of some light acute infection, like *la-grippe* or tonsillitis, sets up an endocarditis.

Beginning of incompetency.

Such cases may properly be considered under the

head of perfect compensation during the period that elapsed between the time of their early infection and that of the final strain which led to insufficiency. At this point then incompetency is established.

Nephritis as an antecedent of cardiac disease.

Another class of cardiac patients consulting the physician very often is that in which a preexisting nephritis exists. The latter affection has led to a retention of solids and waste material in the circulation, which has in turn slowly set up a chronic inflammation in the vascular system that caused a thickening of the walls of the blood-vessels—an arteriosclerosis. The back pressure upon the heart soon develops a compensatory hypertrophy. Now, the chief factor of this hypertrophy is increased function of the heart muscle which has been continued over a period of months or years.

A physical examination of such a heart may not elicit any other symptom than that of simple hypertrophy. Some day an acute infection of the kidney may take place, and the tubules of the kidneys suddenly become completely blocked and an enormous amount of urinary waste is quickly thrown into the circulation, greatly increasing the work of the heart. When this burden becomes too great dilation with insufficiency of the mitral valve occurs, and symptoms of broken compensation readily follow.

Disturbance from faulty nutrition due to arteriosclerosis.

Another cause for disturbance of compensation is often seen in cases of general arteriosclerosis in which the coronary arteries have also become involved leading to malnutrition of the heart muscle itself. It is not uncommon to find these cases presenting no valvular incompetency, and yet the cardiac muscle has become so impaired in function that it cannot

perfectly carry on the circulation. To be sure the disease is often properly called a cardio-vascular disease and many of the signs of failing compensation are seen.

Prophylaxis in compensated case.

Now, what shall be done for the perfectly compensated cardiac cases? We have three objects in view:

I. To maintain and if possible improve the strength of the heart.

II. To prevent or ward off cardiac irritants.

III. To favor its action in every possible way.

Feeding the patient.

We begin by feeding the patient so as to strengthen him in every way, especially his heart, and at the same time to maintain the integrity of the alimentary canal. Oertel first emphasized the importance of the proteins in heart affections, and in well compensated cases we have found that our patients do the best upon about 100 grams daily, with the usual amount of C. and fats. They should as a rule be given the three regular meals, the lightest at night, and rest an hour after eating to avoid raising the blood pressure and thus increasing the work of the heart. If, however, digestion is impaired it will be necessary to give five or six meals daily. These should be arranged so that the solids may be given at the regular mealtime and milk and other liquid between. Whenever these patients are too fat they should be reduced to a normal weight in the same manner as prescribed for the obese; they do not as a rule have to be confined to the bed, but should always be prohibited from physical exercise, except walking, until the weight is reduced to normal. When, however, their weight is excessive it is far better to give the milk cure, with rest in bed from one to two weeks, until considerable reduction has been

Increase in protein.

Rest after meals.

Reduction to normal weight.

Milk cure when weight is excessive.

gained and then complete it in the usual manner; any preexisting stomach or bowel indigestion of course promptly disappears and a betterment of the general health becomes apparent.

Avoidance of irritating food and drink.

Cardiac irritants may be avoided by omitting from the dietary all foods and drinks which may cause excitement to the heart's action. To be especially avoided also are hot, strong tea and coffee, and very hot soups made from meat extracts. Food highly seasoned with mustard, pepper, cinnamon, ginger, etc., act as irritants. Food containing an excessive amount of fat or C. may lead to fermentation in the stomach and bowels, acting mechanically and reflexly through distention and dilatation of the abdominal organs to embarrass the heart's action. For a similar reason charged water should be avoided. Hirsh and Stadler were able by artificially causing tympanites to raise the blood pressure, thereby increasing the work of the heart.

Alcohol and tobacco in those accustomed to its use.

The above paragraph does not, however, apply to patients who have for a long time been accustomed to the use of alcohol or highly seasoned food, but even such should be restricted to very small quantities. The same is true of the use of tobacco; nicotine is rank poison to some and should be shunned, while others who have smoked for years with comparative immunity need not become total abstainers. The latter, however, should be confined to the pipe or one or two cigars daily and not smoke in the forenoon.

Constipation.

Constipation should be prevented by properly regulating the diet and drinks. The food should be arranged as to calories by the patient's weight, and then three rules should be observed for stimulating peristalsis:

Methods of stimulating peristalsis.

I. Give sufficient liquids on an empty stomach—water or milk.

II. Give fat—the kind which is least likely to be absorbed from the bowels, *e.g.*, olive oil.

III. Give coarse food which leaves a large residue to go through the bowels—whole wheat, graham, rye, oatmeal and bran bread, vegetables and fruit, nuts, figs and raisins, etc.

The reader is referred to the chapter on constipation for further details upon this subject. The amount of fluid need not be restricted as in the uncompensated cases to be presently described, though it is wise not to allow more than six glasses daily, about 1500 c.c.; this amount will include (coffee and tea if allowed), milk, soup and pure water. Milk should constitute a part of the daily diet as it is easily digested and also helps supply the fluid requirements of the system.

Necessity of treating underlying cause.

When the cardiac disease is secondary to a lesion of the kidneys or some blood dyscrasia, we must of course direct our therapy in part to the underlying malady. This will usually compel us to consider carefully the vascular system, the digestive and eliminative organs. When we come to the discussion of the disturbances of compensation we are confronted with many formidable questions. Is this the first symptom of broken compensation, or have there been several heart slumps before—with tachycardia, dyspnea, accelerated respiration with slight cardiac dilatation, congestion of liver, kidneys, frequent micturition? Is there now present cardiac asthma, bronchial râles, hacking cough with cyanosis, edema of the extremities, oliguria, great distention of capsule of the liver, and consequent distress in the epigastrium

Determination of kind of case.

with dyspeptic manifestations? How much overweight is the patient? Is the affection primary; if not, to what disease is it secondary? These problems and others must be definitely settled before deciding upon our treatment. It should be clear to any physician that a case of beginning failure of compensation does not require such radical therapeutic measures as a case that has all the symptoms of advanced myocarditis.

es which y to all liac cases.

A few rules may be laid down, however, which with modifications will apply to all cardiac cases:

I. The patient should be given a more or less prolonged period of rest in bed.

II. If overweight, he should be reduced to normal.

III. The diet should be simple and easily digested.

IV. The bowels should be kept free.

V. Refreshing sleep should be secured.

VI. If there is edema present the diet should be comparatively salt-free and the fluid intake be maintained as low as is consistent with proper nourishment until the edema disappears.

The treatment of the mild cases of broken compensation can be readily deduced from that given under the discussion of the first division of this subject in the early part of this chapter. We shall therefore elaborate the above rules more particularly as applicable to the severer types of cardiac insufficiency.

ercise and st.

First, as regards exercise: *No greater mistake can be made than that of allowing these patients to exercise so long as their hearts have any extra work to do, and they certainly have until we have brought their weight down to or below normal.* They may walk about a little on the level, stopping frequently to rest, if they have no

dropsy, but no violent exercise should be allowed and long periods of rest in bed should be required. When dropsical symptoms are present absolute rest in bed is obligatory.

For example: a lady recently came to me weighing 248 pounds, she was 100 pounds overweight. She had a slight mitral insufficiency with edema of the shins, rapid pulse, and respiration. She stated that a physician had had her under his care for a year or more for obesity, and he had advised rowing in a Harvard rowing machine for an hour every morning in a poorly ventilated attic room in her house. She was to wear a thick sweater while engaged in this exercise, and get into a profuse perspiration, after which she was to immediately take a cold-water bath, then dress herself, taking care to put on another sweater, and go for a long rapid walk. She was to rest by sitting down, but never lying down. An afternoon of similar strenuous effort was to be passed. The result of this treatment had been, of course, pernicious, and the patient had not succeeded in reducing her weight at all, as her diet had been improper and her appetite very much increased. Moreover, her symptoms had grown worse.

Illustrative case.

It should not be difficult for an intelligent person to understand that an excess of fat in the system necessitates a great number of extra blood-vessels which have to be supplied with blood, thus enormously increasing the amount of work put upon the heart, and that a heart thus embarrassed should fail if required to withstand the further strain of active exercise. A lady, forty-four, 20 pounds overweight, with a blood pressure of 180 mm., recently came into my office complaining of a choking sensation in her

Excess of fat increases work of heart.

Illustrative case

throat, congestion in her head, inability to draw deep breaths which she seriously felt the need of—air hunger. Physical examination revealed a rapid and weak pulse, heart sounds muffled, right side dilated, no murmurs. Liver three fingers below costal margin, legs swollen to the knees, feeling of stiffness and fullness in hands and face. She was ordered to bed and given one glass of skimmed milk every two hours in the day with Epsom salts in one-teaspoonful doses to be dissolved in 2 ounces of cold water, one, two, or three times daily as needed to produce four to six stools daily. In five days her weight was reduced 12 pounds, blood pressure 160 mm., and all edema and other symptoms had disappeared; she was then ordered one solid meal daily at noon, consisting of chop or chicken, baked potatoes, boiled greens, and one other vegetable, and cooked fruit. Morning and evening the skimmed milk was continued with rest in bed until she had lost 8 pounds more, and then she was given daily three solid meals without sugar and with considerable reduction of the starches.

The second rule is observed by carefully carrying out the first and third.

For the purpose of keeping the bowels in good condition the proper diet will avail much, and when laxatives are required, the salines are to be preferred, and among the best are the milk of magnesia, sodium phosphate, and Epsom salts. The last should be used when dropsy is present, because the most reliable, and it can be given in the smallest dose.

Case illustrating the sixth rule when edema is present.

The sixth rule is well illustrated by citing a case from one of my recent card histories. Patient—male, height 5 feet 7 inches, weight 197 pounds, family

history negative. Patient had the usual children's diseases lightly; always well until four years ago, when he fell suddenly to the floor after a full meal and was said by the doctor who was called to have acute indigestion. He did not go to bed, but realized that he was not well for several days afterward; has since noticed that he gets out of breath easily upon exercising, and has had several asthmatic attacks recently, has been hoarse and had a slight hacking cough. Appetite good, bowels regular, sleep disturbed by having to change his position often in bed; is more comfortable with two pillows than one.

Physical Examination.—The patient's respiration is exceedingly difficult, all the accessory muscles of respiration being called into action. The expiratory effort is greatly exaggerated and prolonged; loud and dry sonorous râles are heard all over the chest; the heart sounds are further muffled by the superimposed fat; the superficial cardiac dullness extends to the mid-sternum; the apex is felt in the fifth interspace just outside the nipple line; a slight systolic mitral murmur is heard; the edge of the liver is felt two fingers' breadth below the costal margin; the shins pit on pressure up to the tibial tubercle; the urine shows passive congestion of the kidneys. The pulse is 120 irregular and intermittent; temperature 99° F.; the systolic blood pressure is 200 mm. sitting.

This man was put to bed and one teaspoonful of magnesium sulphate was ordered at 7 A. M., 12 M., and 6 P. M., for one day, which caused eight liquid stools; after that one dose in the morning sufficed to produce two or three stools daily. He was given a skimmed-milk diet, one glass every two hours, a baked apple or

one orange each day for four days, when all his edema had disappeared, and he could lie flat in the bed without dyspnea. He was then given a solid meal at noon, and his milk at 6, 8 and 10 A. M., and at the same hours in the evening for three days, when a solid breakfast was ordered, and milk omitted until evening for four days, after which the three regular meals were resumed. Ten days after going to bed his pulse was 70, regular, and no intermission was afterward noticed. His systolic blood pressure was 150 mm. He was kept in bed one month, somewhat longer than would have been necessary had this been the first time that he had suffered with heart failure. At the end of the second week he declared he felt as well as for the previous twenty years. His weight was reduced 27 pounds. He got up at the end of the month feeling strong, but for the first week he was only allowed to walk a little about the house, and to take short rides in his automobile. A second week of motoring in the country, with daily increasing walks, was allowed before he resumed his business in an office.

Points in illustrative case which may be applied to all cases.

On account of this case being such a typical one of broken compensation, I will here emphasize the most important points in the treatment which may, with slight modifications, be applicable to all similar cases, the majority of which will be more promising at the outset than the one just described. After a long experience with this method of treatment, I can confidently give a favorable prognosis in a very large percentage of these cases, unless there is a severe kidney complication present. Of course, we always have the personal equation to reckon with, which is an unknown but frequently determining factor.

We would, then, especially emphasize:

Rests. I. The importance of rest in bed. The horizontal position lessens the peripheral resistance to the circulation and lowers the blood pressure. It also slows the heart's action and reduces the pulse rate. Now, as the heart muscle itself is nourished during the diastole by the blood received through the coronary arteries, it follows that when we reduce the pulse rate from 120 to 70 the diastolic period will be considerably prolonged and the cardiac muscle consequently better supplied with nourishing arterial blood. Improved nutrition for this most important muscle means better general body metabolism. Furthermore, rest for the entire body reacts favorably upon the heart by its sedative action upon the nervous system and also because inactive muscles require a minimum of blood.

Milk diet. II. A skimmed-milk diet or (when the patient is lean) whole milk with perhaps cream added taxes the digestion least and acts as a diuretic. It also furnishes sufficient protein to maintain the nitrogen balance, and the patient burns up his own fat, thus lessening the work of the heart. No fear need be felt that cardiac cases dieted in this way will become weak, because this is *best* avoided by lessening the amount of work which the heart has to do. I regard the first few days dieting with milk, while freeing the water-soaked tissues of their fluids, as perhaps the most important part of the entire plan, as it is preparatory to the feeding which follows, when the dry solid diet is begun. And the latter should not be commenced until all edema has subsided and other distressing signs, like hacking cough, *pulmonary congestion*, distress in the epigastrium, etc., have ceased. I am often asked if,

in such a case as this described. I would give digitalis. As a matter of fact such patients have usually had digitalis, strophanthus, and other cardio-vascular tonics before I see them, but it is rare that they are benefited. If any drugs seem imperative for the first few days to tone up the heart I much prefer the mixture of strophanthus in 3-minim doses, or the fermented mixture of opium, 3 to 10 minims three times daily, as it slows, steadies, and strengthens the heart's action and quiets the nervous system, favoring refreshing sleep. These drugs will, however, be required only a very few days. Caffein and the Tr. of nux vomica may often be combined with opium when it is thought advisable to further stimulate the digestive and urinary secretions. Potass. acetate may be given if for any reason one wishes to rest the bowels from salts. Digitalis (Caesar and Loretz prep.) may be given for two or three days instead of strophanthus.

Dr. J. C. Pratt et al. have recently shown that most of the digitalis being sold throughout our country is comparatively inert, and when a universally reliable preparation of that drug can be obtained better results may be expected. However, I am convinced that without the more important rest and diet no drug treatment is rational or practical.

Slow transition from liquid to solid diet

III. It is necessary that the transition from the milk to the solid diet should be *slow* and *cautious*, beginning first with soft-boiled eggs and a slice of dry toast once a day; then after two days a small portion of chicken or squab with a baked potato, well-cooked spinach, cauliflower or asparagus tips, cooked fruit, for the second meal, giving milk for the third meal, and finally, after a few days, three full meals are given. It may

be wise for a few days even then to make the solid meals very small and give one glass of skimmed milk between the meals and at bedtime.

IV. While on a mixed diet the proteins should be above the normal for health and given preferably in the form of the animal proteins, because more palatable and better digested. The only exception to this rule is in cases complicated with nephritis, when the proteins may be considerably reduced, but not entirely cut out. It is probable that the same rule obtains in respect to animal proteins as the starches, because their digestibility varies somewhat with the kind and manner in which they are cooked, as well as the habit and idiosyncrasy of the patient; *e.g.*, some will digest the milk, cheese or egg albumen easier than that of fish or meat, and *vice versa*. They will also more easily digest the starch of potato than that of bread or rice, likewise, for some, oatmeal starch is much easier of digestion than bread or macaroni. Undoubtedly habit plays the chief rôle here; it cannot, therefore, be ignored in the treatment of this, as well as all other affections.

Increase protein in solid diet

Since Prof. Chittenden published the result of his praiseworthy scientific study of protein metabolism there seems to have arisen in the medical profession a wide-spread antipathy to the use of meat in health as well as in disease, until it has become a fad with medical authors and lecturers, as well as popular lay writers, to advocate a great reduction of, if not the entire elimination of, its use as a food. In its place some substitute other animal proteins—milk, egg, cheese, and fish, besides large quantities of vegetable proteins—making a total protein content greater than when the

patient was on a mixed diet in which meat was an essential factor, while others eliminate all animal proteins and depend upon the vegetables to furnish what proteins the system demands.

Now, whereas some good may arise from fads, I am satisfied that in this respect the shorter time it has possession of the thinking mind the better, as it bars out better thoughts.

Protein in moderate amount not harmful.

Does protein do harm in the system when given in the usual moderate amounts? No harm so long as digestion and elimination are good. When there exists disease of the gastro-intestinal or urinary tracts, then the character of the lesion must be carefully studied before it can be determined what kind of food can be most readily consumed in the body, and at the same time furnish the eliminative organs with innocuous waste. In some instances our chief reliance must be upon fat, in others, carbohydrates or proteins. Clinical study based upon physiological chemistry with a pathological study of the stomach contents, the stools and urine, together with that of the blood pressure and pulse, will help us to settle this important question of what to eat. Now, what harm results to those suffering with disease of the digestive and eliminative organs if they eat proteins in moderation or excess? The prompt response comes to the reader's mind, intestinal putrefaction, diarrhea, and gouty symptoms.

Granting this answer is correct, we should ask ourselves still another question: May these changes not be due to the fact that the patient is overtaxing digestion with carbohydrates? An affirmative answer I am sure will be forthcoming from clinicians of wide experience. In short, I cannot recall a gouty patient

who has consulted me for several years past, who was not taking starches and sugars in excess and did not immediately improve and finally recover by cutting out all sugar, restricting his starches, and making no change in the quantity of meat, except in most cases to increase it as the digestion of protein is often greatly enhanced by the reduction of the carbohydrate. The reader here says: How about the blood pressure? Will not this be raised? If the high blood pressure in a particular case is due to the toxins of faulty digestion or kidney insufficiency, of course the pressure will diminish instead of increase by the above method of diet, as the functions of the gastro-intestinal tract and kidneys are better performed with the diet of protein than C. If, on the other hand, the cause of the high tension is an old arteriocapillary fibrosis, it will be advisable to reduce the proteins. The question of arterial hypertension has been well discussed by Dr. A. R. Elliott in the *Am. Journal of Med. Sciences*, May, 1910, and with our present meager knowledge of this subject in vascular cardiorenal affections I believe it is up to date.

Liquid diet in broken compensation.

V. The question of liquids in broken cardiac compensation can be briefly settled by observing these points:

a. While the patient is in bed in the edematous stage give no liquids except the six or eight glasses of skimmed milk daily.

b. Stage immediately following the edema. Give no more than five full glasses of liquid daily including broths, milk and water until the patient is up and about, when he may take one or two extra glasses each day.

VI. When three solid meals are allowed, for the first two or three weeks, they should be simple and later gradually made more elastic. The patient should be instructed never to allow the weight to go above normal. The carbohydrate may be cautiously increased by watching the weight.

A suitable table is appended for the beginning of solids which, later, after he is able to resume business, is made more like a partial reduction diet.

BREAKFAST, 7.30 A. M.

Fruit—tart grapes, apple, raw or stewed, berries, cooked or raw, orange; a chop or small piece of steak; a small piece of one of the leaner fishes broiled; one medium-sized baked potato with a moderate amount of butter; one cup of coffee without cream or sugar or a glass of milk; eggs, soft-boiled or dropped on toast.

Lunch, 10 A. M. One glass of skimmed or butter milk.

DINNER, 1 P. M.

Raw oysters; clam bouillon, essence of chicken; chop or steak as above; Roasts—squab, chicken, lamb, veal, beef; Fish—schrod, haddock, halibut, smelts, perch, brook trout, flounders, salt-water perch; an egg if not taken for breakfast; Vegetables—lettuce, spinach, stewed celery, squash, string beans, asparagus, tomatoes, baked potato; one of the above-named vegetables should be eaten in addition to a baked potato; Dessert—fruit as for breakfast; a glass of milk or water may be taken.

Lunch, 4 P. M. One glass of skimmed milk.

SUPPER, 6 P. M.

Eggs if not taken earlier in the day; one or two thin slices of dry toast with butter; one glass of milk and a baked apple or stewed berries. Two Bent's water crackers and milk may be allowed twice a week.

9.30 P. M. A glass of whole milk or butter milk.

SUGGESTIONS

Do not eat meat and fish, meat and eggs, or fish and eggs at the same meal.

Do not eat hurriedly.

Do not drink during the mealtime.

Vary the meals as much as possible from day to day.

Take a small portion of meat.

This diet will probably be continued for one or two weeks, when the lunches between meals will be omitted and the full solid diet, three times daily, be adopted.

The fat and carbohydrate will have to be arranged according to the weight of the patient.

ARTERIOSCLEROSIS

Frequency in early adult life.

This affection is not limited to old age, but is frequently met in early life, especially around twenty, when the dissipations of early adult life begin and the student unfortunately acquires bad habits and gets into bad company. The drinking of alcohol in the teens very quickly affects the delicate sensitive internal coats of the arteries of the body and leads to endarteritis, resulting in thickening and hardening of the arteries. Syphilis, especially at this time of life, leads to an inflammation which leaves in its wake not only sclerosed arteries, but a long list of other symptoms, many of which affect the most important nerve centers of the body, *i.e.*, the brain and spinal cord.

Causes of art. scl.

I have recently taken the blood pressure of a college student, eighteen years old, who has been addicted to alcohol while in college. I found the systolic pressure 200 mm. This young man had a marked general arterio-capillary fibrosis and was as old in many ways as a man of sixty. Added to the above causes of arteriosclerosis, we have strenuous, muscular effort coupled with other excesses like smoking and the exposure to the various toxic agents, metallic poisoning, lead, arsenic, etc., to which the working man is subject, and the chemical toxins circulating in the blood through perverted functions of the ductless glands —the thyroid, thymus, adrenals, and ovaries. Of course, many of these chemical toxins exist in early life, but their effect in the organism does not become so

apparent until adult life or old age is reached. Every active practitioner frequently has a farmer or tradesman in his office with a marked atheroma, which is clearly due to the strenuous life which he has led, especially when great strain has been brought upon his heart and vascular system.

Whatever the etiology of the vascular disease may be, the dangers to be feared are many; for instance, nephritis; aneurysm; rupture of a blood-vessel; ischemia; claudication; impaired nutrition with all its baneful results; nervous affections, both general and local; and the dietetic treatment must be directed to the actual condition of the cardio-vascular system, with especial attention given to renal complications. **Results of art. scl.**

The daily diet should consist of 1 quart of milk, or more, and it is necessary, when there is a coexisting interstitial nephritis, that the protein should be limited, but not too much restricted; and with the latter complication to contend with, if there are dropsical symptoms present we restrict food rich in salt content for reasons given under the chapter on nephritis. When the kidneys are not involved to any considerable degree and there is no edema, the diet may be made more liberal by giving food that contains more salt. I cannot emphasize too strongly the rôle which milk should play in nearly all cases of arteriosclerosis. It can be given in the form of milk soups, purees, chowders, gruels and light puddings with cream. **Restriction of salt in diet.**

The following table may be consulted for reference:

Diet List for Arteriosclerosis

BREAKFAST, 7 A. M.

Fruit—the juice of an orange, grape fruit, stewed peaches, or apricots, plums, pears, berries (raw or cooked), grapes, apples

(baked or stewed); Eggs—coddled, scrambled, soft-boiled, dropped on toast, or shirred two or three times a week; Broiled fish—schrod, haddock, halibut, smelts, fresh codfish, pickerel, mackerel, bluefish, trout; Chops—lamb or veal; broiled chicken; broiled honeycomb tripe; meat or fish hash; baked potatoes; dry toast; one glass of milk or buttermilk, or a cup of weak tea.

10.30. One glass of milk or gruel.

Dinner, 1 p. m.

Raw oysters; vegetable soups made with milk, fish chowder; broth of oyster stew; Fish—boiled, broiled or baked; Roasts—lamb, veal, chicken or turkey, partridge; chops; Vegetables—Irish potatoes, lettuce, spinach, celery, tomatoes, string beans, squash, cauliflower, onions, asparagus, beets, carrots, green corn, green peas; Dessert—fruit, molasses ginger bread, light puddings with cream sauces; crackers and cheese (Camembert, Brie, Cream); one cup of weak tea, or glass of milk.

4 p. m. One glass of milk.

Supper 6 p. m.

Lamb or chicken stew with vegetables; eggs may be taken when not eaten for breakfast; fish as above; baked potatoes; two or three times a week a supper may be made of a bowl of milk with crackers and baked sweet apples; or a puree of vegetable soup with bread and butter and cooked fruit may be taken; one glass of milk or buttermilk. If constipated, a cornball, some popcorn or bees' honey may be taken.

9.30 p. m. One glass of warm milk.

Suggestions

Eat small meals.

Avoid skins and seeds.

There is no objection to tea once a day.

One glass of hot water or milk should be drunk on awakening and cold at 11 a. m. and 4 p. m. At least five glasses of liquid should be taken daily.

Do not drink during the meal, but one glass or cup after.

If the patient is underweight he should take cream soups and cream sauces; if overweight thin milk should be substituted for cream.

Do not eat fish and meat at the same meal; eggs should not be eaten when meat or fish are taken.

Take at least two vegetables, besides the potato, with dinner.

As a rule cooked fruit is better in this affection, and it will agree best if taken after the meal.

Eat slowly and thoroughly masticate the food.

Vary the food as much as possible from meal to meal and day to day.

ANEURYSM

Aneurysm of the aorta and other arteries calls for a non-stimulating diet with a limitation of liquids to relieve the vessels of all extra strain. Meats should therefore be given with moderation; condiments should be avoided and the liquid should consist of cocoa, milk and water, given usually in the amount of 40 ounces daily. No tea, coffee, or alcohol should be allowed. If the patient is fat, he should be reduced to at least a normal weight, and under such circumstances the diet should consist of skimmed milk or buttermilk, eggs, lean meat or fish, cheese, all the vegetables, and a minimum of bread. A good quantity of cooked fruit should be given three times a day. If lean he should be given more fat, and whenever possible more of the easily digested C.

ANGINA PECTORIS

As a rule, the diet should be that of arteriosclerosis, as the sclerotic condition of the arteries is very rarely confined to the coronaries. All meals should be small. The reader is therefore referred to the preceding pages on arteriosclerosis.

DIET IN LUNG DISEASES

In the treatment of respiratory affections we have especially to consider four objects:

1. To secure free ingress of pure air to the lungs.
2. To give the lungs less work to do, which means less CO_2 to eliminate.
3. To furnish the lungs and entire system with better arterial blood.
4. To remove all obstacles to free excursions of the diaphragm.

Carbohydrates and fats increase the carbon products in the blood. These are chiefly excreted by the lungs as CO_2.

Now, as many of these foods cause flatulency and abdominal fat which seriously impedes the descent of the diaphragm, they must lessen the filling of the air vesicles with the oxygen which is necessary to take up the carbon from the blood into the pulmonary capillaries whence it is eliminated as CO_2; hence, by reducing the quantity of carbohydrate and fat, we lessen the work of the lungs, and by giving proportionately more protein, we improve the quality of the blood, thereby securing better metabolism everywhere, especially in the lungs, where most needed.

In the treatment of some of the lung diseases the heart is the organ most *banked* upon. Now when the patient has an excess of abdominal fat it is deposited in the pericardium and heart muscle, as well as in the abdomen, and this condition often obtains in chronic bronchitis, emphysema, and bronchial asthma.

Here, naturally, our first indication is to get rid of the excessive fat by proper diet. When a chronic bronchitis is due to renal disease, diabetes, tuberculosis, or some chemical or toxic agent in the circulating blood, our attention must of course be directed to the cause of the bronchitis. Any obstruction in the trachea or bronchi, or spasms of the bronchioles may throw a portion of the lung out of commission and lead to an accumulation of carbon slag in the air cells and capillary bronchi, thus seriously impairing the carbonizing process of the unobstructed lung tissue. Practically all inflammatory infections of the lungs, save carcinoma, new growths, gangrene, etc., are self-limited, and our aim should be to support our patients by proper food and good hygiene to favor this elimination. Hence it often becomes a great error when an exudate has taken place in the alveoli and capillary bronchi in pneumonia to arrest a loose cough by drugs.

We have often seen a patient with pulmonary tuberculosis in active business for twenty or twenty-five years by the coexisting chronic bronchitis and emphysema, which is nature's compensatory method. The cough in such a case, of course, causes hyperemia of the lungs with a very desirable leucocytosis, and it would be a grave error to arrest it; on the other hand, when the cough is dry, as in acute bronchitis, it should be palliated until the moist stage sets in. This stage can be hurried with ammonia preparations, or the iodide of sodium.

BRONCHITIS

The treatment in the acute stage should vary according to the severity of the disease. The fever usually ranges from 99° to 103° F., and in the mild

tomatoes, onions (if properly boiled), cabbage (when chopped fine and cooked ten minutes in salted boiling water).

Constipation should be avoided by giving a laxative diet and if necessary mild cathartics.

For a full diet list which may be given to a fat bronchitic the reader is referred to the section on obesity.

The bronchitis of old patients often requires frequent small meals with a little alcohol, preferably whiskey or Burgundy. Only a little is necessary unless the patient has been accustomed to stimulants for years, when full doses will be required. Of course, its food value is a saving grace, as well as its stimulating power.

ASTHMATIC BRONCHITIS (BRONCHITIC ASTHMA)

Classification. Until very recently bronchial asthma has been considered as caused by nervous disturbances. Recent work seems to show that many cases at least are due

Bacterial. to bacterial activity, the foci of infection being located as a rule about the nose or throat—very frequently in the ethmoid cells. The asthmatic attacks are probably due to absorption of toxic proteins, arising from the bacterial metabolism. The absorption into the blood stream of these proteins causes an anaphylactic reaction. Anything that interferes with the drainage from one of these infected sinuses brings on an attack of asthma. Matthews of the Mayo clinic, and Sanborn of Boston report some very interesting cures resulting from drainage of infected foci, and treatment with autogenous vaccines.

Leube classifies under this head only such cases of dyspnea as are caused by purely nervous disturbances,

and not by any perceptible lesions of organic disease. This makes it easy to differentiate asthma based upon a pure neurosis and that accompanied by obstruction in the nares, edema of the glottis, spasms of the larynx, bronchial stenosis, bronchial emphysema, etc. If, then, we are to look to a nervous basis for asthma, we can usually find its origin in some irritating food or morbid change taking place in digestion, or some lesion in the gastro-intestinal tract which has led to autointoxication, introducing an exciting chemical toxin into the blood. It is often seen in the gouty or in the descendants of gouty families, but it is not necessary to infer that it was inherited in such cases, as there are so many other conditions to which it may be traced.

Neurotic.

Organic.

From the earliest times, the importance of stomach and intestinal indigestion in asthma has been realized. Aitken said asthmatics never could eat and drink like other persons. Many asthmatic patients tell us that eating certain kinds of food always causes an attack of asthma. This undoubtedly explains why a brief change of residence from the country to the city, or *vice versa*, may suffice to *bring on* or *cause an attack to disappear*, as a radical change in the diet usually takes place upon such an event. In others the reason of the suddenness of onset or disappearance may be explained by the changes in the psychical condition. Hence we have to especially safeguard the mental attitude of the patient and protect the stomach from savory insults. The latter is accomplished by careful study of each patient's idiosyncrasies.

Importance of stomach and intestinal indigestion in asthma.

Change of residence.

At all events, an asthmatic should first be put upon a non-irritating diet easy of digestion. It must not

flounder; chops—lamb or veal; broiled honeycomb tripe; broiled chicken; breakfast bacon; baked potato; one or two slices of dry toast or the crusts of two rolls may be eaten with a little butter; bees' honey, marmalade or jam may be taken two or three times a week; a cup of coffee, tea, or a glass of water.

DINNER, 1 P. M.

Clam bouillon; fish, broiled or baked; steak (not more than once a week); chops; roasts—beef, lamb, veal, chicken, turkey, partridge, quail, corned beef or tongue (boiled six hours); Irish potatoes, lettuce, spinach, stewed celery, cauliflower, beets, carrots, squash, onions, parsnips, cold slaw, cucumbers (cut thin as tissue paper); dessert—crackers (2) and cheese—Brie, Camembert, cottage, farmer's skimmed milk cheese, old-fashioned curd; cooked fruit; one glass of water or a cup of tea.

SUPPER, 6 P. M.

Raw oysters or little neck clams; soups; eggs when not taken for breakfast; stale bread and butter, and toast; fish if not taken for breakfast; baked potato; cooked fruit; one glass of milk or a cup of tea.

SUGGESTIONS

Eat small meals.
Do not drink while eating.
A few crackers at 4.30 P. M., and a glass of milk at bed time.
Take a different kind of fruit at each meal, preferably cooked.
Drink one glass of hot water at 7 A. M., one glass of cold water at 11 A. M., and 4 P. M., and one glass of warm milk at bed time.

EMPHYSEMA

The diet in this affection must take into consideration its causes and complicating affections, especially cardiorenal diseases, arteriosclerosis, obesity, chronic bronchitis, stomach and intestinal insufficiencies. Especially must we protect the patient from constipation and flatulency, and it is only by taking these coexisting and causative agents into serious considera-

be all that is necessary. When the patient is asthenic at the start, or in late adult life or old age, we should give from the first milk with Vichy or lime water, peptonized milk, egg albumen, oyster and clam broth, beef juice, making the intervals of feeding two and, if possible, three or four hours. The liquids should be varied through the day, so that no one food will be taken oftener than twice in the twenty-four hours, as the psychical attitude has much to do with digestion.

Liquids in acute cases.

In old persons, and those who are especially lacking in resistance and recuperative energy, as well as alcoholics, it is often necessary to give alcohol, whiskey, champagne, Jamaica rum, or brandy, care being taken to select a good quality, giving some heed to the patient's former likes, as it will be better borne.

Alcohol.

Much of the crusade against the use of alcohol in every disease is due in the one case to the spirit of the iconoclast and in the other to the want of experience, while still other conscientious physicians seem to move most readily in the line of least resistance.

Alcohol is a rapidly oxidized food, and therefore its digestion taxes the system very little. It is an antipyretic, a diuretic, diaphoretic and cardiac stimulant and, being eliminated through the lungs, favors expectoration. It thus fulfills many indications in this disease.

Its usefulness in treatment.

After thirty years' experience, I wish to go on record as a believer in the proper use of alcohol in pneumonia. It has been, probably, the means of saving more lives in this disease than all other remedies. In alcoholic subjects it should be begun at the onset of the disease and given in much larger doses than in the non-alcoholic. The usual 1/2-ounce dose of whiskey will do to

How to give it.

begin with and can be repeated every three, four, or five hours, as indicated. In the non-alcoholic and poorly nourished asthenic, one teaspoonful every two, three, or four hours should be tried, beginning as soon as the first evidence of weakening of the heart power appears, as shown by a diminution of the intensity of the first sound of the heart and the pulmonic second sound, heard by auscultation. This will often quiet the patient's delirium, restlessness, and induce refreshing sleep.

Contraindications to its use.

Contraindications to the use of alcohol are the existence of an acute endocarditis, pericarditis, and myocarditis. No hard and fast rules can be laid down for the use of alcohol, but each must be studied on its own merits. Within a day or two, after the fever has subsided, it should be reduced in the case of the non-alcoholic, and soon after omitted altogether. In alcoholic patients who are over fifty or sixty years of age, it is better to continue it, but in reduced doses through the convalescence. Coffee or citrate of caffeine may be tried in the non-alcoholic before giving alcohol. Oftentimes the efficiency of caffeine as a cardiac stimulant in this affection is quite as marked as in those due to cardiac disease or typhoid fever.

Increase in diet during convalescence.

During convalescence all pneumonics should have their diet gradually strengthened by increasing the proteins and fats, and lastly the carbohydrates. Solids should be cautiously begun two days after they are fever free. Toasted crackers, or a bit of dry toast, raw oysters, junket, bonny clabber, soft-boiled eggs, and cooked fruit may be given for two or three days, and then the solids may be further increased by the addition of squab, chicken, sweetbreads, lamb or veal

chops, beefsteak or roast beef, baked potatoes, asparagus tips, cauliflower, spinach, green peas, string beans, stewed tomatoes, and cooked fruit. These should be given as rapidly as the digestion will allow. Great care should be taken to avoid indigestible food and that which is liable to undergo fermentation.

Three important points in treatment.

Three points should always be kept in mind in the care of a case of pneumonia:

1. *To allow the patient enough water, but in frequent small quantities*, bearing in mind that the liquid food lessens the amount of drinking water necessary. If 2 pints of milk are allowed daily, about the same amount of water may be given, or 1 pint of Celestins Vichy may be substituted for water. Milk and alkaline waters seem to be relished by, and agree with, fever patients. However, I cannot agree with some authors who advise giving aerated waters and effervescing drinks (Apollinaris water and ginger ale), as, by virtue of their air and sugar content, they not only distend the stomach, causing indigestion, but also lessen the excursions of the diaphragm, and in this way further embarrass the lungs. It is also a very great mistake to give 3 or 4 quarts of liquid daily, as any considerable increase of volume in the circulating blood will materially increase the work of the heart, and thus precipitate the exhaustion which we should strive to prevent. When, on account of extreme sensitiveness of the stomach, we can give very little of anything by the mouth, we should inject, with a long rectal tube, 1 pint of water twice in twenty-four hours. This will not only quench the thirst, but will spare the stomach until its function is restored.

2. *We should not allow our convalescents from pneu-*

monia to get up and about too quickly, for obvious reasons.

3. *We should keep the bowels active without exhausting the patient.*

In the fever of pneumonia the secretions are checked, and elimination by the bowel is limited, because of the great restriction of food which it entails. As someone has well said, the bowels are dry. To relieve this condition, we would advise salines (and Epsom salts is perhaps the best) in teaspoonful doses, once, twice, or three times daily, as necessary. Only one movement is advisable, and the simplest laxative which will cause this is the best. Often the action of the salts can be increased by adding one teaspoonful of glycerin to each dose. Pills are unsafe, because of uncertainty of dosage and liability of griping. I cannot too strongly endorse the teaching of Dr. W. H. Thomson, namely, that salts when given in concentrated solution operate more quickly and surely than when in dilute solution; moreover, this method spares the stomach. It may be necessary, occasionally, to give enemas also.

BRONCHOPNEUMONIA

The diet in this type of pneumonia is similar to that of the preceding in principle except that this form is longer in duration and runs its course with a lower temperature; hence, food should be begun earlier and be more liberal except in cases where the involvement of the capillary bronchi is extensive, which is often the case in children in whom this affection is oftenest seen.

It is often necessary to wait before giving food from

twenty-four to forty-eight hours, for the stenosis of the finer tubes, either through spasm of the bronchial muscle or hyperemia of the bronchial mucosa, to subside, and exudates to be removed with the aid of sedatives or emetics. Then begin cautiously with the liquid food as heretofore described. It is also advisable in the more chronic cases not to wait for the fever to entirely disappear before giving solids, and especially when the digestion of liquids is good. We can often begin with the simplest solids when the temperature is between 99 and 100, giving them only in the early part of the day. As to the further diet in this form of bronchopneumonia, it does not differ essentially from that of convalescents from lobar pneumonia.

PLEURISY

Pleurisy in its dry stage may be given the same diet as that of pneumonia, but in the stage of effusion, if there is no fever, the diet suggested by Schroth is advised—simple rolls without liquid, or the milk diet, which increases diuresis, may be tried, both serving the same end; namely, to promote absorption. Either method may be aided by the administration of saline laxatives to produce three or four loose dejections daily. We have found that 2 pints of milk daily with a moderate amount of easily digestible, mixed solids, like eggs, fish, meat, spinach, cauliflower, baked potatoes, asparagus tips, dry toast, cooked fruit, milk puddings, blanc mange, bonny clabber, custards, will answer very well when little, if any, water is given, and the suggestions concerning the laxatives and diuretics just mentioned are observed.

Diet when effusion is present.

Paracentesis. Of course, paracentesis is the best method of treat much effusion, and should always be resorted to wl permissible. *As pleurisy with effusion is so commo due to tuberculosis, it will be usually necessary to patients upon the treatment of this disease.*

TUBERCULOSIS

As tuberculosis is an infectious disease due to the tubercle bacilli it may be acute or chronic, and it may invade any organ of the body—skin, nose, throat, lungs, brain, stomach, intestines, kidney, bladder, etc. It is recognized, however, much oftener in the lungs than elsewhere, and on this account we will give our chief attention, in this volume, to tuberculosis of the lungs (consumption).

The fundamental principles in the dietetic therapy of the local infection in any part of the system do not differ materially. Pulmonary tuberculosis is, as is well known, a curable disease, and more rapid advance has been made during the last ten years in the treatment of this affection than that of any other.

Open air. Forced feeding.

Bremer and Detweiler are the pioneers in the open-air treatment with forced feeding. When this method is adopted the most incipient cases get well, and many advanced in the disease are very much improved, so that they may resume their usual avocations. Formerly it was thought necessary to send these patients to a high, equable, dry climate, but now it is believed that many of them will get well faster if they can live out of doors at home with their friends about them. However, there can be no doubt that one who goes to some favorable climate leaving care behind (as often happens with single and well-to-do individuals) will recover more quickly, as the appetite and nutrition improve under the better tonic climatic conditions.

the experience of physicians who have a very large private and consultation practice would be also instructive on this point, as the food problem can often be more accurately studied, and much more palatable food can be furnished patients in their own homes. It was well proven by Pawlow that the appetite is psychical, and digestion and assimilation are much improved by palatable food. Hence, a less amount of savory food will yield more calories than a much larger amount of unpalatable food which is given a patient in a sanitarium, because it happens to be the day when every other patient is served that particular dish. The fact must never be forgotten that most of our sanitaria have to leave the food problem to incompetent and unscientific persons, so that the finances of the institution may not suffer. It is impossible in a large institution to cater to the appetite of individual patients. Personal idiosyncrasies cannot be considered. Variety in diet, which is preeminently important when it is to be long continued, is impractical in public or private institutions; while in private practice among the well to do, of course, there is no barrier. Among the poor, monotony in diet can readily be avoided with the aid of a village nurse, who should be well trained in the art of cooking and instructed by the attending physician as to the proper diet.

Conditi fecting diet.

Fisher's second object—a standard diet for the average patient—may well be approximately worked out in this simple manner: By taking the average diet for that individual in health, and so varying it by the addition of protein, carbohydrate, and fat that he will have a diet which has a caloric value of about

Making standard

10 to 15 calories per kilo body weight, every twenty-four hours, in excess of his normal diet. In this way a patient weighing 150 pounds with tuberculosis is receiving at least 750 calories more per day than is his average diet in health. The excess should be varied according to the patient's loss or gain in weight.

Increase in all elements of diet, but especially proteins.

Practically all authors on this subject agree that the increase shall be in all the principal elements of food, but the protein element should be increased the most and the fats second. People who eat animal protein are less disposed to tuberculosis than vegetarians, and tubercular patients are often fond of fish and meat and digest them with ease, as a rule.

Animal proteins can be given in the form of milk, egg albumen and cheese, when for any reason meat or fish are temporarily contraindicated. By giving animal proteins, considerable fat, also carbohydrate, is introduced at the same time. Roast beef is 22.3 per cent. protein and 28 per cent. fat, while whole milk is 3.3 per cent. protein, 4 per cent. fat, and 5 per cent. carbohydrate. But the chief reason for increasing the protein is its importance of building up the cell protoplasm of the body, and thus improving metabolism, and hence digestion, which is often very much impaired in this disease.

The amount of vegetable protein should also be increased considerably by selecting food rich in this element, peas, beans, etc. The protein may safely be increased in most cases to 200 grams daily.

Fats can better be utilized than the carbohydrates to furnish heat and energy, and to make up the major part of the excess of calories required.

It can be given in a more concentrated form, and is less bulky than the carbohydrates.

It causes less indigestion.

It is better liked by the patient.

The fat may be taken in the form of milk, cream, butter, meat, cheese, eggs and bacon, nuts, olive oil, codliver oil.

Some tubercular cases are fat when they come under treatment, so of course need not have any increase in their carbohydrates, but this element should be reduced, while their protein remains high, in order that their weight may drop to near the normal physiological weight.

When it is necessary to increase the carbohydrates, it should be done by adding a little more stale bread or dry toast, rice, spaghetti, macaroni, honey, grape or milk sugar, oatmeal, cocoa, milk chocolate, beer or alcohol in some form.

Treatment in acute stage.

In general, it is safe not to tax the digestion, when the patient is in the acute stage or suffering with an exacerbation, by forcing solids or liquids. He should then be kept in bed, or at rest, and given milk, when this is well digested. When disliked or there is strong prejudice against it, by flavoring it with coffee, tea, or cocoa it may be given; or koumiss, kefir, buttermilk, separated milk or meat juice may be substituted for a few days.

Liquids.

Solids.

Occasionally time may be saved by fasting for a day and giving a laxative to relieve the portal circulation, as constipation is the rule in this affection. As soon as the fever subsides, the diet should be cautiously and gradually increased by adding solids to the above liquid diet, until the requisite number of calories is obtained.

If milk is well tolerated it is best to give at least 2 pints daily through the entire course of the disease, preferably between meals and at bedtime.

Alcohol.

The bedtime feeding may be reinforced with a little whiskey or brandy, or its place may be taken by a glass of beer.

Tubercular patients should be given their largest meals in the morning and at noon, as in the early part of the day their digestion is the best.

Below is given a diet list for a well-to-do man, weighing 150 pounds, who is comparatively free from acute symptoms; also another list for a poor man of the same weight who must buy his food cheaply. Reference is made in the last chapter to the art of buying and preparing cheap food.

Diet List for Patient with Chronic Pulmonary Tuberculosis without Fever

Breakfast

Fruit—any kind in season, raw or cooked; eat with cream when possible; eggs—in any style (scrambled, dropped on toast, shirred, poached, soft-boiled, baked); fish—any kind in season, especially salmon, bluefish, mackerel, shad, eel, butterfish, trout, pickerel, broiled or baked in cream; chops—lamb or veal; broiled honeycomb tripe, broiled chicken, liver and bacon, beefsteak; baked potato with plenty of butter; bread with plenty of butter, stale, toasted or dried in the oven; one cup of coffee, one-half cream.

Dinner

Raw oysters or little neck clams; soups, preferably purees; fish when not taken for breakfast; roasts—beef, lamb, veal, chicken, turkey, duck, partridge, quail, venison; steaks or chops; corned beef or tongue (boiled six hours); pork, boiled ham; vegetables—Irish or sweet potatoes, lettuce, spinach, celery, cauliflower, cold slaw, beets, squash, carrots, tomatoes, string beans, peas, asparagus, parsnips, brussels sprouts, rice, macaroni, spaghetti, onions, green

corn, cucumbers, egg plant, oyster plant; vegetable or fruit salads; dessert—puddings, apple tapioca, sago, rice, custards, baked Indian pudding, molasses gingerbread, angel cake, sponge cake, ice cream; crackers and cheese—Camembert, Brie, Roquefort, Imperial cream; one glass of milk with cream.

Supper

Raw oysters or little neck clams (especially the soft parts); fish as above; chops as above; stews—beef, lamb or chicken with vegetables; eggs when not taken for breakfast; baked or creamed potatoes; bread as above with plenty of butter; honey, jam, marmalade, or any of the other cooked fruits; one glass of milk with cream or a cup of cocoa.

Suggestions

Eat small meals.

Eat slowly and thoroughly masticate the food.

Drink a glass of milk on rising, in the middle of the forenoon, in the middle of the afternoon, and at bedtime.

Vary the food from day to day and from meal to meal, as much as possible.

Eat the fat of meat.

Have a different kind of fruit at each meal when possible.

Weigh yourself each week, and when you have arrived at the proper weight for your height and build, so arrange the diet that the weight will remain at about that point.

Diet List for a Patient with Tuberculosis in Moderate Circumstances

Breakfast

Apples (baked, raw, stewed, evaporated), evaporated apricots, stewed prunes, berries in season, home-made canned fruits; Scotch oatmeal, Quaker oats, hominy with plenty of cream and a little sugar; eggs—(when selling at their lower prices) in any way—soft-boiled, baked, shirred, scrambled, dropped on toast, omelet, poached; fish—cod, haddock, halibut, finnan haddie, smelts, flounders, perch, pickerel, mackerel, salmon, bluefish, herring, bloaters; fish hash, meat hash, Hamburg steak, sausages, bacon, ham; baked potato with butter; bread, stale, toasted or dried in the oven, with butter; bees' honey; one glass of milk or a cup

of coffee with cream; when cream can be had cheaply use it in the coffee and make the glass of milk one-third cream.

Dinner

Soups; corned beef or boiled tongue; hashes (meat or fish); chowders (fish, clam, oyster); Hamburg steak, chops (lamb or veal), pot roast, roast pork, pork chops, boiled ham, beef, Irish stew; fish as for breakfast if desired; vegetables—Irish potatoes, string beans, kidney beans, cabbage (cut fine and cooked ten minutes in boiling water in which is a little salt), beets, carrots, parsnips, squash, turnips, onions, spinach, rice, macaroni, spaghetti, cucumbers, cauliflower, all kinds of greens; dessert—puddings (rice, tapioca, apple tapioca, Indian, hasty pudding, cornstarch, blanc mange), molasses gingerbread, junket, bonny clabber; cooked fruit; one glass of milk.

Supper

Soups, preferably purees (bean, pea, potato, celery, corn, tomato); fish as above, fish and meat hash; eggs if not taken for breakfast; beef stew, Irish stew, oyster stew; fish and clam chowders, made with plenty of milk; cold corned beef or boiled tongue (boiled six hours); potatoes with butter; bread and butter; molasses gingerbread; cooked fruit as for breakfast; apple sauce; fried hominy with molasses; one glass of milk.

Suggestions

Eat slowly and thoroughly masticate your food.

Vary the food as much as possible from meal to meal and from day to day.

Drink a glass of milk on rising, at 10 A. M., 4 P. M., and at bedtime. Sip the milk slowly.

Eat the fat of meat. Oleomargarin may be substituted for butter where butter is expensive.

From the preceding study of pulmonary tuberculosis the following deductions may be made:

1. Consumptives should not be overfed.
2. Proteins and fats should predominate in the diet.
3. The carbohydrates should be only a little increased.

4. The diet should not be monotonous.

5. It should be palatable and the appetite catered to.

6. The patient's weight should not be increased much above the normal weight in good health—not over 5 to 10 pounds.

7. Obese patients should not be increased in weight.

DISEASES OF THE STOMACH

INTRODUCTORY REMARKS ON STOMACH DISEASE

Diagnosis. To make a diagnosis in stomach affections requires a thorough general examination, including an examination of the blood, urine, and feces whenever ulcer or cancer is a possibility, even, and when bile is found in the urine, or when pancreatic disease or bowel obstruction is suspected. The most scrutinizing attention should be given to the patient's rational history, noting particularly the various diseases passed through and their relics, if any (cross examination), surgical operations endured, especially in the pelvic regions, upon the appendix, and particularly upon the gall bladder, since a history of stomach symptoms appearing soon after the operation might suggest adhesions, causing obstruction to emptying of the stomach, pain, vomiting, etc. Dr. Maurice Richardson operated several years ago upon one of my patients and removed some gall stones, and one year later the patient returned for stomach trouble, motor insufficiency, pain in epigastrium, vomiting of undigested food, general malaise, and diarrhea. Adhesions were diagnosed, and a second operation showed kinking of the stomach and duodenum, and transverse colon. A history of intermittent attacks of indigestion (dyspepsia) with pain immediately following the meals, or two or three hours after, with acid belching or heartburn, relieved by soda or water, is very suggestive of gastric or duodenal ulcer. On the other hand, when a patient past middle

life comes complaining of anorexia, loss of weight, with distress in the stomach, and considerable belching of gas, with or without taste or smell, we *suspect*, at least, malignant disease, even though he may not yet look anemic or cachectic.

When a man of sixty years of age, with a face variegated with dilated capillaries, intermingled with venules of capacious caliber, comes with the history of morning hawking and coughing up of large masses of mucus, and loss of appetite without loss of weight, you can often make the diagnosis of gastritis by asking him one question—how much alcohol do you drink? Much additional information is gained by the physical examination. A visible peristalsis, the presence of a tumor in the epigastrium, or tenderness on pressure in this locality may give us the cue, but the most valuable assistance in making a diagnosis is through the aid of the stomach tube. With it we learn, first, the position and size of the stomach; second, the quantity and nature of the stomach contents—dilatation, hyperacidity, hyperchlorhydria, hypoacidity—achylia gastrica, the presence of lactic acid; third, the motor sufficiency of the stomach—its power to empty itself of a full meal in seven hours; fourth, the other contents of the stomach, such as blood, dark brown fluid, shreds of mucous membrane, cancer cells, large quantities of mucus.

The stomach tube.

The contents of the normal fasting stomach in the morning, after a full dinner the night before, should consist of a little saliva, and any secretion from the nose or pharynx which has been swallowed during the night. This residue has a neutral or alkaline reaction. If, instead, a considerable amount of undigested food

—lactic acid yeast bacilli, and the Oppler-Boas bacilli—is found, we have positive evidence of stasis in the stomach—motor insufficiency—and this may be due to reduced tone of the stomach, arteriosclerosis of the splanchnic vessels, or faulty position of the stomach—dilatation, hour-glass contraction, gastroptosis, or to stenosis of the pylorus from the hyperacidity of a gastritis, by ulcer of the stomach or pylorus, by cancer, or by adhesions to other neighboring viscera, and tumors of contiguous organs.

The use of the stomach tube, then, confirms many things suggested by the rational history, and helps to settle all cases of doubtful diagnosis of stomach diseases, especially cases of ulcer and cancer. Unfortunately all cases of ulcer of the stomach are not accompanied with hyperchlorhydria, neither are all cases of cancer of the stomach accompanied with hypoacidity, palpable tumor or stasis. A microscopic examination of the contents of the stomach may reveal the presence of blood, mucus, or cancer cells, which further helps in making the diagnosis. Great care in making the examination must be taken to eliminate all sources of error.

X-ray. We have still another means of making a diagnosis, which is of itself often sufficient, and at other times helpful, namely, the *x*-ray, but in affections of the stomach we should never rely on an *x*-ray examination alone, as it may mislead us. It often, however, clearly shows the presence of ulcer, and tumors of the stomach, and in our experience it has occasionally shown gall stones in the gall bladder, or appendicitis, when ulcer of the stomach or pylorus was clinically diagnosed.

Such, then, are the means at our disposal of making a diagnosis, and the longer we study diseases of the stomach, the more frequently we resort to the use of the stomach tube, and call the *x*-ray specialist to aid us.

We shall discuss briefly the different diseases of the stomach under the classification of Strümpell: **Classification.**

I. Acute Gastric Catarrh—Acute Gastritis.

II. Chronic Gastric Catarrh—Chronic Gastritis.

III. Phlegmonous Gastritis—Purulent Inflammation of the Stomach.

IV. Ulcer of the Stomach.

V. Cancer of the Stomach.

VI. Anomalies of the Secretion of Gastric Juice—Achylia Gastrica, and Hypersecretion of the Gastric Juice.
   1. Achylia—Anacidity—Achlorhydria.
   2. Hypersecretion of gastric juice:
      (a) Dyspepsia with hyperchlorhydria.
      (b) Dyspepsia with hypersecretion of gastric juice—continuous flow.
      (c) Periodical (intermittent) hypersecretion (gastroxynsis).

VII. Abnormalities in size and position of the stomach—motor disturbance of the stomach.
   1. Abnormality in size of the stomach—atony of stomach.
   2. Abnormal position of stomach—gastroptosis.

VIII. Nervous Dyspepsia—Gastric Neurasthenia.

ACUTE GASTRITIS

For brevity I will discuss acute, subacute, and chronic gastritis together, as the two former often run into the latter.

Etiology. In a mild form this affection confronts the doctor probably oftener than any other disease, because the stomach is more exposed to insults than any other organ of the body. The most common causes are irritation from food imperfectly masticated, excessive in amount, too hot or too cold, or perhaps infected, tainted fish, meat, unclean milk, or alcohol, especially on an empty stomach. Infection of the stomach from the discharge that has been swallowed from infectious foci in the nose and throat is not so infrequent as one thinks, although the hydrochloric acid of the gastric juice usually prevents this by its antiseptic action.

Symptoms. The symptoms will vary, according to the cause, from the simple feeling of discomfort or fullness in the stomach, loss of appetite or craving for highly seasoned food, or slight dyspepsia, to the more severe symptoms with nausea, vomiting of food, mucus, or even blood, pain, slight or severe, belching, or rumbling; typhoid-like symptoms—chilliness, headache, dizziness and stupor, with slight elevation of temperature—are not uncommon, and are often described under the caption of gastric fever.

Senator described some very severe cases, with marked symptoms of vomiting, intense headache and great muscular weakness, accompanied by extreme nervousness, in which the acetone breath was apparent, and the strong reddish color of the urine produced by adding ferric chloride to it demonstrated the presence of diacetic acid, and assigned these symptoms to auto-

intoxication. We have had several such cases, to which I will refer later.

The treatment hangs upon the cause. In the mild cases mere abstinence from food for one or two days, clearing out the bowels by an enema when necessary, and then beginning gruels and milk, diluted with Vichy or lime water one day, to be increased the second day with eggs, toast, cooked fruit, and so on, until a full diet is reached.

For poisoning with caustic acids or alkalis, although vomiting has usually been exaggerated before the doctor sees the patient, lavage of the stomach should be the rule, then an antidote should be given. (For excellent antidotes see Kemp's Diseases of Stomach, page 187.) One can readily remember some of the most common and available. For corrosive acid, we can use chalk saleratus, washing soda, soap suds, olive oil, milk and eggs. For corrosive alkalis, use vinegar, lemon juice, butter, olive oil, lard. For oxalic acid, use wall plaster or calcined magnesia. Plenty of water should be drunk, followed by milk or oil as a demulcent.

There are so many causes of gastritis that one has, first, to remove the cause; second, to allay the various symptoms in the way that seems applicable to the individual case, *i.e.*, (a) vomiting in one instance by lavage, when bile by reversed peristalsis has been continually brought into the stomach. The lavage should be followed by calomel and an enema. We use for lavage warm salt solution, or milk of magnesia in water; (b) when vomiting has been excessive without bile in the vomitus, we give morphia subcutaneously, abstinence from food for twenty-four or more hours,

Treatment.

allowing cold Celestins Vichy or hot water, in doses of 1 dram to 1 ounce every few minutes until the appetite returns; (c) pain, except in poisoning, is usually mild, and relieved by a hot water bottle, but when severe the anodynes just alluded to are necessary; (d) appetite when lost should be restored quickly; by giving the stomach a day or two of rest from food, with tablespoonful doses of water, or a mild alkali every half hour during the day, and a night and morning enema of warm salt solution, then teaspoonful doses before meals of some vegetable bitters—quassia or gentian—in a few days will usually restore an appetite. Often, however, the latter is due to constipation, when laxatives or enemata are all that is necessary. When due to nephritis or cardiac incompetency it is often very difficult to cure, since relapses so frequently occur. On the other hand, excessive appetite should be restrained by giving food six times daily instead of three, and a diet in which the proportion of fat is rather high.

CHRONIC GASTRITIS

Chronic gastritis may follow an acute catarrh of the stomach. This is the most common form of gastritis, and is an inflammation of the stomach causing an increase of mucus secretion, and modifying the amount of the digestive juices, thus inducing dyspepsia. Among the most common causes are excessive smoking, chewing tobacco or cigar butts, and the habitual use of alcohol and drugs. It is often secondary to acute infections, like typhoid fever, pneumonia, and most chronic diseases, both of the stomach itself—cancer, ulcer, etc.—and of other organs—cirrhosis of the liver,

and heart, lung, and kidney diseases. It is also a troublesome complication of gout, diabetes, severe anemias, and leukemias. Therefore, it can be readily seen that probably nearly everybody has acute or chronic gastritis several times during life, and so it is not strange such a large proportion of a doctor's patients complain of dyspepsia, one of the most common symptoms of gastritis, though the term has unfortunately been used as synonymous with the disease. Etiology.

The essential features of this inflammation vary according to its intensity: (1) simple catarrhal swelling of the mucous membrane, increased secretion of mucus and excess of hydrochloric acid; (2) a more active inflammation involving the muscular wall of the stomach, often leading to considerable hypertrophy; during these active processes we may often get benign stenosis of the pylorus, and consequent dilatation of the stomach; (3) in still other cases, or a later stage of the above, the interstitial becomes hyperplastic and a degeneration of the muscular layer follows, atonic dilatation ensues, and finally we have, (4) atrophy of the mucosa—atrophic gastritis with *achylia gastrica*.

Now, it is so easy to confuse a case of active intense inflammation of the stomach, accompanied with hyperchlorhydria, gastralgia, heartburn and pyrosis (relieved by soda), faintness and hunger, two to four hours after meals, intermission of attacks, *with ulcer of the stomach*, or to confuse a case of atrophic gastritis, with its absence of, or low amount of acidity, accompanied by dilatation and stenosis of the pylorus, *with cancer*, that it is always necessary to examine these patients carefully with the stomach tube and *X*-ray, never forgetting to examine stools for occult blood, before

making a diagnosis, and even then it sometimes happens that a positive diagnosis cannot be made. The physical examination will, however, with the rational history, determine the proper treatment. If there is found an excess of mucus and HCl, the stomach must be washed out every morning before breakfast with warm soda water, one or two drams of the bicarbonate of soda to one quart of tepid water, or salt solution with the soda added, until no mucus returns in the wash water. At the end of lavage, if the patient suffers with constipation, a dose of Epsom salts or Pluto water should be given through the tube before removing it.

Treatment.

Alkalies.

In severe cases of long standing, when there is a good deal of tenacious mucus in the stomach, it is advisable to give equal parts of bismuth subnitrate, magnesium usta and sodium bicarbonate one-half hour to one hour before the lavage, since the alkali disintegrates the thick mucus which then clings to the bismuth until dissolved or washed out. If for any reason it is not desirable to resort to lavage the above alkalis should be given one hour before meals. In severe cases lavage should be done daily before breakfast, in milder cases once or twice a week only.

Lavage.

Mineral waters.

Patients who are constipated and secrete a large amount of mucus, should be given a course of saline and alkaline waters, and for the well-to-do class a visit to the Spas is advisable, if a competent private advisor can be had, otherwise it is dangerous. When not practicable for patients to go away from home the Carlsbad salts and our own Congress water are good representatives, and can be alternately given on rising in the morning. The mucus is removed and the con-

stipation cured, while the appetite immediately improves. This course of mineral waters or their salts should be continued from three to six weeks. When there is marked hyperchlorhydria and no mucus, we should lessen the secretion of HCl by giving olive oil and fats before and during the meal, and even then we may need to give the bicarbonate of soda after the meal to still the pain. This soda treatment is often called for, also to allay heartburn and acid belching in cases of gastritis, accompanied with dilatation and motor insufficiency, which leads to the formation of lactic, butyric, and acetic acids, which rise in the throat or mouth, with an acrid sour taste—"sour stomach" well named by the patients. Obviously this treatment is only palliative, and the cause of the fermentation must, if possible, be found and cured.

If the cause of the insufficiency and dilatation is due to muscular atony, lavage should be done, and tonic doses of the tincture of nux vomica given, 5 drops, to be increased daily by one drop, until 10 or 15 drops are given, three times a day, and then the dose should be decreased one drop each day, until the original dose is reached. This course of gymnastics for the stomach muscles can be repeated with great benefit, and the top limit exceeded each time, as is recommended in gastroptosis. In most of these cases the atonic dilatation is secondary to some perversion of nutrition and blood dyscrasia, as seen in gout, nephritis, cardiac disease, and severe anemias. Every effort must be made to improve the blood condition, by open-air life, good appetizing food pushed to the limit of toleration by giving six small meals daily, and such tonics as arsenic and iron.

Hygiene.

Doubtful cases.

Sometimes it will be impossible to decide whether we are dealing with a severe case of hyperchlorhydria—acid gastritis—or ulcer of the stomach. What are we to do? It is our custom to treat the patient medically, not surgically, for ulcer. For the past two years we have used the Sippy diet, slightly modified when necessary, to adapt it to the individual case. This method is given at length under the medical treatment of ulcer. The fact that these patients recover so quickly, and remain well without recurrences, leads us to believe that they suffer with hyperchlorhydria, and not ulcer, but since a diet similar to the above is equally good for either affection, it should obviously be used. Moreover, in either case it will be necessary to use considerable soda or magnesium, with bismuth, to neutralize the excess of acid and mitigate the pain.

PHLEGMONOUS GASTRITIS

This affection is so rare, and the dietetic treatment so purely symptomatic, that no time can be given to it in this volume.

Diet therapy: (1) Tell the patient what to eat to get well.
(2) Tell him what to eat to continue well. (Prophylactic.)

Diet.

At first, in mild cases, the patient should be fed upon milk, one glass with one ounce of lime water every three hours during the day until bedtime; eggs—soft boiled or coddled, toasted bread or crackers, oatmeal gruel, boiled rice, macaroni or spaghetti, meat broths, fruit juices; later soft, well-cooked vegetables and meat should be gradually added.

In the severest cases, unless the patient is very much exhausted, it is well to have him fast for one or two days, and then give koumiss, zoolak, or skimmed milk, egg albumen, or beef juice for two days more, when the whole egg and toast, with oatmeal gruel, and vegetable soups should be added. This can be given for one week, when cautiously, pure milk with lime water, well-cooked, soft vegetables—potato, squash, spinach, cauliflower, onions, carrots, small beets, asparagus, boiled veal, lamb and chicken, light fish, and well-cooked fruit should be added. In cases with large secretion of mucus, much cream and fats, of course, should be avoided, and in all cases of gastritis all alcohol should be interdicted. As a rule it is better to give daily six small meals than three full ones. **Severe cases.**

The prophylactic treatment is by far the more important, since this disease is bound to recur under the most trivial causes, such as slight indiscretion in times of eating, postponing the time of meals on Sunday one-half hour to one hour, or eating a full meal at noon when it is the custom to take it at night; eating when over-fatigued, or very hungry, which always means eating too much. Indigestible food should be avoided, like raw fruit; coarse vegetables, such as uncooked celery, cold slaw; fried foods, salads with oil dressing, or fat meats, and cream soups; alcohol, particularly cocktails, and liquors on an empty stomach; very hot and very cold drinks, strong tea, coffee, and condiments; a bountiful meal, especially when the stomach is dilated or atrophied. The drinking of one or two glasses of water just before the meals distends the stomach and dilutes the gastric juice, which may already be under normal. In fact, the habit of **Prophylaxis.**

drinking more than one glass of water at one time should be prohibited, and no water allowed until after the meal is finished.

ULCER OF THE STOMACH

Variability of symptoms.

The symptoms of ulcer of the stomach vary perhaps more than those of any other organic disease, except cancer. A patient may have hemorrhage for his first symptom, or he may have a slight acid dyspepsia for short periods for several years, with intervals of complete freedom from stomach trouble. The more severe attacks may include hyperchlorhydria, pyrosis, epigastric pain (mild or very severe), vomiting soon after meals, and in some instances hematemesis. Not infrequently the stools contain occult blood. Sometimes a small mass can be felt in the epigastrium, which points to an old ulcer, with hard, irregular borders. Some of these ulcers may exist for years, during which time they are latent and may give rise to very little trouble, unless a blood vessel is eroded, or a partial or complete stenosis occurs at the pylorus. Vomiting may then become copious and frequent. The loss of blood and frequent vomiting, and loss of flesh which must ensue will often be diagnosed as cancer by the doctor, and it will require careful analysis, together with an *x*-ray examination, to make the differentiation. Because of the multiplicity of symptoms in this affection, and the great resemblance to several other diseases of this organ, and to gall-bladder disease, I have tabulated side by side the chief symptoms of these various diseases (see p. 198), putting in italics those symptoms upon which most reliance is to

be placed in making the diagnosis, and after we have exhausted all our means of diagnosis there may, in rare instances, still be some doubt. This is particularly true in some cases of hyperchlorhydria without hematemesis or melena, when the *x*-ray does not show evidence of ulcer; in nervous dyspepsia; in some cases of cancer of the fundus without involvement of the cardia, and in some cases of old ulcer with tumor and stenosis of the pylorus, with anacidity. One should remember in all cases of ulcer of the stomach or duodenum, when the diagnosis is not clear, the possibility of a chronic recurrent appendicitis, even though there has never been a history of pain or muscular spasm in the appendix regions, should be considered. In not a few instances have we been surprised, at operation, upon our own cases of ulcer, to find no evidence of the latter, but a chronic appendix instead. Surgeons frequently report such experiences. It is important that we should learn to differentiate between these affections, since most ulcers should be treated medically, while all cases of chronic appendicitis should be operated. At best, as William Mayo has said, one cannot possibly diagnose all cases without an exploratory incision. He calls such cases surgical, and says an operation is always indicated.

Chronic recurrent appendicitis.

Exploratory laparotomy.

Since duodenal ulcer usually occurs within three-quarters of an inch of the distal surface of the pyloric ring, and as about two-thirds of the cases diagnosed as ulcer of the pyloric end of the stomach are really duodenal ulcers, according to the classical work which Dr. E. A. Codman of Boston has done on this subject, and for the very reason that one cannot always be positively differentiated from the other, it is proper to

Duodenal ulcer.

consider the treatment of duodenal ulcer in the same chapter with ulcer of the stomach.

I was never more impressed with the extreme difficulty of differentiation of these two affections than while present at a clinic of the Mayo Brothers in Rochester, Minn. Several medical and surgical men after listening to a patient's history diagnosed the case as that of either a gastric or duodenal ulcer—probably the latter. Dr. William J. Mayo made the diagnosis of *surgical disease* which required operation, and suggested that we might find an impacted stone in the cystic duct. The operation showed his wisdom, as the cystic duct was found impacted with several small stones, and no ulcer of either of the above organs existed. However, in many cases the diagnosis of duodenal ulcer can be safely made. Leube emphasizes the point of hyperacidity of the stomach as facilitating the diagnosis of stomach ulcer. The pain in duodenal ulcer is apt to occur later than in ulcer of the stomach—one and one-half to two hours or more after meals, and has been called hunger pain.

Hunger pain.

Now, as the pyloric end of the stomach—which may, for all practical purposes, include the first inch of the duodenum—is very small and subjected to the greatest irritation, and is also kept active by the existence of the ulcer, and by the acid content of the stomach passing over it, we can readily see that an ulcer of the duodenum may exhibit only characteristic symptoms of ulcer of the stomach. This was well illustrated by Dr. Codman recently in a specimen which he had just resected from an old man's duodenum. The ulcer was just outside of the pyloric ring, and about the size of a quarter of a dollar. Dr. Codman

said that a rational history of an ulcer of the stomach of at least forty years' duration was obtained in this case. Hence, the dietetic therapy of duodenal ulcer must be essentially that given in gastric ulcer at the pylorus. Especial care should be taken to reduce the acid secretion of the stomach and make the food of such a kind as will cause the least possible irritation in passing through the duodenum. To this end magnesia usta or soda are often administered, one and one-half hours after meals.

Hyperchlorhydria.

For the past few years it has been our custom to treat all cases of hyperchlorhydria in which ulcer cannot positively be ruled out, as if it were ulcer, for a week at least, when if it is not ulcer it is cured, and the diet can then be made liberal, with fat and protein predominating.

Ulcer and cancer.

In studying the table of symptoms of ulcer and cancer, one must recall many symptoms of cancer which are not enumerated in the table, such as metastases, heredity, anemia, cancer and old ulcer, dysphagia, when the cardia is involved, phlegmasia alba dolens of a leg or arm, and consider carefully the character of each symptom, especially the onset of the disease, the time of vomiting and character of the vomitus, the more constant yet not as severe pain in cancer, and in ulcer the long periods of freedom from pain. Belching is common in cancer and rare in ulcer. The blood examination in cancer often shows low hemoglobin, low red count, and increased white count. Examination of the contents of the stomach after a test breakfast, if ulcer is present, frequently shows increased HCl, which is more often diminished or absent in cancer. An *x*-ray may settle the diagnosis. After

all, these extremely serious cases are very important to accurately diagnose, since practically all should be operated if the diagnosis is ulcer. Most cancers at this late stage should be let alone.

Indications for operation.

In deciding when to operate a moderately severe case of ulcer of the stomach or duodenum, we endeavor to settle several questions:

1. Has there been serious hemorrhage?
2. Is there stenosis, with stasis?
3. Has the general health become much impaired?
4. Has the ulcer existed a long time?
5. Is the man engaged in active business, and often laid up for several days by acute attacks?
6. Have there been attacks of local peritonitis (local pain, tenderness, muscular rigidity, nausea, vomiting, and constipation).

Any one or more affirmative answers to these questions will lead to operation. Negative answers, on the contrary, will warrant our first trying medical treatment.

Medical treatment.

The drug treatment of ulcer of the stomach consists in alkalis to relieve hyperacidity, when it exists. Cases of stenosis of the pylorus with marked stasis may require resorcin, or even HCl, and lavage should be tried unless there has been recent hemorrhage. The tincture of belladonna should frequently be used to lessen the secretion of HCl. The best alkalis are magnesia usta and soda bicarbonate, and they should be combined with bismuth, as indicated below.

Diet.

The diet therapy for this affection has been greatly improved during the past few years. Following Pawlow's teaching, we give fats to lessen HCl secretion, and avoid giving any irritating food to cause its

excessive secretion, and after a few days we begin to add such foods as will use up the HCl in their digestion. The patient should, therefore, be fed often, and when fasting, if the stomach still secretes acid, it should be aspirated with a stomach tube to remove the surplus.

There are several excellent plans well adapted for the above purpose, and I shall give here only three, each of which we have found well adapted to individual cases; first, Leube's; second, Lenhart's; third, Sippy's.

Leube's Diet

First three days:

7 A. M.	150 c.c of milk.
8 A. M.	150 c.c. of milk.
10 A. M.	150 c.c. of milk with strained barely water.
11 A. M.	150 c.c. of milk.
1 P. M.	150 c.c. bouillon with peptone preparation.

Fourth to eleventh day:

7 to 9 A. M.	300 c.c. of milk.
11 A. M.	300 c.c. of milk with barley, rice, or oatmeal water.
1 P. M.	One cup of bouillon (200 c.c.) with a beaten egg.
3 to 5 P. M.	300 c.c. of milk.
7 P. M.	Milk with barley water.
9 P. M.	300 c.c. of milk.

Eleventh to fourteenth day:

7 to 9 A. M.	300 c.c. of milk, two crackers, softened.
11 A. M.	300 c.c. of milk with barley water.
1 P. M.	200 c.c. bouillon, one egg, two crackers.
3 P. M.	300 c.c. of milk, one egg.
5 P. M.	300 c.c. of milk, two crackers.
7 P. M.	Milk with barley water.
9 P. M.	300 c.c. of milk.

[illegible]

[illegible] [illegible]

[illegible] [illegible] 30 grams. [illegible] [illegible] 300 c.c.

[illegible] 300 c.c. of milk.

[illegible] 300 c.c. of milk [illegible]

[illegible] 300 c.c. of milk with cream.

[illegible] 300 c.c. of milk.

[illegible]

[illegible] [illegible] 30 grams. 300 c.c. of milk.

[illegible] 300 c.c. of milk, [illegible] 30 grams. [illegible] 30 grams.

[illegible] 30 grams. [illegible] 30 grams. [illegible] 30 grams. [illegible] 30 grams. [illegible] 300 c.c.

[illegible]

[illegible] 300 c.c. of milk with [illegible] 30 grams. [illegible] 30 grams.

[illegible] 300 c.c. of milk.

[illegible] Diet

after haemorrhage

1st day	Eggs 2.	Milk 200 c.c.	
2nd day	Eggs 3.	Milk 300 c.c.	
3rd day	Eggs 4.	Milk 400 c.c.	Sugar 20 grams.
4th day	Eggs 5.	Milk 500 c.c.	Sugar 20 grams.
5th day	Eggs 6.	Milk 600 c.c.	Sugar 30 grams.
6th day	Eggs 7.	Milk 700 c.c.	Sugar 30 grams.
	Raw scraped beef 35 grams.		
7th day	Eggs 8.	Milk 800 c.c.	Sugar 40 grams.
	Raw scraped beef 70 grams. Milk cooked with rice 100 c.c.		

At first eggs and milk are given ice cold, and in teaspoonful doses.
Bismuth is given in large doses the first few days.
Diet gradually increased.
Patient kept in bed two weeks.

Sippy's Diet

1st day. Heavy cream 1/2 ounce.
Milk 1/2 ounce every hour during the day.
I. { Sodium bicarbonate 15 grains / Bismuth subcarbonate 15 grains } with each feeding.
II. { Light oxide of magnesium, grains 10 / Bismuth subcarbonate, grains 15 } 1/2 hour after each feeding.

2nd day. Heavy cream 1 ounce.
Milk 1 ounce every hour.
Powders same as first day.

3rd day. Heavy cream 1 1/2 ounces.
Milk 1 1/2 ounces every hour.
Powders same as first day.

4th day. Heavy cream 1 1/2 ounces.
Milk 1 1/2 ounces every hour.
1 egg.

5th day. Heavy cream 1 1/2 ounces.
Milk 1 1/2 ounces every hour.
2 eggs.

6th day. Heavy cream 1 1/2 ounces.
Milk 1 1/2 ounces every hour.
2 eggs.
Helping of oatmeal or other soft cereal.

7th day. Heavy cream 1 1/2 ounces.
Milk 1 1/2 ounce every hour.
2 eggs.
Extra helping cereal.

Treatment following hemorrhage.

Beginning with first day aspirate the stomach one and one-half hours after the last feeding to remove surplus gastric secretions, and, if necessary, in another one and one-half hours aspirate again. This operation is continued each night until only a normal amount of gastric secretion is obtained, with normal acidity. Diet is then gradually increased as conditions warrant.

N. B. The gastric condition returns to normal ordinarily in ten days to two weeks. The patient is kept in bed usually at least three weeks.

If we see the patient immediately after his first

hemorrhage, we keep him in bed from three to six weeks, and after feeding him per rectum for two days, in order to allow the clot of blood to become organized, we begin liquid food by the mouth. During the first two days, he is given the usual high nutrient enemata of beaten eggs and peptonized milk at long intervals, having previously taken care to irrigate the bowel with salt and water. During these two days the patient may be given bits of ice to dissolve in his mouth, and cold water to gargle his throat.

Modified Sippy diet.

The past two years we have used the Sippy diet, with slight modifications, and found it most excellent. It has been our experience that the diet should be continued a little longer than is his custom, or Lenhart's. We have not often found it necessary to aspirate the acid at night. Should the patient not show very marked improvement in three weeks on the Sippy diet, we advise operation. Devonshire cream (clotted cream) may be substituted for pure cream after the first week, a part of the time. The change from this diet to the regular diet should be very gradual, and when well established, olive oil may be given in tablespoonful doses before each meal, to lessen HCL secretion. In case of severe hemorrhage, feeding by the mouth should be omitted for two days, and rectal enemata given two or three times daily, except in cases of duodenal ulcer, when they should be omitted. For a long time all irritating food should be avoided.

Suitable formulæ for rectal enemata are given below:

Leube's:

I. 300 c.c. of milk.
   6 grams of peptone.
   300 c.c. of milk.
   60 grams of starch.

II. 300 c.c. of milk.
3 eggs.
3 grams salt.
40 grams starch.

Boas' Formula:
250 c.c. of milk.
2 yolks of eggs.
A small quantity of salt.
1 tablespoonful of red wine.
1 tablespoonful of Kraftmehl (health flour).

Ewald's Nutrient Enema:
2 or 3 eggs mixed with a tablespoonful of cold water.
A little flour is boiled in 1/2 cup of 20 per cent. dextrose solution and allowed to cool.
Add a wine-glass full of claret to this solution.
Stir in the egg solution and fill mixture up with water to 250 c.c.

Singer's Formula:
I. 125 c.c. of milk.
125 c.c. of claret.
2 yolks of eggs.
A little salt.
A dessertspoonful of Witte's peptone.

II. 250 c.c. of milk.
2 yolks of eggs.
2 tablespoonfuls of claret.
A pinch of salt.

III. Egg and milk enema.

250 c.c. of milk.	170 calories.
3 eggs.	200 calories.
3 grams salt.	....
	370 calories.

	Ulcer of stomach	Nervous gastralgia	Cancer	Hyperchlorhydria	Cholelithiasis
Age	20 to 40	16 to 50	30 to 80	After 10	After 38; rare under 25
Sex	Women oftener	Women oftener	Men oftener	Men oftener	Women much oftener.
Epigastric pain	Intense from a few minutes to 2 hours after meals. More rarely when *stomach is empty.*	Irregular doesn't depend on food; relieved by pressure. Several days without pain.	Pain less intense but continuous, rarely free from pain; local *tenderness.*	Pain 1 to 2 hours after food. Often relieved by protein food, or soda.	Pain — *paroxysmal* — independent of meals, in pit of stomach or gall bladder, through to back and back to front. Alkalis do not relieve it. Pain attacks patients in perfect health.
Appetite	*Good*	Variable	*Poor as a rule,* with at times marked exceptions.	Too good	*Good, except during attacks.*
Temperature	*Normal*	Normal	*Slight variations, of* 1/2 to 2 *degrees,* with *chilly sensations.*	Normal	*Often a chill, with* 1 *to* 3 *degrees of fever.*
Belching	*Absent*	Often present	*Present,* with *bitter, sour* taste with *disagreeable odor of breath.*	None, as a rule.	Negative.
Regurgitation	Often present; *water brash, pyrosis.*	Common	Present	*Water brash* and *pyrosis.*	Negative.
Vomiting	Soon after meals	Irregular	*Not as a rule, until* the *cardia* or *pylorus is involved.*	Rarely, and then due to hypersecretion.	May occur with the chill and pain.
Hematemesis	When present may be fresh blood or coffee grounds—occult blood.	Negative	At frequent intervals or not at all; coffee grounds rarely.	Negative	None.
Melena	Often present	Negative	Rarely	Negative	None.
Tumor	*Rarely*	Negative	*Often.* Uneven, hard, tender, movable.	Negative	None.
Secretion	Hcl *increased; lactic acid* —O.	Usually absent	Hcl *lessened* or *absent; lactic acid present.*	Increase of HCl	No change.
Perforation	May occur	Absent	Very rare	Absent	
Complexion	May be pale and anxious	Pale	*Sallow. Cachectic.*	Normal	*Occasional jaundice.*
Blood	No change	No change	*Moderate leucocytosis, eosinophilia.*	Normal	*Leucocytosis, increase of the polynuclear cells.*
X-ray exam	*Positive in most cases*	Negative	*Shows a tumor if one has formed.*	Negative	*Shows gall stones in a large percentage of cases.*

CANCER OF THE STOMACH

Cancer and ulcer.

This disease, according to the Mayo Brothers, has its origin in gastric ulcer in about 36 per cent. of the cases, and Moynihan raises the percentage as high as sixty. The age of the patient when it most commonly appears is between forty and seventy, in three-fourths of the cases, according to Welch of Johns Hopkins, heredity plays some rôle in its etiology, inasmuch as the disease has often been observed in three or four members of one family. Williams cites four cases in Napoleon's family—father, brother, and two sisters. The disease often runs its course with classical signs, such as pain in the epigastrium, not only after eating but quite constantly, belching with a sour bitter taste, vomiting of imperfectly digested fermenting food stuffs, more or less rapid loss of weight immediately preceding without a previous history of dyspepsia, cachexia, hematemesis, melena. Examination of the fasting stomach contents shows lactic acid, Oppler-Boas bacilli, and yeast cells, and after the test breakfast, absence of HCl and pepsin. A palpable tumor in the epigastrium may be felt.

Classical signs.

Conflicting evidence.

In such cases one says it is easy to diagnose cancer of the stomach. However, symptoms almost identically the same can be found in an old ulcer of the pylorus, with hypertrophied cicatricial borders, causing almost complete pyloric stenosis, with marked dilatation. The same is true of a chronic gastritis which has led to hypertrophy of the muscular walls of the stomach with stenosis and dilatation. But perhaps the most frequent mistake in diagnosis is made in confusing the early development of cancer of the stomach with nervous dyspepsia, since the only symp-

is the time of all others to accomplish most in the way of treatment. If cancer can be ruled out and nervous dyspepsia in a neurasthenic established, all source of alarm in the patient can be quieted at once, and the proper method of treatment exhibited to cure the symptoms quickly. On the other hand, if cancer can be early diagnosed, especially before the mechanical function of the stomach is disturbed, and before metastasis has taken place, the prognosis is much better as to the duration of life, and cases of cures extending over a period of five to seven years have been reported by reliable surgeons. Unfortunately, as a rule, the diagnosis is not made until one or both orifices are involved, and the motor and secretory functions of the organ are impaired to such a degree that the vitality of the patient is too low to undergo the shock of a capital operation, and metastasis has almost surely taken place.

Confusion of achylia and chronic gastritis.

Perhaps achylia gastrica and chronic gastritis are more often mistaken for cancer than any other affection of the stomach, save ulcer, which has already been considered, for two reasons:

1. They are most apt to occur at the same time of life—between 50 and 70.

2. They have so many symptoms in common. One should remember that achylia gastrica is often a symptom of chronic gastritis and of cancer, and that the two former affections have a much longer clinical history, and do not quickly develop a cachexia and such a marked anemia as does cancer. The examination of the contents of the stomach, the *x*-ray examination, or the finding of a nodule near the umbilicus, or in the supraclavicular spaces, a cardio-spasm, or a

therefore, the prognosis as to duration of life is much better, and indeed the chance of complete recovery very good, since a surgical operation is much more likely to completely eradicate the mass before metastases have occurred, and moreover much, or the whole, of the secretory apparatus of the stomach remains intact. It is, therefore, evident that the surgical treatment of cancer of the stomach is by far the most important, and the indications for operation are:

Indications for operation.

I. All cases wherever the disease is located, if the diagnosis is early made, and the vitality of the patient is not so low as to preclude a chance of recovery.

II. Whenever there is a doubt in the diagnosis of cancer, or the feasibility of operation, an exploratory should be done, and the nature of the operation depend upon the conditions found.

III. When there is almost complete stenosis of the pylorus, unless extreme age, complications, or failure to gain the consent of the patient prohibits, a gastroenterostomy often gives complete relief and prolongs life for several months.

Medical treatment.

Medical treatment should be aimed first, at supplying HCl when it is found that it is below normal, or entirely absent. This may be given in doses of 10 to 15 drops in a glassful of water during meals, or one hour after meals. I prefer the former method. Sometimes larger doses will be necessary; second, to relieve gas belching and regurgitation, which are due to the absence of HCl which is really the antiseptic and antifermentative of the stomach. Carbonic acid gas, hydrogen, oxygen, nitrogen, and sulphuretted hydrogen can be set free by fermentation, hence the amount of fermentation is a very fair measure of the

deficiency of HCl. And here again HCl and pepsin are called for in greater or less amounts, and are our best remedies. In cases of marked stasis, alkalis (magnesia, soda) and bismuth are called for to disintegrate and neutralize the tenacious mucus which is held by the bismuth until passed through the pylorus or vomited; third, pain should be treated with a hot water bag on the epigastrium, lavage (milk of magnesia in warm water), chloroform (10 drops in ice water), or tincture of belladonna in water, and finally codeine or morphine; fourth, the vomiting is best allayed by lavage with borax or salt solution, and when it is a marked symptom, as in stenosis of the pylorus, this

Hemorrhage. should be done daily; fifth, hematemesis is best relieved by an ice bag on the stomach, and the tincture of ferric chloride internally, and gelatin—10 per cent. solution—two teaspoonfuls every hour, and when very severe a subcue of morphine should be given at once; sixth, as tonics, condurango, Fowler's solution, tincture of nux vomica, and iron are often required, and are given in the order in which they serve us the best; seventh, constipation is often a very troublesome symptom of this disease, and must be treated by the diet, enemata, and by such remedies as tonic pills, phenolphthalein, A. S. & B., cascara, comp. extract colocynth, comp. liquorice powder, milk of magnesia, castor oil, and the various salines, frequently changing the cathartic. If the stomach must be spared we give the physostigmin sulphate, in 1/60-grain dose, hypodermically.

Diet therapy. Class I. The diet therapy resolves itself into three stages, according to the seat of the cancer and the presence of HCl.

I. When neither orifice is involved, and

(*a*) when the secretion of HCl and pepsin is about normal;

(*b*) when HCl is reduced or absent.

II. When the cardia is involved, and HCl present or absent.

III. When the pylorus is involved with hypochlorhydria or achlorhydria.

I. In many ways the first stage is the most important, since an early operation may save, or at least greatly prolong the patient's life, and if for any reason an operation is not sanctioned, a fair condition of health is often possible for quite a long time.

The diet should consist of a well balanced ration, avoiding raw and coarse vegetables, uncooked fruits, highly spiced foods, pickles, mustard, cayenne, alcohol, malt liquors, charged waters, and drinks containing syrups, and this is especially true in all three stages.

It is not advisable to keep the patient's weight much, if any, above normal, but to assist in every way the metabolism. This can be done by giving milk, eggs, fish, meat, cheese, bread and butter, well cooked vegetables and fruits, in three regular meals. The fluids should, as a rule, be given as a food, such as milk, cream, gruel, or beef juice. The amount of protein should be reduced in the case of hypochlorhydria, but not entirely cut out. The muscle fiber of meat can be avoided when necessary by grinding or dissolving it in cold water, and considerable protein can be given with eggs, cheese, milk, and other carbohydrates. Great care should be given to the selection of the meats with regard to the digestibility and the patient's

taste. The best are partridge, quail, duck, squab, veal, lamb, chicken, beefsteak. With these suggestions in mind one can easily prepare a non-monotonous diet for patients in the first stage (a and b) with the slight modification of protein necessary.

Menu for Cancer of the Stomach when Neither Orifice is Involved

BREAKFAST, 7.30 TO 8 A. M.

Cooked fruit—apples, peaches, pears, apricots, oranges, melons (if ripe), baked bananas, grapes, stewed plums, grape-fruit juice (one tablespoonful). Eggs—coddled, soft-boiled, raw. Fish—(broiled) sole, flounders, perch, brook trout, schrod, pickerel. Hash—meat and vegetable; breakfast bacon. Pulled bread, dry toast (with plenty of butter). Bees' honey. One glass of milk, pure or with cream added, or gruel, half milk, or weak tea or coffee.

DINNER, 12.30 P. M.

Raw oysters. Soups—vegetable purees with milk (rich milk or thin cream). Meats—as above, broiled, roasted, or braised. Vegetables—Irish or sweet potatoes (baked, boiled, or mashed), well cooked spinach, carrots, onions, green peas, tender string beans, boiled rice, green corn, parsnips, beets, white turnips, artichokes, tomatoes (without the skin) raw or stewed, spaghetti, macaroni, cauliflower, stewed celery, asparagus, cranberries. Dessert—light puddings (junket, blanc mange, custard, apple pandowdy, berry tarts with Devonshire cream (clotted cream); toasted cracker and cheese (soft or crumbling). One cup of weak tea, or glass of milk or water.

SUPPER, 6 P. M.

A vegetable puree, when necessary, or a cup of beef juice with an egg. Stale bread or dry toast with butter. A large saucer of cooked fruit. One glass of oatmeal gruel (half milk), or one glass of whole milk.

SUGGESTIONS

Drink one glass of hot water at 6.30 A. M.

At 10.30 A. M. take one beaten egg with the juice of an orange, or one cupful of beef juice.

At 4 P. M. take one glass of orange juice and water, or lemonade, with the whites of one or two eggs.

At 9 P. M. one glass of warm milk or thin gruel.

Diet. Class II.

II. The diet for the second stage must be of such a nature as to be easily swallowed and non-irritating, avoiding very hot or cold as well as coarse food, but it is not necessary to omit the proteins, as there is often a fair amount of HCl present for some time, and until it disappears from the stomach meat should be ground up, or scraped, and given as well as all the other proteins, which may be given in a liquid or semi-solid form; hence the essential difference between the food of this class and the former consists in the preparation, so that it shall be finely divided or in solution, therefore more milk, cream, gruels, soups (vegetable purees), eggs, rice, spaghetti, macaroni, beef stews without the meat, beef, lamb, and chicken, fish and clam chowder (avoiding the fish and clams), oyster stew (without the oysters). Crackers may be rolled and put into the stews. Light puddings, as in the other class, can be taken, as well as fruit juice and well cooked fruit (without skins and seeds), toast (softened with milk or water). It is generally best to feed the patients six times daily, with either milk, eggs, cocoa, or gruel for lunches.

Diet. Class III.

III. When much stenosis of the pylorus is present, the patient must be fed on liquids and semi-solids, but, as Strümpell has shown, after repeated washings of the stomach, which as a rule contains an excess of lactic acid, free HCl is often secreted by the still active oxyntic cells, hence protein can be digested in the stomach, and if there is partial failure there the digestion will be completed in the intestine. Therefore, a

diet suitable for such patients can be similar to that of stage II, with a little more of the semi-solids, especially where the stenosis is not marked and the vomiting is slight. We should in all the cases of Class III also give HCl and pepsin in large doses during, or after, meals to lessen fermentation and aid digestion. In the worst cases of stasis without excessive lactic acid fermentation, fermented milk alone acts well, and indeed in this group it is well to give koumiss, or some other fermented milk, two or three times throughout the day. When vomiting is a troublesome factor lavage should be done, and a day or two of rest given the stomach; indeed the time may come when all feeding by the mouth is impossible, and nutrient enemata must be resorted to. A very good one consists of one glass of warm milk, the yolk of one egg, 2 ounces of liquid peptone, 5 drops of laudanum, and 15 grains of sodium bicarbonate.

ACHYLIA GASTRICA

This affection is known to exist only by the findings of the stomach tube. There is found absence of hydrochloric acid, pepsin, and rennin in the stomach contents one hour after the Ewald test breakfast.

Etiology. Among the many causes are, first, the organic chronic gastritis, undoubtedly the most common; arteriosclerosis, a quite common cause in our experience, especially in cases where the splanchnic vessels are seriously involved in persons over sixty years of age. With syphilitic cirrhosis of the liver it has occurred. It is also a symptom of cancer of the stomach, and very often an accompaniment of pernicious anemia, and indeed very often confused with these two

diseases. It may be secondary to diabetes mellitus, or an infectious fever. Cases have been reported in vegetarians (atrophy from disuse). Second, the simple functional achylia gastrica is the form which most interests the general practitioner, because it is the most common in his experience, and manifests itself by many of the ordinary symptoms of dyspepsia, like anorexia, feeling of weight in the stomach, nausea, and occasionally vomiting. Such symptoms are usually attributed to neurasthenia or psychasthenia, and indeed may often be due to these conditions, but quite as often a thorough examination will reveal the fact that there exists a gastroptosis, mucous colitis, or some other organic disease of which the achylia is only a nervous reflex.

Symptoms.

We have, then, in an etiological sense, two classes of achylia gastrica—the organic and the functional. The diagnosis of both can be made only by the analysis of the stomach contents after the test meal.

Treatment of Class I.

The treatment of the former class must be directed to the primary disease, and to the special symptoms, caused by the absence of the normal secretions of the stomach. If chronic gastritis is the cause, of course HCl and pepsin must be given during and after each meal (10 drops of HCl in a glassful of water, to be drunk during mealtime). Not only should the secretory power of the stomach be ascertained, but its motility and capacity also, since lessened motility and dilatation would suggest stenosis of the pylorus, and cancer, as we have already seen. We must remember, however, that atonic dilatation, with motor insufficiency, is not a very rare accompaniment of chronic gastritis, and may be found in achylia gastrica, and

Diet. must be treated with tincture of nux vomica, in ascending doses, arsenic, iron, etc. Such cases are often benefited by lavage two or three times a week. The meals should be small and frequent (five or six meals daily); they should consist of liquids and semi-solids largely, with the more easily digested solids, milk, gruels, broths, purees of vegetables, gelatins, eggs (coddled or soft boiled), rice, spaghetti, macaroni, potato (baked, boiled, mashed, or creamed), carrots white turnips, parsnips, asparagus, chopped spinach, chard, sweet breads; chops (lamb or veal), tender beef steak or minced meat, partridge, chicken; light fish (flounders, sole, etc.); stale bread, toasted bread, or crackers; cheese (cream, camembert, cottage, brie, gruyere); puddings (blanc mange, custard, bonny clabber, junket). Beware of salads, fats, and sugar when there is much dilatation with insufficiency, since they greatly favor fermentation, thus increasing the dyspepsia. If there is much loss of flesh a moderate amount of butter and a large amount of cream should be given. In some instances sugar should be tried, and if cane sugar causes fermentation try sugar of

Protein. milk. The protein is very much needed, though rarely craved by patients suffering with achylia. We should introduce it in such a form that the stomach can push it forward, so that the intestinal juices will completely digest it, even if it escapes the action of artificially added HCl and pepsin. We may give the protein as above in the form of meat, eggs, bread, whole or separated milk; fruit juices, prepared by pressing or grinding the fruit, should be given at least twice a day, and apples, peaches, pears, or apricots, when baked or stewed, and deprived of their skins

and seeds, once a day, to facilitate digestion and help maintain the normal reaction of the blood. The liquid food taken will usually furnish water enough, so that very little, if any, more will be craved or advisable.

The treatment of achylia, complicating cancer, or other diseases will be found under those heads.

Functional cases. Class II.

The treatment of the functional cases which so frequently come in middle life, and more often in old age, are the most important of all, because the most common, and they can, in many instances, be entirely cured, and in others greatly ameliorated. In the curable there is no loss of motility, although there may be complete achylia, but more often there is absence of HCl, with presence of pepsin. Many patients complain of very little save fatigue, loss of appetite, a slight looseness of the bowels, and distress in the epigastrium, with occasional loss of weight. Others of a severer type have belching, nausea and vomiting, severe pain, troublesome diarrhea, and rapid loss of weight. The former type requires boiled milk to control the diarrhea, and a well-regulated diet of a little protein and carbohydrate, and fat in considerable amounts, with HCl during or after the meals. In the severer type, with atonic dilatation, more care must be given to the diet, avoiding all coarse vegetables, fried foods, fats, pastry, alcohol, and strong tea, coffee, and condiments. More of the food should be in liquids and semi-solids, chiefly milk rich in cream and eggs.

Symptoms.

Treatment.

Diet.

The latter form is often a sequel to gastroptosis, or a part of a general splanchnoptosis, and it is surprising to see how rapidly such patients improve after

being built up in weight and muscle tone, as described under the section upon gastroptosis.

Food must.

In all cases of dilatation of the stomach, from whatever cause, we must remember to give food six times daily and not too much liquid at one time. We recommend such patients to be given one-half hour to two hours after each meal, with the hips high, to facilitate emptying the stomach. When atonic dilatation will not yield to rest, rest and forced feeding, a gastroenterostomy may give happy results providing there is no stenosis present.

HYPERSECRETION OF GASTRIC JUICE

As the acid of the gastric juice is largely HCl, this is the factor which most concerns us, and the small amount of organic acid is ignored. The total amount of HCl secreted during a test breakfast varies greatly in different individuals who are in good health, under the varied conditions of living at ease, or a strenuous life. Some persons secrete comparatively little HCl, showing an index as low as 20, or as high as 100 at the end of the test meal, and the average is usually put down as 60. This is called the total acidity, while the free HCl may be 40 or 50. Now, a patient may have a much higher HCl index and have no clinical symptoms, but when such symptoms do occur he has hyperchlorhydria. This term is applied to an oversecretion of gastric juice during the period of digestion. It is also not uncommon to find patients who have a continuous flow of gastric juice—hypersecretion—and free HCl is found in the fasting stomach. Unfortunately this condition has been called by some gastrosuccorhea. Rarely this flow may appear period-

HCl secretion.

Hyperchlorhydria.

ically or intermittently (gastroxynsis). It is better then to use only the two terms hyperacidity and hypersecretion in the above sense.

No doubt half of the persons with stomach troubles seeking aid of the doctor suffer with hyperchlorhydria, and the diagnosis is usually made without the use of the stomach tube because they are so common, but very often, especially in the case of hypersecretion, a mistake in diagnosis is made. Among the causes of hyperchlorhydria are great business strain, hurried eating, hot and cold drinks, alcohol, strong coffee, highly spiced food, pickles, tobacco—smoking and chewing—chlorosis, neurasthenia, cholelithiasis, gastric ulcer, calculus of the kidney, chronic appendicitis, etc. The symptoms of the mild attacks come on gradually; they appear one to two hours after eating, and less frequently on an empty stomach, in marked contrast to the pain of ulcer of the stomach. A sense of fullness, heat, or burning in the stomach is complained of one to two hours after meals, and a general feeling of soreness is felt in the epigastrium. Under proper treatment all these symptoms may readily subside, or they may develop into a very obstinate attack. Attacks may be severe from the beginning, accompanied with intense gastralgia, extending through to the back, up under the sternum, and even spreading out into the arms, simulating an angina pectoris. I have seen in consultation several such patients in which this confusion had arisen.

Etiology.

Symptoms.

Severe attacks.

Undoubtedly this kind of gastralgia is partly responsible for the origin of that ill-chosen term "pseudo-angina." The patients have acid eructations, pyrosis felt in the stomach, beneath the sternum, or in the

throat. Vomiting of strongly acid stuff with immediate relief, may take place. Attacks occur more often after small meals, because large meals take up the excess of HCl. Sometimes patients complain of a sense of hunger two or three hours after eating, when the pain is coming on, and find by experiment that taking food will arrest the attack. They also can still the pain by reducing the acidity by drinking a glass of water, or taking a little soda or magnesia. The symptoms of the severe cases are so similar to those of ulcer that one must use every aid to diagnosis, like the examination of the stomach contents for acidity, stenosis of the pylorus, blood, etc. The stools also must be examined for occult blood, and the *x*-ray specialist may often be able to settle the question.

Hunger pain.

Periodicity.

In this connection it is well to remember also that the severe attacks may last for days or months, and then let up for a short time, and return again, until after a while atonic dilatation takes place, probably from pyloric spasm, excited by long-continued irritation by the hyperacid contents. In such instances, as in all cases of dilatation, headache and mental depression occur, and contribute largely to make the patient miserable. However, in hyperacidity, *ectasia* is rare, and there really exists a hypermotility, and the stomach is found empty sooner after a meal than normal, a point to be considered in feeding the patients.

TREATMENT

We have three classes of cases:

1. The mild.
2. The severe.
3. The cases of hyperacidity with hypersecretion.

The keynote in the treatment of the three classes is, first, to take care of the excess of HCl—symptomatic; second, to lessen the secretion of HCl—prophylactic. Fortunately we can, in most instances, so plan our diet as to fulfill both indications. All kinds of protein food uses up an enormous amount of HCl, and *some* more than *others*. Fleiner demonstrated that egg albumen binds more free HCl than any other food. Among other proteins especially useful in this respect he advises boiled veal, beef, mutton, ham, pork, cheese, milk, cocoa. We have found that cold meats seem to act better than hot, as they do not stimulate an extra flow of HCl in the same degree that hot meats do. Milk, and all articles containing protein, can be utilized in our list, and given in much larger amounts than considered necessary in health, since neither carbohydrate or fat can utilize HCl. Drinking water and alkalies will help to neutralize the acidity.

Diet.

By feeding protein food often, every two and one-half to three hours, we can usually bind the acid so it will cause no discomfort. We must give all our food in the most digestible form, and avoid everything irritating and stimulating, like meat broths, alcohol, strong coffee, highly spiced food, mustard, cayenne pepper, pickles, rare roast beef, steaks, hot meats, and certain acids—lemon, vinegar; puddings, pies, ices, and sweet pastries.

Frequent feedings.

The prophylactic treatment is far the more important. Since Pawlow blazed the trail by his important discovery that fats lessen the secretion of HCl, we have had less trouble in controlling the amount of acid secreted. It has been our custom for several years

Fats.

to give such fats as are the best adapted to the individual peculiarities of the patient, *i.e.*, their weight and tastes. If they are under weight we give cream and butter, fat meats and fatty cheeses; if overweight we give olive oil, or glycerin, and certain meat fats not readily absorbed, being governed by the same rules as govern our use of carbohydrate in emaciation and obesity. Our aim should be to keep the weight of the patient fully up to normal, and even a little above if there is present a gastroptosis, or below if there exists an insufficient heart. A slight variation in the amount of carbohydrate or fat will readily accomplish this, and I am convinced that it is better, whenever gastroptosis or atonic dilatation with fermentation exists, to increase the latter and decrease the former if necessary, since we thereby lessen fermentation and facilitate emptying the stomach.

Body weight.

Some patients do better on three meals daily, especially mild cases with no dilatation or dislocations, while others of the same type, and especially those having the above complications, will do much better on five or six small meals daily. A menu suitable for a moderately severe case of hypersecretion of HCl, with slight atonic dilatation, acid eructation, epigastric distress, constipation, and headache ensues:

BREAKFAST, 7.30 A. M.

Two eggs, or meat and vegetable hash, or broiled fish with baked or creamed potato; two slices of dry toast, zwieback, or pulled bread, baked apple, peach, or plum (without skin or seeds), or the juice of one orange, or half a small grape fruit; one glass of whole or separated milk.

10.30 A. M.

One glass of milk, or one egg (white or whole egg); or one egg, cheese, or bread and butter sandwich.

Dinner, 1 p. m.

Cream or vegetable soup, or meat stew (especially good if patient is underweight); boiled meats (beef, mutton, veal, fowl); cold roasts; fish (fat or lean, as indicated) boiled or baked in cream; all well cooked vegetables, except celery, cabbage, yellow turnips. Certain raw vegetables, like the tender shoots of celery, young lettuce, and fresh water-cress are allowable. Vegetables to be chosen are new peas, string beans, cauliflower, green corn, chopped spinach with or without cream—butter should be used on vegetables. Crackers and cheese. One glass of milk and Vichy, equal parts.

4 p. m.

One glass of milk and Vichy, equal parts, or whites of two eggs, with the juice of one orange, or the equivalent of one Bent's water cracker and cheese (Camembert, cream, or Cottage), and one glass of water.

Supper, 6.30 p. m.

A vegetable puree, when not taken at noon, or raw oysters; cold meat, with baked or creamed potato; pulled bread, dry toast, or stale bread and butter; a large saucer of cooked fruit, as above, or stewed evaporated fruit, which is excellent and inexpensive; one cup of cocoa, or glass of water or separated milk.

9.30 p. m.

A glass of creamy milk, or separated milk, or milk and Vichy.

Suggestions

Drink one glass of hot water or Vichy one hour before breakfast, and one glass of plain water between 11 p. m. and 4 a. m., if awake. The aim should be to give at least 42 ounces of liquid daily, beside the soup or medicine taken.

Several choices of food are given to favor a gain or loss in weight and to avoid monotony, and one should always remember to give a coarse diet of the vegetables when there is no dilatation. On the other hand, when we have a severe case, with considerable dilatation or dislocation of the stomach, the diet must be mostly liquid, and very similar to that of gastric ulcer.

When the acidity is extreme, without dilatation, more water should be allowed, with meals and between meals.

All fruit should be taken after the meals, and without cane sugar, since the latter stimulates the secretion of HCl and favors fermentation.

Sugar of milk can be used, when desired.

Celestins Vichy only should be allowed, and no effervescing waters, for obvious reasons.

DRUG TREATMENT

With the above diet drugs will rarely be required in mild and moderately severe cases. In the worst cases, however, we shall be obliged to give alkalis, one to two hours after each meal, and occasionally during the period. When the stomach is completely empty of food on account of the presence of HCl in considerable quantity, it is necessary to aspirate the acid to relieve pain, or stop vomiting, as in ulcer of the stomach. To neutralize extreme acidity if constipation exists, magnesia usta is our best remedy. If it operates too much upon the bowels, sodium bicarbonate or subnitrate of bismuth should be combined with it. When no laxative is required, and there is not such extreme acidity, the soda alone should be used, but never when atonic dilatation exists, with fermentation. In the mildest cases one glass of Vichy, or 1/2 ounce of Phillips' milk of magnesia in a glass of spring water, is all-sufficient.

Alkalies.

Aspiration of stomach contents.

Belladonna.

One excellent remedy has not received sufficient attention by writers upon this subject, namely, belladonna. It is very valuable in cases of extreme acidity with severe pain, and should be administered just before meals, *i.e.*, one to two hours before the time of greatest acidity. This will greatly lessen the secretion of HCl, thus forestalling the gastralgia. It should be given in doses of 5 to 10 minims, before

one, two, or three meals, as necessary. This drug can often be discontinued after a few days, as the perverted nervous function, or habit, has been broken up. And just here I would like to remind the reader that glandular habits are quite as easily acquired as sphincter habits. One very familiar comes readily up in your mind—sweating.

ABNORMALITIES IN SIZE AND POSITION OF THE STOMACH

I. Size of the stomach—atony, dilatation.

The size of the normal stomach varies considerably in different individuals in health. In some persons it is very small, while in others very large. During one's growth, by full meals the capacity of the stomach may be increased without atonic dilatation, since muscular hypertrophy takes place as fast as necessary to compensate for the stretching of the muscular wall. Now, so long as the gastric muscle is sufficient to completely empty the stomach of a full meal within the customary time, atony or dilatation cannot be said to exist, hence the test for diagnosis. The capacity of the stomach can be found approximately by distending it with water or air, and then percussing it out. The lower border should not reach below the navel. The more exact method is to give a test meal, and after seven hours aspirate or wash out its contents. If any residue is found there is stasis; that is, obstruction or muscular insufficiency. A primary acute dilatation in health is rare, and occurs only after a large meal, or partaking of large draughts of water, beer, or other fluids, and the post-operative dilatation from anesthesia is familiar to you all. Such a

Capacity of stomach.

dilatation is usually relieved by vomiting or lavage, followed by a few hours of fasting. But acute dilatation during the course of a chronic gastritis, ulcer, or cancer of the stomach, because of atrophy of the gastric musculature, or stenosis of the pylorus, followed by chronic dilatation, is so common that we have come recently to regard with suspicion every case of stasis of stomach contents.

Dilatation.

Acute and chronic dilatation so often follow acute fevers—typhoid, pneumonia, anemia, and inflammatory affections of adjacent organs, causing adhesions to the stomach and duodenum—that stagnation does not always mean stenosis of the pylorus, cancer, or ulcer, but its cause should be earnestly sought, and one will never be satisfied with his treatment until the cause of the dilatation is discovered. It will quite often be found in the rational history that the patient has previously undergone some operation in the upper abdomen, since which time he has had dyspepsia, necessitating the greatest care in his diet to be able to live half comfortably. Quite recently I had such a case, operated by Dr. Charles L. Scudder for motor insufficiency, due to kinking of the duodenum by adhesions after a gall-bladder operation ten years before.

The cases occurring after acute fevers and anemias, and those dependent upon gastroptosis or displacement of the stomach from tumors of other adjacent organs, must be differentiated from each other for treatment. This is especially true since the former do not offer the same obstacle to treatment as the latter affection, namely, the pyloric stenosis. It should be remembered, however, that the former may be more

obstinate to treat, and are frequently incurable, except with the aid of a surgeon. The treatment should aim to eliminate the cause when possible. Of course, every severe case should be examined thoroughly with the aid of the stomach tube and by *x*-ray, and if an organic stenosis is found, an operation should be seriously considered. If not found, or surgical means are not feasible, all dilated stomachs, save those with ulcer, should be washed out to get rid of the fermenting residue, and prevent further dilatation. This relieves the pain and vomiting, and removes the mucus in chronic gastritis, and obviously this method is also suitable for some cases of ulcer, with marked stenosis. Lavage should be done before retiring, the remedies suggested for the treatment of chronic gastritis should be used, and the diet directed, first, to the relief of any coexisting disease—anemia, gastroptosis, ulcer, etc.—and second, to relieve the symptoms.

Treatment.

Lavage.

A menu suitable for an ordinary case of dilatation of the stomach, without stenosis, should at first be made up of liquids and semi-solids. The food should therefore be given six or seven times in the twenty-four hours, to avoid distending the stomach, and it should be so prepared as to pass readily out of the stomach: milk, boiled or mixed with strained oatmeal or other gruels, or diluted with water or Vichy; koumiss; cocoa; soft-boiled or lightly coddled eggs; strained vegetable soups—pea, tomato, potato, made with cream; beef juice; crackers can be powdered and put into the milk or soup. Any one feeding should not exceed 8 ounces of food. This diet is suitable also for chronic dilatation, with stenosis, except ulcer cases, and must be continued for a long time.

Diet.

After a few days semi-solids should be added, like porridge, boiled rice, spaghetti, macaroni, baked potato, blanc mange, tapioca, scraped beef, minced veal, veal and chicken soups. In two weeks or more the ordinary patient may be allowed a little dry toast, a small lamb or veal chop with baked potato, fruit juices, and baked or stewed fruit. Small meals six times during the day must be continued, and patients should be admonished to always stick to this régime. Many severe cases of chronic dilatation are very much emaciated, and can be greatly benefited by a properly fitted abdominal belt.

ABNORMAL POSITION OF THE STOMACH—GASTROPTOSIS

There are two forms of this affection:

Classification.

1. The congenital, with the long, narrow thorax, and usually a floating tenth rib and splanchnoptosis—the Habitus Enteropticus (Glénard).

2. The acquired—the causes being tight clothing and lacing, increased pressure by fluid or tumors of the thorax, lessened abdominal pressure, great loss of fat in the abdomen, tumors of liver, spleen, or other viscera, relaxation of abdominal muscles, frequent confinements, chronic anemias, dilatation of the stomach, frequent tapping of ascites, and the removal of large belly tumors. The diagnosis is usually made by inspection alone if the patient is thin, as in the standing position the flat epigastrium, with the pulsation of the aorta clearly in evidence, and the belly bulging forward below the navel, forms a picture not easily forgotten. In fleshy people these features are less apparent, and one needs to percuss out the

The "pot belly."

upper border of the stomach, which is always low in this affection, and the liver may often be palpated below the costal margin, when no heart disease exists. The right kidney is readily felt lower than normal, and if the stomach contains fluid the splashing sound can be obtained below the navel, in some instances marking the lower border of the stomach. When in doubt the stomach should be blown up with air, when both its upper border and the lesser curvature can be clearly seen. Should this method fail, resort may be made to the bismuth paste and *x*-ray examination, which also show the descent of the lesser curvature necessary to make the diagnosis of gastroptosis, since the lower border may be as low, or lower, in dilatation. It should not be forgotten that there may be ptosis of the stomach, even to quite a degree, without symptoms, but in severe cases there is often a ptosis of the liver and colon as well, and kinking of some part of the gut may occur, which would modify the symptoms materially. The symptoms of this disease must vary according to the degree and kind of displacement of the organs, and also with the neurosis which often accompanies it. This alliance is so intimate that it has led to much speculation as to the causative relation of either one to the other. It seems to us much more logical to deduce the neurosis from the displacement than the reverse. The symptoms, to be sure, are quite often similar to those of neurasthenia. There is present anemia, backache, faintness, easy fatigue, belching, and discomfort in the epigastrium, constipation as a rule, although rarely colitis, headache and general nervousness. Several of our patients complain of bearing down sensations, pains in the liver

Succussion.

***X*-ray.**

Accompanying neurosis.

region going around to the back; also of pains in the kidney region, and frequent micturition. Tachycardia is common.

TREATMENT

I. Prophylaxis. This applies only to the acquired form. Prevent tight bands of all kinds about the waist; give the parturient woman proper support by an abdominal belt before and after labor, not allowing her to leave her bed too soon. Some speak very highly of Rose's plaster strapping.

TREATMENT OF GASTROPTOSIS

1. Stimulate the abdominal muscles by sponging with cold water twice daily, and appropriate exercise of these muscles.

2. Increase the weight of the patient, and fit with a V-shaped pad to wear when erect.

3. Treat symptoms, such as constipation, diarrhea, dyspepsia, nervousness, etc., as they deserve. Some of them, at least, can be cured, and all of them may be relieved until the patient is built up. The vegetable bitters, arsenic, and iron are very useful for these cases. If the patient is much emaciated and suffers with dilatation as a complication, with a fear of eating because of the distress, we invariably put her to bed for four to six weeks. Lavage is indicated for the first week or so. Elevate the foot of the bed 9 or 10 inches, and begin on the same kinds of liquids as are recommended for extreme dilatation of the stomach. Continue these for a week or more, when semi-solids and solids are added to the diet. By the third week proteins, in the form of chicken, lamb, veal, duckling, fish, eggs, cheese, etc., are added.

Rest in bed.

Diet.

Fats, in the form of butter, cream and cheese, are steadily increased until the fourth week, when the patient has many more calories than necessary to maintain her body weight, and she gains rapidly. Coarse vegetables are added the fifth and sixth weeks. After the first week or two the patients have nothing to complain of except a fullness in the stomach after eating. It is best to feed these patients six times daily, and never large meals. It is not unusual to see them gain 10 to 15 pounds during the rest cure. After getting up they may wear a special corset, like the La Greque, making the pressure from below up, and leaving the upper part above the navel loose, or they may wear only the V pad, made to cover the lower abdomen up to the navel, with perineal straps.

NERVOUS DYSPEPSIA—GASTRIC NEURASTHENIA

Very little has been written the past five years upon the nervous affections of the stomach, when compared with the volumes upon ulcer and cancer of that organ. There can be no question that the internist sees ten cases of nervous dyspepsia to one of ulcer or cancer. The surgeon's interest, however, in stomach cases ceases when he discovers that there is nothing to be done surgically, hence the internist is too apt to infer that it is of little consequence whether he does anything or not. I believe that it is of very common occurrence that no attempt is made to analyze and classify these unfortunate cases, perhaps for the well-known reason that they present such a varied and numerous array of symptoms, practically all of which are known to exist in organic affections of the stomach, and also because very many of them get well

if let alone, but chiefly because of the want of some method of differentiation. It seems, therefore, practical, and not too exacting upon the time of the busy all-round practitioner, to have some sort of a classification of his nervous dyspepsias. Some such plan as the following may be of service: First, rule out all organic diseases of the stomach, including malpositions, etc., using the stomach tube and *x*-ray when necessary. Arrange under two classes all other affections of the stomach, whether of a secondary or reflex nervous origin, like the tabetic crisis, or the reflex vomiting of pregnancy, or a primary neurosis, bearing in mind the secretory as well as the motor functions of the stomach. Hypersecretion, hyperacidity, hypoacidity, achylia gastrica, hypermotility (the "peristaltic unrest" of Kussmaul), hypomotility with eructations or vomiting, may all have origin in some psychic cause.

Classification.

Class I. Those nervous affections which are secondary to diseases of the adjacent or remote organs through reflexes; also to the various diseases, like anemia, syphilis, la grippe, arteriosclerosis, etc.

Class II. The so-called primary nervous dyspepsias, or those due to some primary perversion of the secretory or motor nerve function of the stomach through the cerebro-spinal, or sympathetic nervous system. This class is made up largely of neurotics—psychasthenic, neurasthenic, and hysterical patients. Also the cases of nervous vomiting of tabes, meningitis, pregnancy, cyclic or periodic, habit. Spasms of the cardia are often due to a neurosis, and the same is occasionally true of pyloric spasm, although the latter is usually the result of ulcer or hyperchlorhydria.

Class I will receive very little time here, as the organic diseases from which the nervous dyspepsias arise are discussed in this volume elsewhere. However, I desire to call attention to arteriosclerosis affecting especially the splanchnic vessels, as a common cause of nervous dyspepsias of the first class, as it has not received sufficient attention in the literature upon stomach affections. By lessening the blood supply to the digestive organs it must of necessity modify their motor and secretory, as well as sensory functions. This cause of nervous dyspepsia may readily be overlooked when evidence of arteriosclerosis in other parts of the body are wanting. A high blood pressure, or an alcoholic history will often give you a cue, however. The treatment should be directed chiefly to the primary affection, and the alleviation of secondary nervous symptoms. About half of the number of daily calories needed should be supplied by liquids (chiefly milk and gruels), and the balance should be supplied by easily digestible carbohydrates, fats, and protein in this order of relative value. Special pains should be taken to prevent constipation. Class II is so comprehensive, and embraces such a large per cent. of all the patients visiting a doctor's office, that it seems necessary to pause and see what ails these individuals, and what can be done to relieve them. They are really very interesting if one will take the time to analyze their symptoms. What do they complain of? In one instance of bulimia. The patient is seized with a great desire for food, perhaps an hour after eating; there is a gnawing sensation in the stomach, and often fear and anxiety. In another, anorexia. There may

Symptoms in Class II.

be a complete loss of appetite for every kind of food, or a dislike for certain kinds. I see very many patients who are finnicky about their food—if a certain kind does not look right, or have an agreeable odor, they cannot touch it. Dislike for certain kinds of food after a while leads to a morbid fear of it, and little by little the custom of eating meat, fish, eggs, bread and butter, and, indeed, nearly every edible, in extreme cases, is given up, until the patient takes only milk for fear of indigestion. Often this habit is acquired by having some friend at the table who is a vegetarian, or a nervous hypochondriac, or an introspective dyspeptic. Still others have acquired this habit for fear of certain kinds of food making them fat, or developing cancer or some other disease. Now, these patients suffer with a feeling of emptiness and all-goneness, they are weak and have no endurance, no energy, and are often very anemic. As a rule they belong to the psychasthenic group, and get well by re-education and good, substantial food. Others complain of extreme sensitiveness in the nerves of their stomach, crawling sensation, heat and cold, beating (aortic pulsation), cramps, and upon further inquiry other symptoms of a neurosis are elicited.

ia. Gastralgia undoubtedly appears in neurotics, as a primary neurosis; also as a nervous reflex in pelvic diseases, especially of women, and in affections of many organs of both sexes. It is important to note that this pain differs from the pain of organic disease of the stomach, in that it bears no relation to the time of taking food, or the kind taken, whether indigestible or not, and it can be traced to some mental or psychic disturbance (common in hysteria).

Habit belching.

The author would earnestly call attention to the frequency of gas belching, and cardiospasm as a habit in the neurotic individual, and often the cause of a nervous dyspepsia. This is due in part to education. In infancy if the baby was apparently distressed below the diaphragm the mother immediately turned it over and whacked it on the back, and as it grew a little older she gave it a carminative tea, at the same time following it up with a personal demonstration of the most practical, if not always artistic, way of voluntarily causing the stomach and esophagus to contract with loud explosions, whether the organ contained any gas or not. Thus arose the confusion of the sound of muscular spasm with that of gas explosion. By this time the young boy or girl is further influenced by an older brother, sister, or school companion, and later by business associates, until they learn through a layman, druggist, or doctor, of some good remedy to bring up the gas, and then with joy practice with it, especially after the meals, when every normal individual has plenty of gas in his stomach, and can give the best exhibition of his art. This practice is continued until it goes on involuntarily. I have seen the habit arise also in patients with a facial, nasal, or laryngeal tic, naturally forming a part of that curious nervous syndrome.

It is only a step from gas belching and cardiospasm to habit, regurgitation, pyrosis, rumination and vomiting, and often by studying your patients you will discover this habit origin. We have seen several such treated for months by lavage and various remedies with the result of no improvement, but on the contrary an increase of their fears. After explaining the

cause of their habit to them they quicky recover, as a rule, except the cases due to spasmodic tic, which rarely get well. It is not wise to allow any of these patients to keep up a habit of taking drugs or placebos, since it suggests the idea to them that you are doubtful of your own diagnosis, and the re-educative plan fails. It is necessary to see these patients quite often—once, twice, or three times weekly, according to their intelligence and their strength of will. Whenever there is present a marked lowering of vitality, or a nervous prostration, arsenic, iron, or nux vomica may be of great service, and the reason for giving them should be clearly explained to the patient. The diet should be nourishing, with protein and fat predominating, and rest for a brief period may be useful. However, these patients as a rule are well nourished, and do not need any special change of food. They often need counsel as to regularity of time of meals, mastication, and drinking. They are apt to bolt, and drink too much liquid with their food.

Diet.

I am sure the number of these cases of habit spasm will grow upon one, if he has this point in mind when analyzing his nervous dyspeptics for classification.

Causes of the primary nervous dyspepsia.

In this chapter attention has been called to arteriosclerosis involving the splanchnic vessels as a source of a secondary nervous dyspepsia. In a somewhat similar manner we have a primary nervous dyspepsia due to a disturbance of the vegetative "nervous system" (Cohnheim). In other words, the sympathetic nervous system, particularly the abdominal branches, the splanchnic nerves supplying the abdominal viscera, are involved. The sympathetic nervous system,

though influenced by the cerebrospinal system, is not completely under the control of the latter, and one of its duties is to control and regulate the size of the arteries of the body, thus influencing the amount of blood going to the different organs and tissues. Therefore, it is easy to see how anything which disturbs or irritates the sympathetic nerves may disturb the functions of the organs to which those nerves are distributed; hence where an unstable equilibrium of these nerves exists we have a variety of nervous conditions, like hysterical vomiting, diarrhea, etc. Nervous dyspepsia, therefore, is stomach evidence of a general nervous condition. No morbid change has ever been demonstrated in the splanchnic nerves in this affection, and there always coexists a neurasthenia or hysteria.

Causes.

Among the most common causes of the condition are excitement, depression from death in the family, or other affliction, great care, fear of calamity, like loss of property, existing disease, epidemics of typhoid fever, influenza, tuberculosis, cancer, fright from any cause, accidents ever so slight, even a little jar received on a trolley car is quite enough to develop a neurasthenia or nervous dyspepsia. Among other causative factors may be mentioned diseases of any of the organs more or less under control of the sympathetic nervous system, like the sexual organs, men suffering with phosphaturia, spermaturia, and those who indulge in masturbation; while women with chronic organic ovarian and uterine disease usually are confirmed neurasthenics and suffer with nervous dyspepsia. Chronic constipation and diarrhea are also common causes. Nervous dyspepsia prevails in

psychasthenia to even a greater extent perhaps than in neurasthenia or hysteria. The symptoms of neurasthenic dyspepsia are so well known that time would be lost in enumerating all of them, if it were possible. The disease can often be diagnosed while the patient rehearses them. They differ from those of an organic disease of the stomach by their multiplicity, vagueness, and in that they are entirely subjective; also in the patient's anxiety to have the doctor understand the magnitude of each symptom, thus reiterating and exaggerating many of them. They are often accompanied with flatulency of the bowels, alternating constipation and diarrhea, or mucous colitis. These patients are invariably introspective, and react quickly to suggestion, quick to improve or grow worse. They are given to moods. Some cases are so mild they need no medicine, and no special diet. Some slight change of living, where there will be new subjects of thought, or removing them from a disagreeable kind of employment, or away from boorish companions is adequate treatment.

Another very common cause is living alone and doing one's own cooking. Often going into the country or city for a few days or weeks is quite enough for a cure. In moderately severe cases the re-educative treatment comes first, and for patients who have been overworked mentally, brokers, lawyers, doctors, travellers, and others, a brief period of absolute rest at home, or far better, in a good sanitarium, is very beneficial. When under-nourished they should be given a diet rich in protein and fats, with plenty of fruit three times daily, and carbohydrates up to the toleration point.

One class of patients suffer with nervous vomiting, with or without diarrhea, which recurs once or twice a year and lasts from one to seven days. This is often accompanied with severe headache, after which the patient is well until the next attack. This is the periodic vomiting of Von Leyden.

We have seen only a few such cases which resembled migraine. One patient, a female, forty-five years old, single, has been under our care for the last ten years. She consults us not oftener than twice yearly for such an attack, but in the meantime has headaches very often, for which she takes laxatives and fasts for a day or so, and is always very careful about her diet. The attack often begins with vomiting, which is soon followed by headache and diarrhea, and sometimes a headache ushers in the attack. Inside of twenty-four hours she is very ill, with rapid small pulse, and extreme exhaustion. The urine contains acetone and diacetic acid at the beginning of an attack, heart is normal, thyroid of normal size, no hysterical symptoms, no lues. For a number of years we treated her with rectal enemata of salt solution, 2 quarts twice daily, and Celestins Vichy by mouth, at first in sips and later in glassful doses, which acted better, as during the act of vomiting some of it passed into the duodenum. We were unable to arrest the attack in less than six or seven days, ten years ago, but more recently in one to three days. Some three years ago an examination of the urine showed acetone and diacetic acid for the first time, and it has been present in every attack since, so it was probably there before. The alkaline treatment for acidosis as first recommended by Dr. Hogan, was exhibited by my associate, Dr.

W. E. Preble, with a comparatively quick arrest of all her symptoms. This treatment must be continued until the urine has become alkaline, and remains so for several hours.

The formula of the alkali used is—

Sodium carbonate $Na_2CO_3 \cdot 10H_2O$	10 grams
Sodium chlorid	14 grams
Anhydrous dextrose	45 grams
Distilled water	1000 c.c.

Mix and set aside for evaporation.

Directions: Give 500 c.c. of this solution every four hours by rectum, introducing it with a very small catheter and funnel. Give no water by mouth, and give grapefruit juice freely, in small quantities.

She now recovers in two days. At the beginning of attacks morphine has usually been given, for the purpose of securing a much needed rest and avoiding the collapse. We could never see that it was effectual in aborting an attack. The same could be said of the bromides.

The cause of these attacks we have never been able to discover in this patient, or in two others whom we are watching now. Our patients, and those reported by others, have been undernourished, hence a strong nourishing diet, in which protein is in excess, with vegetables and fruit prominent also, is indicated. One case seen with Dr. L. M. Palmer of South Framingham, had a quite well marked arteriosclerosis, and probably the splanchnic vessels were seriously involved, as he derived great benefit from the use of sodium iodide, which should be continued three weeks out of four during the rest of his life.

INTESTINAL DISEASES

The intestinal diseases to be considered in this volume from a dietetic standpoint are the acute and chronic catarrhs, dysentery, constipation, appendicitis, and ulcerations of various kinds. The tumors involving the intestinal tract, either in its own structure or of the adjacent organs, will create symptoms which will readily suggest the proper diet.

Catarrh of the intestine may be acute or chronic.

ACUTE INTESTINAL CATARRH

Causes.

This is a short running affection usually caused by constipation, irregularity of eating, improper or uncooked food, taking cold, a previous catarrh of the stomach, some poison or toxin from faulty metabolism circulating in the blood (uremia), infection (malarial, typhoid, etc.). The chronic form is a result of the acute affection not being arrested, or of complications, ulcerations, etc. Many cases are chronic from the start, even before we can determine the cause, *e.g.*, those due to toxemia and infection, they are also very often due to diseases of other organs—heart, kidneys, etc. Usually the first objective sign is a diarrhea, although there may have been a feeling of malaise with headache for a few hours before, but as the diarrhea is the main symptom of the trouble from beginning to end and the subsequent manifestations are dependent upon it, we must carefully study them in order to understand what causes the diarrhea. This may be due to

Chronic form.

Causes of diarrhea in.

I. Irritating bowel contents.

II. Disturbance of the nervous system.

a. Irritation of the peripheral nerves supplying the gut.

b. Paralysis of the same.

c. Similar causes arising from the central nervous system, tetanus, etc.

d. Psychical.

e. Due to nerve reflexes.

III. Toxic agents in the blood, cathartics, carbonate of ammonia, acetone, etc.

IV. Infections—malaria, influenza, dysentery.

V. Acute inflammatory affections of the intestines.

VI. Stenosis of the intestines.

Let us study these causes a little in detail:

Diarrhea due to irritating bowel contents.

I. The contents of the bowels may consist of a large mass of coarse vegetables rich in cellulose, which is undergoing pathological fermentation, or of putrefying meat or other albumen. Either process will soon set up a localized catarrh which inflames that portion of the intestine and leads it to make an extra effort to expel its contents by increased peristalsis. Should it fail, the gut at that part is weakened. At this time the family physician is called in, and he may find, by palpation, the offending mass and administer a cathartic which may cause the bowel to make another stronger effort to expel it by a more powerful contraction, and when the part of the gut proximal to the obstruction is undergoing a series of clonic or prolonged tonic spasms the more distal portion is relaxed, and then our attention is called to two other symptoms, one, subjective pain, due to the increased peristalsis pinching the nerves in the muscles of the bowel; the other

objective, the peristaltic wave often seen through the thin walls of the abdomen; in fact, in some cases the contractions are so strong as to draw in the adjacent abdominal muscle.

Again, the bowel content may be too acid, as in cases of hyperchlorhydria, or too alkaline, as in achylia gastrica, favoring rapid development of gas. This gas is a powerful exciting agent of peristalsis. Intestinal parasites, tape-worm, round or pin worms, as well as trichinæ, may induce a diarrhea either by their irritation or by the chemical effect of their excretion.

Diarrhea due to disturbances of nervous system.

II. Anything which irritates the mucous membrane of the gut will stimulate peristalsis, while a vasomotor paralysis of the intestine leads to diarrhea by virtue of the enormous transudation of water through the vascular walls into the lumen of the gut, which sets up contractions to expel it. It is probable that the diarrheas arising from exposure to cold, from draughts upon the abdomen, wetting the feet or the entire body, may be explained in part at least through the nervous reflex, either stimulating or arresting peristalsis, oftener the latter, and then increased activity of the ever-present bacteria completes the second part by increasing fermentation and augmenting the gas content, which is one of the most active agents in exciting peristalsis.

Fright and great anxiety are quite sufficient to cause a diarrhea with copious watery stools. The brief recital of a case seen by the writer three years ago will illustrate this.

A prominent young professor, aged thirty-two, had just assumed a new position in one of our large colleges,

requiring him to lecture every morning at 9 o'clock to a large class of young men. Although scientifically well equipped, he feared that he could not do it, and worried very much over the matter. He tried writing his lectures and reading them, then only the headings, and finally speaking extemporaneously, but every method failed to give him a satisfactory mental poise to enable him to go through the hour. He was sent to me for a diarrhea which began every morning on awaking after he began to think of the lecture hour, and he would have two to four liquid stools before 9 A. M., occasionally accompanied with vomiting, and often had to leave the class room to evacuate the bowels. There were no more stools for the day. Nothing further to relate concerning his general health. No other symptoms of nervousness. Physical examination, negative. He was treated psychically according to the Oppenheim plan, and requested to continue speaking to his classes without notes daily. He very soon lost his fear, and his diarrhea ceased. A similar effect of fear is cited in another connection, in the chapter on Neurasthenia.

Diarrhea is common in neurasthenia, hysteria, psychosis, Basedow's disease, and migraine. In the latter affection I feel sure that diarrhea is much more common than is generally supposed; in fact, close inquiry of migrainous patients will elicit the fact that they have a severe diarrhea, or intestinal storm, as I prefer to call it, occasionally, which spares them headache. This fact furnishes the chief argument of those who trace the origin of this disease to auto-intoxication. Psychical, or better still, habit diarrhea is that form of nervousness which causes a desire

Psychical diarrhea.

to evacuate the bowels when near toilet facilities, a custom which also obtains among nervous persons, of going to the toilet at any or all times in the day to urinate, when from four to six hours is the normal period for relieving the bladder.

Recently a young man of twenty years was sent to me for a diarrhea which had persisted for months, in spite of thorough treatment with dieting, astringents and opiates. His father had had a similar trouble at times during his life. Upon inquiry it was learned that his diarrhea only occurred at such times as he was under some mental excitement or great emotion, *e.g.*, when he was going to a theater, an important reception, or for an automobile ride. The diarrhea was never accompanied with pain and the stool contained no mucus. The number would vary from one to five in a few hours, and were of the watery type. Physical examination, negative. The patient was a mild neurasthenic, and the habit was learned from hearing his father describe his own trouble. My patient was soon cured by re-education.

Diarrhea from reflex causes.

A diarrhea occurring reflexly is not rare in patients suffering with ulcers of or malpositions of the uterus, also from sexual abuses. Biezaicki calls attention to excessive smoking as a cause of nervous diarrhea. Nothnagel calls attention to a form which has all the characteristics of a nervous diarrhea but manifests no other symptoms of nervousness.

Toxic diarrhea.

III. Toxic agents in the blood will cause diarrhea; cathartics, acetones, uremia and other metabolic toxins, as well as the poisons of spoiled foods. Some of these may be quickly cured by proper treatment, while others are very obstinate because of the impossibility

of stopping the entrance of the poison into the blood stream. In chronic interstitial nephritis it is often impossible to prevent contamination of the blood with the carbonate of ammonia which keeps up a diarrhea.

IV. Infections are by far the most common cause of this disorder. They may be due to the malarial plasmodium, to the influenza bacillus, the ameba coli, Shiga's bacillus, or, indeed, that of typhoid, tuberculosis or syphilis, and many others. The bacilli are sometimes carried into the intestine through the blood and at others through the mouth. Miller and Baumgarten showed that bacteria swallowed with saliva may pass the stomach unaffected by the gastric juice and be evacuated per rectum unaltered, hence the sterilizing effect of the gastric juice cannot be depended upon. Buchner injected hypodermically a pure culture of the cholera vibrio into guinea-pigs and found the germs soon after in the bowel. Escherich showed that the upper intestine contained comparatively few bacilli, because the contents of the bowel at this part are often quite strongly acid, and are quickly diluted with bile, intestinal and pancreatic juice, and the passage of the fluid column is much swifter than in the cecum. *In fact, in the colon where the onward movement of the fecal column is much slower, and its content is alkaline, the proper conditions are favorable to bacterial growth.* Under certain conditions intestinal bacteria grow rapidly, certain kinds flourish in an acid, while the majority grow best in an alkaline medium, and, as we know, in certain stomach affections, like achylia gastrica, the chyme will enter the bowel as a strong alkali, and in ulcer of

Infections.

Bacilli in intestinal tract.

Conditions influencing the growth of the intestinal bacteria.

the stomach the chyme will be strongly acid. Moreover, the intestinal secretion, as well as that of the pancreas and liver, may be inhibited or increased, for some known or unknown reason, so that it is not difficult to understand that the action of the various bacteria will differ according to the variable chemical contents of the intestine. If certain kinds of bacteria are enormously increased, we shall have the fermentative or putrefactive process so augmented as to cause diarrhea. In this connection it should be remembered that "the small intestine is the chief organ of digestion and practically the sole organ of resorption of the products of digestion" (Taylor) hence a diarrhea arising from disease of this part of the intestine will require different treatment from that of the colon which takes no part in digestion and comparatively little in resorption.

Diarrhea due to catarrhal inflammation.

V. Catarrhal inflammations of the small and large intestine, singly or together, are a very common cause of diarrhea, and may arise from a great many conditions: impaction of scybala, indigestion, habitual constipation, intoxication, infections (colds, tuberculosis, dysentery, etc.), ulcers, tumors, cirrhosis of the liver, passive congestion from cardiac disease, arteriosclerosis, nephritis, etc. Fortunately ulcers are oftener located in the large intestine, low down, where they can be reached by enemas. Obviously the diet for patients suffering with ulcer will conform to the underlying disease, be it tuberculosis, syphilis, dysentery, typhoid, etc. In any case, it must always be as nutritious as possible, though bland. In the case of tumors or stenosis, the food should be such as leaves the least residue to go through the bowel and must be highly

Impaction a cause of diarrhea.

nutritious. Impaction is such a common cause of catarrh of the large intestine and diarrhea that we must dwell a moment upon it. It is usually the result of habit constipation, and stagnation leading to the formation of large quantities of gas, chiefly sulphureted hydrogen, causing distention of the bowel and other dyspeptic symptoms. This condition can be readily relieved by a full dose of castor oil, enema of suds, or both.

If much inflammation has taken place the diet for a few days should be liquid (milk, soups) and semi-solids.

When a tumor or ulcer causes a diarrhea it will usually not be difficult to locate the seat of the disease, whereas the part involved in a primary catarrhal inflammation is much more obscure, but can usually be diagnosed by a careful physical examination coupled with an examination of the stools. Often a microscopic study reveals blood, pus and mucus which points to a dysentery, ulcer or malignant disease, while the discovery of fat (gray color) suggests incomplete absorption of fat from failure of emulsification by bile, possible closure of the common duct, or pancreatic insufficiency. Oftentimes we find considerable muscle fiber and connective tissue microscopically which leads, if the stool is acid, to an examination of the stomach contents after a test breakfast.

Examination of the stool.

A yellowish-green color of the stool, and the higher up in the intestine the increased peristalsis begins, the stronger the evidence of an affection of the ilium, especially when the stools are quite lienteric, and take place early in the morning ('morning diarrhea'). Still we must not forget that "an ulcer or carcinoma of

the stomach may perforate into the transverse colon and cause stools of almost completely undigested food" (Nothnagel). Small pencil- and ribbon-like stools or stools passed in short pieces suggest spasticity of the colon and large quantities of mucus in clumps or strings or ropes points strongly to colitis.

The smooth, varnished, pulpy, spongy, soft stool locates it high up in the small intestine and the pea-soup character only needs mention. *Diarrhea due to extreme hyperacidity often follow at once upon the taking of food, and this* form should lead to proper treatment of the affection. Stomach and intestinal lavage with alkalies and an alkaline diet should be given, *e.g.*, milk and Vichy or lime water and vegetable purees for a few days, then the diet given for hyperacidity.

Dietetic treatment of catarrhal inflammation of bowel.

There will always be a large percentage of our cases of diarrhea in which the whole intestinal tract is involved in catarrhal inflammation. In such cases the cause, as we have just described, may be some toxemia, infection, or secondary to heart or kidney disease. These cases may be of short duration and frequently recurring, or they may be chronic and even incurable. The treatment should be directed first to the basal affections—to the elimination of toxins, bacterial infections, and to the relief of cardiac insufficiencies—and second to the cure of the diarrhea. Two quarts of salt solution or alum water should be given, warm, 2 or 3 times daily, by enemata until the symptom subsides. The diet in such cases is as follows: boiled milk at room temperature; lime water or Vichy may be added if nausea is present. Kefir, koumiss or yoghurt may be substituted for milk, or tea one-half or two-thirds milk,

arrow-root, rice, gruel, egg or beef albumen. If the cases are mild and of short duration they will recover in a few days with this diet without drugs, but when due to ulceration they will be chronic and a more nutritious diet must be gradually added, and the number of calories must be steadily increased, avoiding overfeeding. The fat and protein should be raised by giving 1/2 ounce of cream with the milk, tea or cocoa, junket, and cooked fruits, gruels and beef albumen and a little later dry toast with butter, soft-boiled or coddled eggs, scraped beef may be added to the dietary. Should there be an ulcer below the small intestine, broiled meats—lamb, chicken, beef—should be begun early and the diet be otherwise more liberal than when the site of the ulcer is in the small gut. In all forms of chronic enterocolitis when a faulty metabolism is well established, either as a cause or a result of the diarrhea, we should avoid all irritating food such as coarse bread, vegetables rich in cellulose, cheese, raw fruit, salty foods and cane-sugar, all effervescing drinks and any food that is found to produce flatulency; the latter may be relieved with carminatives in hot water. In some cases constipation will alternate with diarrhea; this should be relieved at once if possible by high rectal enemas of 1 or 2 quarts of water medicated with Carlsbad salts, 1 or 2 drams. If this fails, Carlsbad, citrate or milk of magnesia may be given in hot water by the mouth. Occasionally a short course of alkaline mineral water improves the appetite, cleans the mucous membrane of the gut, calls forth better secretion and facilitates absorption. In not a few cases we have secured excellent results when our patients were losing flesh and the diarrhea per-

sisted, by omitting all other food for a few days and giving milk containing lactic acid bacilli or yoghurt, and then while continuing the latter between meals, slowly returning to the former mixed diet. Of the medicinal remedies in common use for the above diarrheas, tannalbin, lead, bismuth and opium, I wish to emphasize the use of the latter drug in preference to morphia for the reasons given under the treatment of dysentery.

Drug treatment of diarrhea.

When the diarrhea is the result of stasis in the splanchnic veins, because of cardiac insufficiency, we should give at once a saline laxative, then cardiac tonics, and we much prefer small doses of opium, 5 minims of the deodorized tr. of opii three or four times daily; and if a good preparation of digitalis can be found, it may be of use. The case of course should be subsequently classed as a cardiac case, the treatment of which is considered in another chapter.

For the treatment of diarrhea in nephritis, Basedow's disease and nervous affections the reader is referred to the pages where these subjects are discussed. I rarely have occasion now as formerly to resort to the use of artificial foods, like condensed milk, Mellin's food, malted milk, plasmon and other valuable preparations, but I wish here to state that I can readily conceive of conditions in which they might be very helpful, either where fresh cow's milk or fresh meats and eggs cannot be obtained, are not well borne, or when we desire to increase the C. or protein elements quickly. With a little addition of condensed milk to the tea or coffee we can increase the number of calories considerably, while plasmon may take the place of protein.

One ounce condensed milk..... 94.1 calories
One ounce Horlick's malted milk.. 119.4 calories
One ounce plasmon (about)..... 84.6 calories

Calories in	1 gram	1 ounce
Total energy value of beef.....	1.96	55.50
Total energy value of lamb.....	3.09	87.80
Total energy value of eggs.....	1.30	37.00
Total energy value of cow's milk..	0.63	18.00
Total energy value of Eagle Brand Condensed Milk.	3.31	94.10

DYSENTERY

Dysentery is a term which applies to catarrhal or ulcerating processes going on in the colon or rectum (more commonly confined to the descending colon or rectum), accompanied by tenesmus, frequent stools containing mucus and blood. It is due to an infection of the ameba dysenteriæ, or the bacillus dysenteriæ (Shiga), plus some local predisposing cause as shown by Flexner. When it occurs sporadically it is usually benign, but when in epidemics it almost always is very grave. It is the former type which we see *here* most frequently, and the rectum and sigmoid are chiefly involved. This form is of short duration, eight to ten days, and usually ends in recovery. In the grave type the whole area of the colon may be in spots affected with ulceration and abscess of the liver and lungs are not uncommon. It often lasts for years. Prophylaxis should play the same rôle in this affection as in typhoid; constipation as well as diarrhea be avoided; drinking water and milk carefully inspected; and the alvine evacuations thoroughly disinfected.

Etiology.

Prophylaxis.

Treatment. A patient with dysentery should be put in bed with

a woolen band around the abdomen, or some warm application may be substituted where the former is irritating. The Shiga serum has not yet fulfilled our expectations in cases due to the Shiga bacillus, but when ameba coli is the cause quinine enemas are almost specific. When the exciting cause is unknown the patient should be given a saline enema, 1 to 2 quarts, to keep the bowel clean. It should be given after every loose stool to get the best results. In mild cases no other remedy is necessary, except the rare instances in which the lavage water does not reach as high as the seat of the disease, as in the ascending colon. In such a case our best remedies are as follows: calomel in 1/4 grain doses one, two or three times daily, or castor oil, 1 to 4 drams daily, or salines, ipecac in large doses (grs. 20–30). In the severe and obstinate forms of dysentery, coupled with the above irrigation, we always give quinine, nitrate of silver, or tannin. All enemas should be given warm to avoid too great peristalsis and if much pain or tenesmus is present laudanum may be added, which in this case should be given as hot as can be borne. If physicians would study more carefully the method of using and the effect of an enema upon this disease I am sure less medicine by the mouth would be needed. Much time is often lost by allowing tenesmus and frequent stools to continue, as food given under such conditions is carried through the bowel before absorption can take place, thus accounting for the great emaciation seen in this disease. This can usually be avoided by proper irrigation and the use of opium. Here it may be well to say a few words about opium, our best drug in intestinal as well as many other affections. It quiets

Shiga serum.

Quinine.

Calomel, salines, ipecac, silver nitrate, tannin.

Temperature of enema.

Opium.

the nervous system, allays peristalsis, reduces the number of stools, lessens the glandular activity, and enormously improves the mental attitude of the patient. Great caution must be exercised in the use of the drug. Rarely does the patient need a large dose, but clinicians all agree that it acts better when given by the mouth than hypodermically in the form of morphia. I usually give Squibb's liquor opii co. or the deodorized tincture of opii in 5 to 10 minim doses in a carminative, one, two, or three times daily as needed. Irrigation of the bowel must be kept up at the same time to prevent stagnation. The diet should be that which leaves little residue to go through the bowels and, until all blood and mucus ceases in the stools, it should be bland and non-irritating, so as to avoid exciting peristalsis. I have found milk alone, or with lime water, Vichy, arrow root, farina, rice or oatmeal gruel well cooked and thoroughly strained to answer well. Tea or acorn cocoa may be given with milk; milk may be peptonized; whey, koumiss, or Bulgarian milk tried; junket or bonny clabber allowed. Egg or beef albumen should be given. In the chronic stage, the diet should be more liberal, keeping in mind the avoidance of mechanical and chemical irritation. Some solids may be used and more fat should be given, purees of light vegetables which will not cause flatulency, dry toast well buttered, baked potato, the whole egg, a small chop or chicken broiled, well cooked fruits with cream in addition to the liquid foods of the acute stage. Some tonic as gentian and iron will often be useful in this stage to improve the appetite and aid digestion.

Diet in acute stage.

Diet in chronic stage.

TYPHLITIS, PERITYPHLITIS, AND APPENDICITIS

These affections may well be considered together, as they produce similar symptoms and, as a rule, begin with an appendicitis with the exception of typhlitis stercoralis.

Causes.

Appendicitis is *usually caused* by acute or chronic enteritis, fluid feces carrying bacteria into the appendix, resulting in catarrhal inflammation of that organ, and perhaps hard fecal impaction, swelling, dilatation, ulcer, stenosis, perforation, gangrene, etc.

Low mortality without operation.

Forcheimer calls attention, in his work on Prophylaxis and Treatment of Internal Diseases, to the fact that 95 per cent. of appendicitis cases in private practice get well without operation when under good medical care. He succeeds best with ice-bags over the groin and small doses of opium, with proper diet. Rarely does he need to use morphine. He calls attention to the fact that opium may mask the symptoms by reducing the fever and slowing the pulse even to normal. It may often be difficult to differentiate between acute and chronic typhlitis stercoralis, and appendicitis, and on this point Boas says the differentiation can only be made with the greatest reserve. Cohnheim defines the symptoms of an impacted cecum as follows:

Symptoms of impacted cecum.

1. Pain of a dull, stabbing or stinging character, extending up along the ascending colon, relieved by heat, escape of gas, or a bowel movement. The overlying skin is more sensitive to pinching than the impacted mass is to deep pressure.

Differential diagnosis.

2. A sausage-shaped tumor when constipation exists, which is absent if there is diarrhea.

3. Fever is absent or low.

4. The bowels are rarely constipated; more often there is diarrhea. The two conditions may alternate.

Bearing these points in mind, together with the blood picture of ulceration, perforating or gangrenous appendicitis, one will, in most cases, be able to differentiate the two affections.

Relief of bowel in impaction of cecum.

When there is no longer a doubt that the case is one of impacted feces, saline laxatives with glycerin should be given, together with rectal enemas. As a rule, this will cure the trouble in two or three days.

Treatment of an acute attack of appendicitis.

The treatment of acute appendicitis should be totally different. If the attack is quite sharp with high temperature, chill and perhaps vomiting, pain and muscle rigidity, it is best to give nothing to eat for two, three, or four days; indeed, until the temperature comes down to normal. The mouth and throat should be kept moist by frequent rinsing and gargling with water, but care should be taken that the water is not swallowed. Then milk and lime water should be begun and given lukewarm in very small quantities (a tablespoonful every half hour in the day and every two hours in the night) for the first twenty-four hours; if it creates no pain, on the second day the same may be given in quantities of two ounces every two hours; on the third day four ounces may be given every two hours, and the caloric value should be increased by adding two teaspoonfuls of cream to each feeding. After this, the milk should be increased to six or eight ounces, and one period may be skipped in the morning and in the afternoon and beef albumen substituted. One slice of dry toast with butter may also be added. After two or three days more the diet should be so modified that the patient is getting daily 1 quart of

Starvation.

Milk and lime water.

Solids in the diet.

pure milk, one baked potato, two eggs, one lamb or veal chop, a squab, a good milk soup (made with potato, barley, rice, spinach) with at least three slices of stale white bread or toast, with the inside of a baked apple or the juice of an orange. This may be continued for about a week, when the variety of food should be increased, meat stews, chops, steaks, roasts, fish of all kinds (in season), such vegetables as asparagus, cauliflower, spinach, all kinds of cooked fruit, and light puddings, custards, blanc mange, junket, and crackers and cheese (Camembert, Brie, cream, cottage). Indigestible foods and such as cause fermentation should be avoided. Small meals, with lunches between, should be the rule.

Treatment of the mild catarrhal attack.

All mild cases of catarrhal appendicitis, appendiceal colic, should not be given any food, or even water to drink, for at least two days, as they cause increased peristalsis which may light up an appendicitis when there previously existed only a slight irritation, and if it is a genuine attack the increased movement of the bowel magnifies the symptoms or even may cause perforation. This disease is of very short duration, and no one need fear the few days fasting until the danger is over. Moreover, the patient fed by the mouth would probably only imperfectly digest the food and the undigested residue would further increase the peristalsis and pain, and more opium would be required to control it.

Moving the bowels.

Next in importance to feeding by the mouth is the question of moving the bowels. The custom still obtains, I am sorry to say, of prescribing either salts and glycerine or calomel at the onset of an attack. Others prefer to accomplish the same by rectal enemas.

As a rule, either of these methods is decidedly bad, and the former should never be practised and the latter only when the rectum is packed with hardened feces which cause great discomfort. Under such circumstances an enema of suds or oil may be given simply to remove the fecal mass, as colonic flushing will operate in the same way as, or even worse than, a physic. Since the descending colon is usually in contact with the diseased ileocecal region, a violent peristalsis is set up by the enema as the experience of all clinicians confirm.

O. Löwe with Von Leube found in experiments on cats after rectal injections that the stomach, duodenum and jejunum remain quiet, while the parts near the ileocecal region and colon were greatly agitated and disturbed, causing violent peristalsis. One clearly observes this in the severe pain which usually follows enemas in this affection. It is most important that the bowels should not be disturbed during the acute stage; in fact, one object of the opium treatment is to keep the bowels quiet, hence the absurdity of giving laxatives or enemas.

Importance of rest for the bowels.

Diet in chronic appendicitis.

In chronic appendicitis the diet must be more liberal; that is, semi-solids and milk should be given freely from the beginning. Whenever an idiosyncrasy against milk arises, it may be allowed in the various forms mentioned elsewhere, or flavored with a little coffee or tea, or it may be peptonized, or koumiss or kefir may be substituted for it (see Typhoid).

Operation for recurring attacks.

In the recurring, as well as chronic cases of appendicitis, operation should be very strongly urged, unless other grave organic diseases contraindicate it. It is self evident that the perforating, fulminating and

gangrenous cases demand immediate operation. It is our custom to have all chronic appendices operated unless they are complicated by some other serious disease, also all patients in their first attack, who show a moderate leucocytosis—20,000 or evidence of a severe localized peritonitis of twenty-four to thirty-six hours' duration. If on the other hand the first attack is milder, we allow convalescence to become well established by waiting ten or twelve days and then have the appendix removed, providing two conditions exist.

I. The patient lives at a distance from a good surgeon.

II. The patient contemplates traveling. Otherwise we do not advise operation but watch our patient for symptoms of chronic appendicitis or adhesions and, if a second attack occurs, we follow the above plan for operating during the attack, or ten days after. Rarely has operation been necessary during the attack in our experience.

POSTOPERATIVE DIETARY

Diet immediately after operation.

During the first twenty-four hours after laparotomy, nothing, not even water, should be administered by the mouth. If the patient is in shock or collapse nothing would be digested or absorbed, therefore it would further jeopardize life. Opium or morphia should be given subq. for pain, collapse or shock, if needed. When the vomiting is excessive, lavage of the stomach should be done with milk of magnes. or borax water.

After twenty-four hours, clam bouillon, beef tea, milk (separated), may be given in teaspoonful doses, and after a few hours, in tablespoonful doses. If they

create nausea, the intervals should be prolonged to two or four hours, or hot water, flavored with a little salt, may be substituted. This will usually quench the thirst and allay the nausea. On the third day whole milk with lime water (3 to 1) and beef tea may be given in two ounce quantities and increased one ounce each time until three ounces are taken. Less lime water need be added each time. Beef albumen or gruels may be substituted twice during the day and bread or cracker crumbs may be added to the milk on the following day, with junket, bonny clabber, and a little cream.

Strengthening the diet.

This diet may be strengthened each day, providing no flatulency occurs. Should this symptom appear at any time, a rectal tube, inserted as far as possible and left in position, or an enema of hot peppermint water, will soon give relief, but the diet should at once be cut down to milk and lime water, broths, etc., until the symptom disappears, and then cautiously increased again. It will usually be found that too much carbohydrate has been allowed. Cane-sugar and food and drink sweetened with the same, like ginger ale, as well as vegetables which leave a large indigestible residue, should be avoided. Potatoes, baked or boiled, or whipped after they have been mashed, are very easily digested, on account of their low percentage of starch (being less than 1/2 of the bread and cereal usually given). Soft-boiled eggs are more readily digested than when raw. The usual egg-nog is far too rich for post-operative cases, and is much too often given after all abdominal operations. It is better to give the egg and milk alone rather than mixed. Aerated waters should not be allowed, because of the extra gas they

introduce into the stomach. Generally in ten days after an operation for appendicitis the simple solids may be given, as in a simple case of purely medical appendicitis.

CONSTIPATION

Probably physicians are consulted oftener for relief from constipation than for any other affection. Sometimes a patient gives a history of constipation from birth, another fixes the date of onset after an attack of typhoid fever, hemorrhoids, during pregnancy, or after a surgical operation involving the abdomen. Some complain of never, for months or years, having a stool without taking something to produce it, drugs or enemata; others that they alternate between constipation and diarrhea. They skip the movement two, three, or four days, and then have diarrhea with or without mucus. Others have one, two, three, or four very scanty stools daily—the total amount of all being less than one-quarter part of a normal healthy movement. Now as the latter condition has constipation really at its inception as an etiological factor, we shall consider it under this head.

Etiology.

Comparatively rarely we are consulted for acute constipation of a few hours' or days' duration, which readily yields, when due to impaction of feces in the rectum, sigmoid or upper colon to treatment by proper laxatives; if caused by volvulus, invagination, angulation, kink, etc., by surgery, hence the discussion of dietetic therapy here is not necessary for the purpose of this volume. The causes of acute constipation will not be discussed here. The reader is referred to the excellent works of Hertz and Gant on this subject which are sufficiently elaborate for the use of the sur-

Chronic constipation.

geon as well as the physician. We may therefore define chronic constipation as a condition of the bowels, from which fecal movements occur only when provoked by stimulation through medication or enemata.

Definition of.

The causes of chronic constipation are so numerous that only the most common and important will be briefly mentioned, as they clearly illustrate the theory upon which other causes operate to induce it. Practically all writers upon this subject make two distinct divisions. These may, for convenience, be arranged under two heads:

Causes of chronic constipation.

Mechanical causes.

1. Mechanical obstructions:

a. Those which arise within the bowel. Fecal impaction, stricture, foreign bodies, calculi from the gall-bladder, pancreas, or intestine, volvulus, invagination, hernia, tumors, deformity, displacement, angulation of the intestines, splanchnoptosis, enteroptosis, hypertrophy of the valves of the rectum, of O'Beirnes' rectosigmoid muscle, or of the sphincters, rectocele, piles, fissures, fistulæ.

b. Obstructions arising from outside of the bowel. Tumors and displacement of adjacent organs—liver, spleen, stomach, kidneys, pancreas, uterus, ovaries, which act first by obstructing the lumen of the gut through pressure, and later by exciting a catarrhal inflammation, also often by kinking, through the adhesions formed between the growth and the intestine. In the same manner inflammatory conditions after operations upon neighboring organs may cause adhesions which obstruct the bowel. Dropsy of the peritoneum or an ovarian cyst

when very large may force the bowels into one corner of the abdominal cavity and obviously cause obstinate constipation.

2. Non-mechanical causes:

Non-mechanical causes.

a. Congenital or hereditary.
b. Age and occupation.
c. Intestinal atony and loss of tone in the abdominal muscles.
d. Irregular habit of going to stool.
e. Improper diet.
f. Inflammations of the bowel, more especially of the cecum, sigmoid, and rectum.
g. Affections of the nervous system—hysteria, tabes, lead poisoning.

As the dietetic therapy for the group due to mechanical causes consists only of such food as will make the feces soft, this group will not be further discussed but attention is called to it here that we may remember the importance of making a *careful diagnosis* of the *causes of constipation*. It is well to remember that congenital causes like imperforate anus or stenosis of the pylorus, etc., are not uncommon and should be relieved by surgical operation. Many say the constipation may be inherited and trace it back to father, grandfather, and so on. I do not feel that this argument is conclusive, but am more inclined to think it is oftener acquired in infancy by *inattention* given the child toward *securing a regular habit of moving the bowel* and to *improper feeding*. The indifference acquired at this time is increased in early school life through false modesty and timidity, and often fostered by want of care on the part of teachers. Again, old age plays an important rôle in the etiology of constipation,

Constipation brought on through faulty habits in very early life.

Constipation in old age.

not only by the numerous diseases incident to that time of life, especially cardiorenal and vascular disease, stomach and bowel affections, which in women with old pelvic adhesion of sigmoid to uterus restrict the proper diet, and prostatic hypertrophy, but also because of lack of appetite they *consume too small and too concentrated meals* to have sufficient intestinal residue to stimulate the bowels to move. Persons of middle age who have given little attention earlier in life to their bowel movements, have, because of the great demands made upon them by their occupation, great temptation to defer the time when nature calls for a more favorable one which rarely yields satisfactory results. This is especially true of clerks, railway conductors, motormen, firemen, engineers, and others too numerous to mention.

Occupation as a cause of constipation.

Constipation due to loss of muscular tone.

c. Loss of tonicity of the intestinal and abdominal muscles. This arises from many causes—sedentary occupations with little if any exercise, obesity, as well as many different diseases which induce atrophy of muscle, lung and heart diseases, diseases of metabolism generally, pregnancy, habitus enteropticus, and especially common is the dilatation of the cecum, sigmoid and rectum. We have often seen the two latter pouches so distended with feces that we could quite agree with the German professor who said some patients use their sigmoid as a privy. Of course any catarrhal inflammation or ulceration of the bowel, as well as inflammatory conditions of adjacent organs, especially the pelvic viscera, may cause loss of tonicity in the muscle, will inhibit peristalsis and therefore weaken by disturbance of function. Another very common cause of loss of tone is the drug and enema habit. Many

persons have taken laxatives for years, or daily resorted to the use of enemas, which, usually taken warm, can easily have a very enervating effect upon the part of the bowel with which the water comes in contact and by constantly stimulating it higher up either leads to spasticity or loss of tone. Cathartics, which overstimulate and often cause catarrhal inflammation, aggravate the constipation.

Constipation due to irregularity in time of evacuating the bowel.

d. Irregular habit of evacuating the bowel. This I am sure is entitled to great emphasis, because it is undoubtedly by far the most common cause of habitual constipation. Habits good and bad are very readily acquired, but much more quickly in childhood than in middle or late life. Any careful mother or experienced nurse will tell you how easily a baby can be taught to evacuate the bowels at a definite time. Every adult knows that persistent inattention to the bowels is quite sufficient to form the bad habit of constipation, so

When nature calls at either door
Do not attempt to bluff her,
But haste away—be it night or day,
Or health is sure to suffer.

Constipation is often complained of by young school girls who have from timidity refrained from going to toilets in public places, or because the closets were unclean or unhygienic.

In many instances they fail to get the desired movement, because of the improperly constructed seats. The seats in most privies connected with schoolhouses are too high, as the proper position during the act of defecation is with the feet resting on the floor and the body bent forward, so that the abdominal

muscles may contract down upon the intestine aided by pressure from the muscles of the thighs, thus propelling the fecal column from the sigmoid into the rectum. This position also favors the action of the levator ani and sphincter muscles. The seats should therefore when too high be provided with footstools. Peasants who rarely use a privy seldom consult a doctor for constipation. Children are often sent to school in the morning before having a bowel movement thereby deferring it. Later if the desire comes, provided the pupil has the courage to ask permission to leave the room and it is gratified, he may succeed, otherwise the day is skipped. Another common occurrence is observed. A person will go to the toilet one day in the morning, the next at noon and the next at night. This will very soon lead to a habit of skipping a whole day, then two or three and so on, and then the next step is the use of drugs or enemas. There are many other causes which lead to the formation of this irregularity of going to stool, but they are too well known to demand discussion here.

Constipation due to improper diet.

e. Improper diet and insufficient liquid. Too much meat which is practically all absorbed from the bowel, and too little of vegetables and fruit, which leave a large residue, as well as too little fat which acts by virtue of the fatty acids and soaps into which it is changed in the alimentary canal is not an infrequent cause of constipation. *Sugar* is a good laxative and should often be added to the food. Again, from loss of appetite, fear to eat or some stomach or intestinal affection the patient does not take enough food or the right kind to stimulate peristalsis.

f. Inflammation of the bowel—colitis—especially of

the flexures—cecum—sigmoid and rectum cause constipation which may alternate with diarrhea.

Constipation from inflammatory conditions.

g. Affections of the nervous system—hysteria, brain and spinal cord disease, tabes, psychic disturbances. Grief, fright and anger often cause indigestion, vomiting and diarrhea or constipation by paralyzing both motor and sensory nerves, thus inhibiting secretion. In melancholic patients we often find the intestines packed with dry scybalous masses which can be easily palpated through the abdominal wall. Every physician knows how important an aid to good digestion is a happy and cheerful mind. The obstinate constipation of hysterical patients is such a common symptom that it is frequently mentioned as one of the stigmata of this disease. The bad habit of nervous patients of carrying a newspaper or book to the toilet to read deserves mention under this paragraph, for the muscles of defecation are partly under the control of the will and on this account all the attention at this time should be concentrated upon the act; in this way evacuation is much more liable to occur and will take place much sooner and thereby lessen the liability of hemorrhoids. Having considered some of the most important causes of constipation we are able to determine the kind. Authors generally agree upon two well recognized kinds of chronic habitual constipation—1. the Atonic; 2. the Spastic—and for purposes of diagnosis and treatment we find this division very satisfactory. In many instances spastic constipation is a sequel of atonic. Cohnheim says chronic constipation, except in the neurasthenic, always begins with the atonic stage, while Schmidt and Strasburger showed by their investigations that the beginning of constipation was

Constipation due to affections of the nervous system.

Two kinds of chronic constipation—atonic, spastic.

Theories of constipation.

not due to muscular weakness, but to too complete digestion and absorption of food in the intestine. As a result the intestinal bacteria had not enough food for their growth and could therefore not form gases, acids and other substances in sufficient quantity to stimulate peristalsis.

Lorisch found that on a three days' test diet the dried substance of the stools averaged 59.3 grams, while in constipation it averaged but 33.9 grams. This pointed to too perfect digestion and absorption. By giving opium to normal persons, which produces a condition simulating bowel atony, the watery elements of the stool were reduced while the dried substance was not altered. This would seem to show that lack of peristalsis cannot alone cause atonic constipation. It would seem sufficiently obvious that several of the above mentioned causes may coöperate to produce an atonic constipation, in which the essential elements are weak muscle, lessened bacterial growth and fermentation. It is likely that some neglect to respond to nature's call or some slight indiscretion in diet which led to a transient diarrhea, and made a cathartic necessary, marked the beginning, after which nature according to a well established law rested until a disagreeable fullness in the abdomen with perhaps some discomfort in the head occurred, or fear was aroused at the prolonged absence of the desire to go to stool, and a laxative or enema was resorted to. At the same time a constipating diet may have been taken to further prolong the symptoms. Such experiences, extended over a period of months or years, coupled with all sorts of diseases, such as anemia, malnutrition, heart, kidney, stomach and bowel affections, and ar-

Conditions which may bring about atony of the bowel muscle.

teriosclerosis, can readily induce such impairment of the blood supply of the intestinal musculature as to lead to its atrophy. Again, we have often seen hypertrophy of intestinal muscle in one part of the tract, while atrophy existed in another in the same patient. This is not uncommon after operations upon some portion of the intestines or an adjacent organ following which adhesions have tied up the bowel in one or more places. This may also be observed in old peritoneal adhesions complicating stomach or intestinal ulcer or tuberculosis of the intestines.

After a patient has suffered a long time with intermittent or constant constipation, he may begin to notice occasional mucus in the stool. This stage is often called the catarrhal; it is, however, reached long before the mucus is observed. This jelly-like mass is usually discovered first around a scybalum, then for a brief period the patient may have alternate constipation and diarrhea, and his only other symptoms are occasional distention of the bowels, flatulency, want of energy, fullness of head, drowsiness, lack of concentration, no abdominal pain or tenderness except in cases where there is an impaction and even then only when there is a fairly high grade of catarrhal inflammation around the mass. The scybala are naturally most common in the colonic flexures. This in time sets up great activity in Lieberkühn's glands, enormously increasing the mucus poured out into the lumen of the colon. Now if the retention of feces is maintained for a long time, the liquid content is absorbed, and the scybala become dryer and harder, and the mucus more and more stringy, the irritation of the intestines becomes so great that repeated contractions

Conditions and symptoms preceding membranous colitis.

upon it are set up, and the intestinal mucosa and muscles are further injured, tenderness and pain arise, and true colic and long, stringy mucus with hard dry fecal output stamps the onset of membranous colitis. This seems the most satisfactory etiological explanation of this affection, so often styled myxoneurosis. Ewald calls attention to the frequency of stercoraceous material stagnating in the ileocecal region, and setting up a high grade of fermentation, and after a time, unless dislodged, nature sets up a stercoraceous diarrhea. This condition I have much oftener seen as a result of such stagnation in the sigmoid and rectum. I suppose every physician has, by digital exploration, discovered a fecal mass as large as his fist filling the rectum. When the colitis reaches the stage of colicky pain and tenderness, with stools containing large masses or bands of mucus, the spastic stage of constipation has been reached. Now by what symptoms can the spastic be differentiated from the atonic? A careful differentiation between the two conditions should always be made, if possible, because the medical and dietetic treatment of each is almost diametrically opposite. Often the two states are combined, as Dr. N. B. Potter remarks in his translation of Ortner's book. He mentions particularly neurasthenic, hysterical and enteroptotic patients suffering with the combined conditions, and wisely calls attention to the use of belladonna and opium to allay the spasm; if they succeed we have to treat a spastic stage. Cohnheim gives several points which with a good rational history and a careful physical examination will make the diagnosis simple in most cases. These may be briefly stated as follows:

Spastic constipation.

Differentiation between atonic and spastic constipation.

Atonic Constipation	*Spastic Constipation*
1. Very common—it comprises the large majority of all our cases.	1. Is comparatively rare. Usually has a neurosis or lead poisoning as a basis.
2. Onset—slow, first stage may exist for a long time without objective signs, and with only a dull-feeling head and lack of inclination to work.	2. Onset—sudden, marked by colic with mucus in the stool.
3. Pain—in the first stage none. Neither flatulency nor meteorism. At a later stage, the mild catarrhal, there is often slight flatulence following the use of irritating food, vegetables, pastries, etc.	3. Pain—slight or very severe. Every form of chronic constipation with pain belongs to the spastic variety.
4. Laxatives and enemata are usually effective.	4. Laxatives to be effective must be given in very large doses. Enemata of little use.
5. Stool is of normal form and consistency, of large caliber, tubular with no excess of mucus.	5. Stool, ribbon-like or size of lead pencil, oftentimes cut off in short pieces.
6. Rectum is full.	6. Rectum empty or filled with feces as above described. Examining finger often feels the rectum contracting upon it.
7. Palpation often shows the sigmoid flexure and transverse colon to be full of feces.	7. Palpation may reveal sigmoid flexure and transverse colon as a hard cord, the size of the little finger. The colon is sensitive to pressure.
8. Mucus. Not in excess.	8. Mucus. Frequently found in form of membrane and brought to the doctor with the mistaken idea of tape-worm.

In doubtful cases Boas flushes the intestine with 1 or 2 quarts of water and examines the return lavage water for mucus. A rectal soap suppository will serve the same purpose. Cohnheim sums up by saying, "Constipation without pain indicates atonic constipation, while constipation associated with gas and mucous colic indicates spastic constipation."

It is well, however, as Strauss suggests, to make a careful search of the anus for piles, erosions, fissures, and entire intestinal tract for stenoses, ulcers or irritable conditions of the peritoneum which might excite reflex muscular spasm and thus cause the spastic form.

Treatment of atonic form of constipation by means of enema and cathartics.

The treatment of the atonic form of constipation must then follow along these lines:

1. To empty an overloaded rectum and colon.
2. To tone up an atonic muscle.

For emptying the colon, an enema of suds, of oil, or Epsom salts and glycerine is the best. When for any reason this is impractical, a dose of castor oil may be given and followed by 1-dram dose each of Epsom salts and glycerine in 2 ounces of cold water to be repeated every three hours, until the bowel is empty. After the last stool the bowel should be allowed to rest thirty-six to forty-eight hours, during which time the diet should consist of milk, koumiss or buttermilk, egg, beef albumen and cooked fruit, as such food leaves very little residue in the intestines.

Importance to treatment of knowledge of food taken in previous weeks.

Then we should begin our attempt to strengthen the weakened bowel, and at this point I must call attention to a very important part of the rational history. It must always contain an account of what the patient has eaten and drunk for several previous weeks as it frequently shows that the diet has been too bland, and perhaps insufficient in amount, leaving so little residue that the colon has received no stimulation; hence a slight change to a coarser diet with sugar will offer the intestine the stimulus it needs to develop its muscle, and cause daily evacuations.

Laxatives and enemas preferable to an increase in coarse food.

Should this, however, fail, as is indeed frequently the case, what is to be done? Shall we give laxatives and enemas, or shall we suddenly

increase the coarse food, making it consist largely of coarse vegetables, fruit and other carbohydrates and fat? I much prefer the former, for the reason that too rapid an increase of the vegetables is very apt to cause a weakened bowel to become dilated, with the excess of indigestible residue, above that under the former diet, and the consequent stagnation and fermentation sets up a catarrh which still further weakens the bowels. It is far better to use a laxative or enema for a few days, or in rare cases weeks, while we gradually and cautiously increase our laxative foods, *especially sugar*.

This method is unaccompanied with risks of any kind. The next question which must be settled is, which shall we use, a laxative or an enema? This will depend upon the physical signs and the doctor's experience. I prefer, if the rectum or sigmoid is loaded, to depend for some time upon enemas, and indeed, when the stasis is higher up in the transverse colon or sigmoid, I usually begin with irrigation through a long rectal tube, using the least possible force with a fountain syringe; should this fail, I begin the use of Epsom salts and glycerine, 1 dram each, every two hours for three doses, and then try irrigation again. The latter is rarely needed except in very old and obstinate cases. Small doses of castor oil may be used every three hours in some instances instead of the above. After the bowel is empty, 1 dram of the salts in 2 ounces of cold water before breakfast each day will usually suffice to secure the movement. If this is insufficient, we may give one teaspoonful of sodium phosphate or Carlsbad salts in a glass of hot water at bedtime, in addition to the morning salts; or cascara, or

Enemas.

Epsom salts and glycerine.

Castor oil.

Sod. phosphate. Carlsbad salts.

any of the simple laxatives may be given, *always in the smallest dose that will empty the bowel without purgation or exciting cramp.* In milder cases, or those in which the bowels have been made to move daily with either a physic or enema, I prefer often to begin with a mild laxative that has not been previously used, and change the laxative every second or third day, that the patient may not become accustomed to any one stimulant, and so cease to respond. When the atony affects only the rectum or sigmoid, aloes and belladonna with glycerine in a rectal suppository at bedtime will suffice, or a pill which causes a determination of blood to the rectum, such as aloes and belladonna, or the aloes and myrrh acts well for a change. I often advise 8 to 16 ounces of cold water enema after breakfast, for a few days, unless injections of some kind have been given for a long time. I wish to call attention to a fact that I think is not sufficiently well understood, namely, that cold water by enema acts as a tonic, while warm water lessens muscle tone, hence the form of constipation under consideration should not be treated by warm water enemas.

Aloes and belladonna or myrrh.

Effect upon bowel of warm and cold enema.

The temperature of the water for the rectum may be much colder than that necessary for irrigating the entire colon. We usually give 8 ounces of water at about 70° for a low enema and 2 to 3 pints at a temperature of 90° F. for a high one, as very cold water high up in the bowel may cause painful colic. Very hot high enemas, 105° to 110° F., are useful in allaying intestinal spasm and its accompanying colic. Alternating cold and hot enemas give immediate relief in acute proctitis when met as a cause of constipation. In the course of a year I see many patients suffering

with chronic constipation who have taken daily injections, usually warm, for one or more years, slowly but surely weakening the bowel and increasing the trouble. Now I do not wish to be understood to advise physic or injections for all patients suffering with chronic atonic constipation, but I do wish to go on record as *thoroughly believing that quite a large percentage of those addicted to the habit of taking drugs, or using enemas for a long time*, will recover much more rapidly and surely if they are given, as mentioned heretofore, one or both of these means of relieving the trouble for a brief period, while toning up their bowels and general health with all the other means at our disposal—a laxative tonic diet, fresh air, exercise of all kinds, certain gymnastics and abdominal massage, the use of the medicine ball, electricity and other well-known tonics for abdominal and intestinal muscles, cold baths in their numerous forms, drinking one-half glass of cold water in sips between meals (except in the arteriosclerotic, for whom hot water is better), attention to the proper hour, after breakfast every day, assuming the low position on the stool. One kind of exercise I have advocated for many years has so often effected a cure that I venture to suggest it here. The patient, while resting alternately each foot upon a bath tub or chair, is directed to go through the motions of sawing wood, effecting twenty strokes in each position. This should be done upon rising and repeated after breakfast each morning. This kind of exercise evidently empties the cecum and sigmoid, setting up general peristalsis. When the condition is complicated with heart disease, pulmonary or other affections, the treatment must be modified. If the

patient is lean, his weight should be increased; if obese, be reduced to normal.

Dietetic treatment of atonic constipation.

The dietetic treatment of the atonic form of constipation is the most important of all factors, because with proper diet alone we can cure some, and with the help of all the other means practically all of our cases. There will always remain, perhaps, 1 per cent. which will never be cured, usually, however, because the patients are too old when they apply for relief, and die before any method of treatment can be properly installed; or they have sufficient mechanical obstruction, bowel and abdominal paresis, or other well-known reason, so that a cure cannot be expected, and it is for this class of patients that laxatives or enemas are justifiable throughout life, and I am glad of this opportunity to say that patients may take certain simple laxatives under the direction of their physician for a great many years without fear of injury. Would that people were as fearful of dissipation in all its forms, gormandizing, outbursts of temper, as they are of a laxative. They would be happier and live longer.

The object of this diet is manifold:

1. It must be nourishing.

2. It should contain a large amount of cellulose, which leaves a considerable residue.

3. It should contain a good amount of fat.

4. Plenty of fruit and salt.

5. A moderate amount of protein.

I think all these points are well understood from the preceding pages, save possibly the use of fruit and salt. The fruit contains acids—malic, tartaric, citric, etc.—which as a whole act chemically, while some,

Action of fruit juices.

like plums, figs, grapes, apples, prunes, etc., act mechanically also to excite peristalsis, and by virtue of the sugar they contain, prevent absorption of water from the intestine, which keeps the column of feces soft. It should also be remembered that fruits contain 90 to 98 per cent. water, which serves to quench thirst and act as a diuretic and laxative. Sugar is also split up in the intestines into marsh gas and carbon dioxid, which further stimulates peristalsis. It can be pleasantly introduced by giving fruit syrups, marmalade, shrub, jams, fruit juices with water and in sauces; bees' honey acts similarly. The salt in most food, especially vegetables and meat, as well as that added in cooking and serving, acts also by drawing water into the intestines, and probably by increasing the patient's thirst and making him drink more. I would emphasize also the value of drinking cold carbonated waters on an empty stomach, cold buttermilk and light beer for their value in exciting bacterial growth and fermentation, which are great stimulants to peristalsis.

Sugars.

Salt.

Cold drinks.

The following list will be illustrative of the foregoing, and may be modified to suit individual cases:

Diet List for Constipation

BREAKFAST, 7.30 A. M.

Fruit—apples, pears, peaches, baked, stewed or raw, *stewed evaporated apricots*, shredded pineapple, *stewed prunes*, *berries of all kinds in season*, melons, grapes, oranges, *grape fruit*, mangoes; plain or toasted *triscuits*, *popped corn* with salt and butter or cream; eggs, boiled or poached, coddled or scrambled, every second morning; *breakfast bacon;* broiled chicken; veal or lamb chop; broiled honeycomb tripe; broiled fish (the fat fishes preferred—salmon, salt-water eels, herring, mackerel, bluefish); baked potato with extra amount of butter; bread—graham, whole wheat, oatmeal,

rye, bran (with butter); *strong coffee* (one cup) with cream, when not contraindicated. *Coffee if taken just before eating is laxative* for many persons. One cup of freshly brewed tea or a glass of water may be taken when preferred.

10.30 A. M.—One glass of Vichy or any aerated water (unless there is a dilated stomach).

Dinner, 12.30 P. M.

Raw oysters or little necks; soup, preferably purees of meat and vegetables; roasts of all kinds; steaks, chops; meat and vegetable stews; corned beef or tongue (see directions for cooking), vegetables—Irish and sweet potatoes, *spinach, celery, turnips; cabbage* (chopped fine and boiled eight or ten minutes in salt water), *cold slaw, sauer kraut, beets with vinegar*, squash, carrots, parsnips, cucumbers (cut thin as tissue paper), Japanese cabbage, *all the greens, brussels sprouts*, egg plant, mushrooms, asparagus; *salads —lettuce, celery and nuts, grape fruit, endive, escarole, chard, watercress, with French dressing* containing an excess of oil; dessert—light puddings with fruit or cream sauces, *nuts and raisins*, fruit, crackers and fat cheeses; one glass of water, buttermilk, lager beer, or cider.

4 P. M.—One-half glass of cold water.

5 P. M.—One glass of aerated water.

Supper, 6 P. M.

Soups—purees of vegetables; stews, chops, baked potato; vegetable hash; fish hash; stale bread and butter with a large saucer of *cooked fruit* or *bees' honey*, molasses gingerbread, *dates, figs*, nuts, tamarinds, *raisins, molasses corn balls, baked sweet apples and cream;* one cup of weak tea or a glass of rich milk.

9 or 10 P. M.—One glass of water, buttermilk or lager beer.

Suggestions

Sip one glass of cold water, which may be carbonated if preferred, one hour before breakfast.

Take at least three of the most laxative foods, which are in italics, during the day.

Take graham, whole wheat or bran bread at least once a day. Take two kinds or more of coarse vegetables besides potato with dinner.

Take a different kind of fruit at each meal.

Do not drink while eating, and never more than the equivalent of one glass of liquid and that immediately after the meal.

More water may be taken if necessary between meals, but only one glass at a time.

Fruits.

The best fruits for relief of constipation are, first, those which contain much woody fiber, skins, seeds, and fruit sugar, *e.g.*, dried figs, raisins, tamarinds, dates, currants, gooseberries, plums, prunes, stewed evaporated apricots, pineapple, blueberries, huckleberries, strawberries, raspberries, blackberries, cranberries, grapes; second, those which act by stimulating secretion chemically and carrying water into the bowel as well as holding it there, by virtue of the sugar content, more particularly apples, pears, oranges, grape fruit, peaches, persimmons, mangoes, and quinces. Many of these fruits may be taken raw, baked or stewed as preferred and as they are found to digest most easily. For elderly persons and those suffering with heart or vascular disease, nephritis and faulty metabolism generally, we succeed much better with *thoroughly cooked fruit*. The juice only should be given in some cases, and it may be expressed with a German grinding mill. Jams and marmalades are very useful, also compotes and fruit syrups. For people of limited means evaporated fruit is just as good and much cheaper, and the inferior grades of raw fruit can always be bought very cheaply and should always be cooked, so the common reason that poor people cannot afford fruit is not tenable. Each patient should be studied with reference to his toleration of fats and carbohydrates, and until the constipation yields they should be cautiously increased. Try one kind of fat at a

Fats and carbohydrates.

time, say butter, and gradually increase it, then cream or olive oil. The last is the one most usually effective, when well borne, as a large percentage goes unabsorbed through the bowel. Almond oil is especially good. Almond chocolate is very good, containing both sugar and fat. Remember that one kind of fat as well as one kind of starch may agree better than another kind. Always give the patient a large menu to select from and underscore several of the most important articles, as in this way *only* can you ever avoid a monotonous diet and obtain the most effective kinds of food.

Value of large menu.

It is rarely necessary to give the large amount of water often prescribed, 3 and 4 quarts daily. It is far better to provide water by giving fruit and vegetables. More than six glasses of liquid daily is rarely needed. The fat cheeses most desirable are cream, Gruyére, Camembert, Imperial Club, 'Inclarens.' Beware of the tough and constipating kinds.

Liquid in.

Treatment of Spastic Constipation.—Here we have to do with a constipation in which the muscles of some part of the colon are in a state of contraction which may continue for an indefinite time. In some instances the contraction may be quite frequent, *clonic* in type, sometimes causing frequent discharge of gas with perhaps a little fecal matter and mucus, while in others the contractions are *tonic* in character and may persist for a long time, allowing the pent up feces to ferment and dry up causing active catarrh of the colon. To cure this condition we have to relax the spasm and cure the catarrh and further restore the loss of tone in the bowel. We may often succeed in relieving the spasm, either with or without belladonna, and this

Spastic constipation.

Treatment other than dietetic.

remedy should always be used after an enema of oil or some carminative water has been tried and failed; in fact, it is useless to try other enemas in this variety of constipation as they only augment the trouble besides increasing the colic. Ten or twelve ounces of olive or linseed oil at a temperature of 100° F. may be slowly injected into the colon through a long rectal tube at bedtime, every second day, and the patient told to lie on his stomach one-quarter hour afterward, or 1 to 2 quarts of warm peppermint, caraway or cinnamon water (temperature 100 to 104° F.) may be used. At the same time the patient should be given *warm but not hot* carminative drinks (temperature 105 to 108° F.) into which the tincture of belladonna, strontium bromide, spirits of chloroform, whiskey, sherry or other sedatives may be put. With these means practically all cases will be relieved of their colic. Where the spasm is due to lead colic, opium is required. When it exists in an hysterical patient, large doses of strontium bromide or asafetida in the warm water enema give immediate relief, and just here we must remember *that these hysterical colonic spasms may be accompanied with catarrh of the colon which remains and must be treated. Note that to secure bowel action in the spastic constipation there is no indication for the use of massage, cold water, internally or externally, electricity or active exercise.* In fact, many of the cases are suffering with various forms of nervous disease, malnutrition, and are under weight, or, in females, there is some pelvic disturbance, displacement of organs, etc. Cathartics, unless very strong, are not effectual for obvious reasons in this form of constipation. These patients should be put in bed

Oil enemas.

Warm drinks to relieve colic.

Dietetic treatment of spastic constipation.

reader will find that the treatment here advised for spastic constipation will cure mucous colic. A brief menu will serve to fix the idea of a bland non-irritating laxative diet for spastic constipation, and be suggestive at least of the general principles which should be considered in the selection of a similar diet for an individual case. The reader should carefully study the Von Noorden method of the coarse diet rich in cellulose for this affection, as occasionally one meets with a case in which the above method fails and the Von Noorden plan succeeds. I have seen such cases, but I believe they were those in which the catarrhal inflammation played little if any rôle and the spastic condition was a slight nervous reflex, or those in which a hyperacidity of the stomach was the cause, which yielded to alkaline treatment with the coarse diet.

A Short Menu for Spastic Constipation

BREAKFAST, 8 A. M.

Baked apples, plums, peaches or stewed fruit without skins or seeds, served with cream; broiled lean fish, schrod, butter fish, sole; broiled lamb or veal chop with the inside of baked potatoes; soft-boiled eggs; dry toast, French, stale or pulled bread; one cup of coffee with sugar and cream, or glass of milk.

10 A. M.—One glass of buttermilk or water at the room temperature.

11.30 A. M.—One glass of raspberry shrub.

DINNER, 1 P. M.

Raw oysters with lemon juice; purees of vegetables; chops; steak or roast; vegetables—squash, cauliflower, spinach chopped fine with a butter or cream sauce, beets served with vinegar, asparagus, green peas; dessert—fruit jellies, light pudding, apple, custard, blanc mange, bonny clabber with cream and sweetened fruit sauces, crackers and cheese (cream and curd).

4 P. M.—One glass of aerated water or warm milk, 105° F.

SUPPER, 6 P. M.

A puree of vegetables or fish chowder; stale bread and butter with honey or a large serving of some one of the above fruits; one glass of whole milk with 1 ounce of cream added.

9 or 10 P. M.—One glass of lager beer or warm milk.

SUGGESTIONS

Give sugar freely, unless the patient is too fat, in the form of cane sugar, molasses, maple sugar, and when overweight give bees' honey, levulose or sugar of milk.

Eat very slowly.

One glass of hot water or whole milk (temperature 105° F.) should be drunk at 7 A. M.

For pain or abdominal distress between meals, sip hot milk or hot water (temperature 105° F.) often. When mucous colitis is present the patient should take at least 1 quart of milk rich in cream with extra eggs beside the regular bland meals during the day.

TYPHOID FEVER

Typhoid fever is an acute infectious disease which runs a comparatively long course, though some cases are so mild that they are accompanied by little, if any, fever, or sometimes only a slight malaise, and convalescence is completed in three or four weeks.

There is so much diversity of opinion as to the dietetic treatment of typhoid that it may not be unprofitable to study at the outset what the indications for feeding are in a severe type of this disease.

Indications for feeding in severe type of disease.

To establish how much and what kind of food a typhoid patient should have in twenty-four hours are two important questions which Von Leyden and G. Klemperer attempted to solve by studying the nitrogen and CO_2 loss with different diets. They found that N. excretion was extraordinarily increased in typhoid fever, due, in part, to the lessened amount of

N. excretion.

food taken, but far more to the poisonous effect of the toxin on the cells themselves, breaking down the albumen molecule, thus throwing a large amount of tissue albumen into the circulating blood to be oxidized into urea and CO_2. By collecting the N. eliminated in the urine and feces, these investigators were able to establish the following facts: That a diet increased in albumen content would lessen the total output of N., whereas, if the albumen content was diminished, the nitrogen output was increased.

A few lines selected from their tables will be quite enough to show these points.

Day of disease	Max. temp.	Food	Cal.	N.	Fat	K.H.	Urine N.	Fecal N.	Total N.	Loss of body N.
	C.	Milk								
VI	39.6	600 c.c.	408	3.2	21	27.0	15.76	0.42	16.18	12.98
VII	39.8	1000 c.c.	680	5.36	35	45	18.96	0.42	19.38	14.06
VIII	40.2	900 c.c. 20 c.c. powd. meats	686	7.67	31.5	40.5	17.88	0.42	18.30	10.63
XV	39.9	2000 c.c. milk 50 c.c. meat soup	1546	17.85	70	90	20.85	2.13	22.98	5.13
XVII	39.9	1500 c.c. milk	1020	8.0	52.5	67.5	15.89	2.13	18.02	10.02

Now, as we have no way of preventing the destructive action of the specific poison of the typhoid bacilli upon the tissues, we should at least furnish the system with as much albumen as possible, as it seems evident that the N. loss under such feeding is lessened. Moreover, there is no ground for believing that the digestion is otherwise impaired by the albumen content of the food.

Necessity for albumen.

The increase in the CO_2 output was also found considerable—on the average about 20 per cent. This would be expected from the increased muscular work of the heart, lungs, and involuntary muscles; but when we consider that these patients are usually confined to the bed, the actual loss in both N. and CO_2 is not so great that more than 2500 to 2700 calories are needed to prevent loss of weight, according to the above mentioned authors.

CO_2 excretion.

"Whoever hungers or receives insufficient food must emaciate," and although typhoid patients have want of appetite and never say they are hungry, yet as they emaciate in the severe type of the disease, we know that they receive insufficient food. By our present methods of feeding we are enabled to considerably lessen the amount of emaciation. Indeed, some of the mild cases may even gain weight during the course of the disease. Fat patients with typhoid should be reduced in weight in the same way that obesity cases are, namely, by increasing the albumen content and reducing the carbohydrate and fat.

Emaciation a sign of insufficient food.

We may now study the symptoms which we have to combat in this disease, to assist in determining the kind of nourishment that will give the most aid in this direction.

Symptoms.

The symptom which from early times has most interested physicians is the *fever*. All sorts of conjectures have been made as to the cause, and now it is the consensus of opinion that fever, together with all the other symptoms of typhoid—malaise, headache, backache, diarrhea, delirium, etc., is one expression of the manifold working of the typhoid toxin.

Fever.

As we have no drug which is a specific for the elimi-

nation of the toxin, we must secure this in other ways, by diuresis and through the skin, and the best-known means to-day is hydrotherapy, especially cold water baths, which act by favoring diuresis, as well as the radiation of heat from the skin. Copious salt solution enemata morning and evening act as powerful diuretics also. The best agent for increasing diuresis is drinking pure water in large quantities, not, however, in the enormous amount (8 to 14 pints daily) which is recommended by Debove, Cushing, Clarke, et al, with the aim of not only increasing the elimination of toxins, but also of favoring the output of common salt, which is retained in the system in typhoid. This retention of sodium chloride need not be considered when a milk diet is given, because of its low salt content. Indeed, *Todd's objection to such a large amount of water —the danger of draining the system of other salts and thus jeopardizing the blood plasma and normal functions of the leucocytes, thereby favoring cardiac exhaustion and arrest—is well worthy of serious attention.*

Hydrotherapy.

Furthermore, we must never forget the increased work which a few quarts of water will put upon the heart to force a larger quantity of liquid around in the circulation. We quite agree with Ker, of Edinburgh, who considers 3 or 4 pints of water, besides the liquid food, ample for the day. Some of this water may be acidified by adding lemon juice to it, or cream of tartar water may be given.

Work of heart increased by too much liquid.

When high fever is accompanied by delirium and marked tympanites, alcohol in some form may be added to the water taken, which acts as an antipyretic by its elimination through the lungs and by facilitating diaphoresis. The mouth should be kept moist

Alcohol.

with frequent sips of water, and an antiseptic mouth wash of boracic acid may be used to rinse the mouth and clean the teeth.

Constipation.

In the first stage of typhoid fever, constipation is the rule, as we would expect with the high temperature and the catarrhal changes going on in Peyer's patches. The excretory glands of the intestinal tract are in abeyance, and the question arises, shall we give laxatives or enemata in this stage, and if so, which? For the first week we give calomel in 5-grain doses with or without compound jalap powder and after this try to get on without either laxative or enema; or sugar of milk, which is a food which often acts as a laxative, or cream of tartar, which we use so much as a diuretic, often becomes gently laxative and works admirably. In the same way lemonade and raspberry shrub will often be efficient. When the above means fail, the *simplest* saline laxative is the best, such as the milk of magnesia or sodium phosphate in doses of 1 or 2 teaspoons of the former or one-half as much of the latter, two or three times daily, sodium phosphate in 1-dram doses. *We should never use the effervescing granular form of the latter salt for it distends the stomach and bowels with gas, and may set up violent peristalsis.* I have found that enemata are much more likely to cause *griping, which, of course, we want to avoid.* They should be given slowly.

Relief by diet.

Saline laxative.

Enemas.

The obstinate constipation, which exists in a later stage, three or four weeks after the beginning of the disease, is due to the paralysis of the intestine, and the resulting distention of the bowel may be very great. It then becomes a serious question whether absorption can take place from a bowel in this condition and

Feeding in presence of obstinate constipation.

whether it is safe to continue to give nourishment in the absence of bowel movements. Von Leyden, however, proved in a series of such cases that only about 9 per cent. of the albumen and 6 to 11 per cent. of digestible fats escaped absorption by the bowel, while Coleman's and Du Bois' results were even better—loss of protein being 7.1 per cent., of fat 7.2 per cent., and of carbohydrate only one-half of 1 per cent. The metabolism experiments of Shaffer and Coleman showed that typhoid patients throughout the disease absorb protein and carbohydrate as well as do normal individuals, while the absorption of fat is a little below normal in the early part of the disease; hence it would seem wise to persist in feeding under these conditions.

Shortly after Lenhartz propounded his method of feeding patients suffering with ulcer of the stomach more liberally, Prof. Frederick C. Shattuck of Boston advocated a more liberal diet for typhoid patients, which was carried out successfully at the Massachusetts General Hospital, and since that time a higher number of calories for this disease has become quite generally adopted in America. Some clinicians increase the calories by adding cream, sugar, gruels, and eggs to the milk, while others give considerable bread, chopped meat, soft vegetables, cereals, and cooked fruit.

There seems to be a consensus of opinion that for obvious reasons, so long as high fever exists it is unwise to give meats, but the other food just mentioned will be digested and absorbed. Each case must be fed according to his needs and pathology. If he is very

ill there will always be days when milk in some form will be necessary to control certain symptoms.

We can often relieve the meteorism markedly with the use of a long rectal tube, which may be left *in situ* for several hours at a time, and the mere presence of the tube may occasionally cause a small bowel movement. If the above means suggested for milder cases do not suffice after two or three days, *we have often succeeded by first giving an opiate and two or three hours later an enema. In such instances the opiate prevents too strong peristalsis.* In some instances we have found it advisable to omit the milk diet for a couple of days, substituting therefor beef albumen, essence of chicken, veal broths and egg albumen, which of themselves frequently act as laxatives.

Opiate and enema for relief of.

The wise management of this symptom of constipation in typhoid will often prevent the serious ulcerations which follow the indiscreet use of enemas and cathartics.

Diarrhea.

Diarrhea is due to the ulceration of the glands of the intestine or to indiscreet feeding. The latter is easily cured by withholding nourishment and giving saline laxatives with copious amounts of drinking water; but when due to ulceration it is sometimes very persistent and difficult to control, as the pathological changes are often deep-seated and may extend through all the different coats of the bowel, resulting in perforation. In such instances a daily enema of salt solution or peppermint water will often suffice. In a well-marked case of ulceration, with bloody stools, *the only drug remedy which has any effect in controlling the diarrhea* is opium, and it seems worse than useless to wait t experiment with bismuth and other allied astringent

Opium in.

The best forms of opium to be given internally are either laudanum or the deod. Tr. of opium. A few doses of 10 drops of either drug will often allay the symptoms and stimulate the heart, thereby improving the nutrition of the intestinal walls, favoring healing of the ulcers. In the meantime, it is well to withhold or reduce the amount of nourishment to a minimum. This may be necessary for two or three days, but care at this time should be used to avoid beef extracts and other food which would stimulate the bowel and increase the diarrhea. Koumiss, arrow-root, boiled rice, peptonized milk, junket and whey may be given frequently. When the patient has only four or five stools daily, without blood, it is better not to try to restrict the number, as Hoesslin proved that absorption is very little disturbed in patients with no more than this number of stools daily. It is quite possible that the patient gets rid of some toxins by the bowel in this way.

Reduction of nourishment.

It is not advisable to withhold water from these patients on account of its tendency to make the bowels act freely, because the drain upon the system of so much loss of water in the stools necessitates replenishment. Again, the advantage of increasing the fluidity of the bowel contents by the water given must be recognized. If hemorrhage occurs all food and even water must be withheld for twenty-four hours.

We are now in possession of the essential facts which will enable us to decide which kind of food is the best to give in this disease. If we believe, under the foregoing conditions, that the suffering of a typhoid fever patient can be better mitigated and the duration of the disease lessened and the recovery enhanced by a

Dietetic treatment.

fluid diet than by the solids and liquids (which is recommended on all sides to-day), we give it or we can, in suitable cases, give the two together.

t diet. We are now in the habit of starting off all our cases, except the most extreme, after clearing out the intestinal tract with calomel and an enema, upon practically the Shattuck diet. During the first two days required for this treatment, they are given milk with toasted cracker. The very severe cases are fed upon milk or some modification of the same, for perhaps one to two weeks, when it becomes possible to begin cautiously a mixed diet of liquids and semi-solids. It is often necessary to use extreme care with the milk diet, owing to personal dislikes and idiosyncrasies.

ous forms hich it may iven. Some persons have a prejudice against milk, and we may often overcome this by changing the flavor by peptonizing it, by giving skimmed milk with salt, or butter milk, pure milk and celestins vichy in equal parts or cream and water or condensed or malted milk well diluted with water. Gruels one-half milk often agree well.

Sometimes the milk may be diluted with a little tea, coffee, cocoa, or alcohol in some form, like whiskey or brandy. When it is disagreeable to patients it may be given in very small doses and very cold, and a pinch of salt will often give it an agreeable flavor. Grape or milk sugar may be used to sweeten it, and a little nutmeg may be added. Hot skimmed milk, salted, is often taken with pleasure. In any case, whether the patient is fond of milk or not, it is good practice to give it in small amounts, say 1/2 ounce every two hours for the first twenty-four, and in the interim lemonade or water, making sure that the patient

gets more than two quarts of liquid during the twenty-four hours.

Idiosyncrasies.

Whenever milk cannot be taken in any form, water gruels sweetened with milk sugar, meat broths and egg albumen with orange juice may be substituted for a short time only, as a sufficient number of calories cannot be afforded by such liquids to support the patient. It must also be remembered that the essential reason why many cannot drink milk is psychical, and in such cases as soon as they become delirious or stupid, this objection no longer obtains, as they do not then recognize what they take, and milk can be given as well as anything else.

Observation of stools.

When feeding milk the most essential thing is to observe the character of the stools, and should curds appear in them, to so modify the milk with the addition of toasted cracker or twice baked bread, that they will disappear. Or the milk may be omitted for a day and then begun again with small quantities of lime water or such dilution as may seem advisable.

Increase in quantity of milk.

The second day the milk should be doubled in amount every two hours, and the other liquids continued. The third day the milk may be again doubled so that the patient gets 2 ounces every two hours. This amount may be continued for two or three days and then increased by 1/2 ounce for a day, when another 1/2 ounce is added, and, in this manner, daily increased to 4 ounces every two hours. After the latter amount has been given for four days, 1 dram of cream may be added each time for a week, when the cream may be doubled. In addition to the 48 ounces of creamy milk, the patient should have about the same amount of water impregnated with fruit juices

Water.

(orange, lemon, etc.), and the caloric value may be much enhanced by adding sugar (grape or milk sugar is preferable to cane); indeed, some patients prefer their milk sweetened, but, as a rule, this cannot be long continued. Great care must be taken not to overfeed. When milk has been the diet throughout, it should be very slowly and cautiously changed after the cessation of fever, as instances are common where patients, who have been given one full glass of milk every two hours from the beginning, have been obliged to fast for one or two days because of a bilious attack; such experiences will make it difficult to continue the use of milk on account of the patient's disgust. Edsall has called attention to the importance of selecting clean milk.

Advantages of the milk diet.

The milk diet with plenty of water fulfills several indications:

1. It is a cheap and readily obtained food which possesses all the elements desired—protein, carbohydrate, and fat.

2. As a rule, it is easily digested and non-irritating to the inflamed and ulcerated intestine.

3. When boiled it is the best remedy for diarrhea due to ulceration.

4. It is an excellent diuretic.

5. The requisite number of calories can be given by adding to the milk, cream, egg albumen, whole egg, sugar, and ice cream.

Cases in which a semi and solid diet may be given.

A semi and solid diet may be adopted for those who cannot take milk and for the mild cases which run their course with a normal temperature (or with only one to one and a half degrees elevation), with soft abdomen and clean tongue. For such, a light diet of milk,

eggs, dry toast, lamb or veal chops, squab, chicken, schrod, calves' foot jelly, baked potato, boiled rice, asparagus tips, spinach, baked or stewed fruit (without skins or seeds), the juice of an orange, junket, custard, blanc mange and bonny clabber with sugar of milk or Devonshire cream may be given. Should diarrhea set in the diet should be changed at once to boiled milk until the symptom has subsided, then the simple solids should be cautiously begun again.

W. G. Thompson calls attention to Henry's saying: "It is not so much solid as indigestible food that should be eschewed, as the first stage of the digestion of milk is a *solid* in the stomach." Klemperer advises, when possible, to give typhoid patients 100 grams of protein, 100 grams of fat, and 350 grams of carbohydrate daily.

In the late stage of typhoid when emaciation has become extreme and cardiac exhaustion seems imminent, we shall often need to give alcohol in the form of sherry, whiskey, brandy or champagne, and possibly cautiously attempt to change the patient's diet *slightly*. All writers upon dietetics in typhoid fever agree that changes in the diet should be very slowly made, as a patient long ill with fever on a monotonous diet does not bear rapid changes well. To strengthen it, a little malted milk or gruel may be added, or half an egg may be given with coffee or tea with cream three times during the day.

I feel the value of coffee as a cardiac stimulant and diuretic in this disease is not fully appreciated. Strong tea may also be efficacious.

During convalescence, the semi-solids, like jellies, gelatines, stale bread, dry toast, or toasted crackers, or crackers and milk, soft-boiled or coddled eggs, por-

ridge, junket, blanc mange with cream, may be regarded as a stepping-stone to the more solid food.

I cannot close this chapter without the following admonitions: 1. *Watch the stools* of your typhoid patients and do not depend upon anyone's description of them. 2. *Explain in detail just what the nourishment is to be* for the day and know that it is given as directed.

Diet List for a Patient with Typhoid Fever Who can take Solids

BREAKFAST, 7 A. M.

Fruit—the inside of a baked or stewed apple, the juice of an orange or one-fourth the juice of a small grape fruit; eggs—soft-boiled, coddled, or dropped on toast; chops—lamb, veal; fish—schrod, halibut; squab or chicken (broiled); baked potato with butter; dry toast with butter; a glass of milk.

Lunch at 10 A. M.—A glass of milk and a slice of toast or stale bread with honey, junket, blanc mange or bonny clabber with cream. Devonshire cream can be taken when preferred.

DINNER, 1 P. M.

Raw oysters; soups, purees—potato, celery, or tomato, a little fish if not taken for breakfast or a lamb or veal chop; broiled sweet breads, chicken or squab; calves' foot jelly; baked potato with butter; spinach, asparagus tips; minced chicken or lamb on toast; eggs, soft boiled or coddled; junket, blanc mange, bonny clabber, baked custard; a glass of milk, or cup of gruel.

Lunch at 4.30 P. M.—One glass of milk, or whites of two eggs, with orange juice.

SUPPER, 6 P. M.

Minced chicken or lamb on toast; eggs; as above, broiled squab; dry toast with butter; fruit as for breakfast; a glass of milk.

One glass of warm milk at 9 P. M.

SUGGESTIONS

Do not eat hurriedly. Masticate the food thoroughly.

Do not eat eggs and meat, eggs and fish, or meat and fish at the same meal.

Do not drink while eating; wait until the end of the meal.

Use sugar of milk freely for sweetening.

The equivalent of one lamb chop is enough meat for the day.

DISEASES OF THE LIVER

DIET IN CHOLELITHIASIS (STONE IN THE GALL BLADDER), CHOLANGITIS (INFLAMMATION OF THE LIVER DUCTS), AND CHOLECYSTITIS (INFLAMMATION OF THE GALL BLADDER)

As the diet in these affections is practically the same, they may be considered under one head.

Treatment during the attack.

An attack of gall-stone colic is usually of a few seconds' to a few minutes' duration, and, though it may be often repeated for several days, still, as a rule, it lasts only a few hours, and the dietetic treatment is therefore largely for the after-effects. While the attack is on, the diet should be such as to excite the least possible peristalsis. As very little, if any, bile will be secreted during a biliary colic, fat may be eliminated entirely from the diet during an attack, and the patient may simply take a few swallows of milk and lime water occasionally, unless there is nausea. As long as nausea continues, it is better not to give food. A few ounces of milk and lime water daily will suffice for two or three days, even until the attack is past, and we direct our attention to the remaining cholecystitis.

Cholecystitis.

The treatment of this affection will be the same whether the stone was eliminated during the attack or not. If it still remains in the gall bladder, it is more than probable that our dietetic treatment will not eliminate it, although there are many who still believe in the effectiveness of olive oil as a solvent for gall stones. They base their belief on the fact that 72 per cent. of olive oil is oleic acid, which, they claim,

Use of olive oil in treatment.

has the effect of slowly reducing the size of a gall stone by dissolving its chief ingredient, cholesterine. Also that oleic acid is excreted by the bowel when olive oil is taken by the mouth, and hence comes in constant contact with the stones. This theory, however, is not widely accepted, but it is believed by many physicians that intestinal peristalsis is increased by the presence of much olive oil going through the duodenum, and stimulating the papilla of Vater, thus exciting a freer flow from the bile ducts. The olive oil may be given in doses of 1 to 8 ounces daily, either pure or combined with menthol and brandy. It can also be given with potato and salads. When it causes nausea, the oleic acid may be given in 5- to 10-grain doses in capsule, two or three times daily.

The two principal points in dietetic treatment.

In the dietetic treatment of cholecystitis we should always keep two points in view: 1. To prevent stagnation of bile in the gall bladder and ducts. 2. To prevent, as far as possible, ascending infections, like typhoid or colon bacillus. To aid in the prevention of these we must carefully watch the condition of the stomach and bowels, as anything which favors a lesion of the gastrointestinal tract may be a pote t factor in the above causes of gall stones; for instance, a gastrointestinal catarrh, colitis, or stasis in the colon from chronic constipation, resulting in a colon bacillus infection. For this reason cholecystitis frequently runs a long course, with occasional exacerbation, and even ends in suppuration of the gall bladder. If the patient is not jaundiced, it is fair to assume that a moderate amount of bile is passing through the ducts into the intestines.

As it is the duty of the bile acids to break up the

fat molecules of the food, we may give in this stage of the trouble, a reasonable amount of fat in the diet. At the same time, the liver being somewhat inhibited in its action, it is well not to increase its glycogen content by giving too much carbohydrate, and the albumen should be less than would be given were the liver able to functionate normally.

To prevent stagnation of bile in the gall bladder and ducts, we must combine liquids with our diet. Alkaline waters or spring water may be used in good quantity between the meals, which will gradually increase the flow of bile and render it less viscid.

Water probably acts by subduing intestinal catarrh, also by stimulating the ampulla of Vater, in the same manner as frequent feeding is known to cause more frequent emptying of the gall bladder into the cystic duct and duodenum, though there are many who believe it acts chiefly by increasing the volume of blood in circulation, which in turn creates a vis a tergo to accelerate the flow of bile. We cannot, however, agree with those who give very large amounts of water—4 quarts daily—as we believe the general welfare of the patient will not be enhanced thereby.

Carlsbad salts and sodium phosphate are our best laxatives throughout the disease. We prefer to give Merck's crystals of sodium phosphate in one-half teaspoonful doses in hot water before each meal. When Carlsbad salts are given it is best to give ʒi in hot water at bed time and in early morning.

Necessity for frequent meals.

The meals should be given very frequently for the purpose of creating almost constant peristalsis in the duodenum as mentioned above. The carbohydrates should be given in purees, or be finely divided, and

not in too large quantities. No large amount of cellulose should be given for fear of intestinal fermentation. As the albumens stimulate a free secretion of bile acids, which increase the fluidity of the bile, it is apparent that we cannot omit them from our dietary, though they should be somewhat reduced from the normal amount given in health.

The following table may be useful for reference in cholecystitis.

Diet in Cholecystitis

BREAKFAST, 7.30 A. M.

Fruit—grape fruit, apples, baked or stewed, pears and evaporated apricots stewed, grapes, berries in season without sugar; fish—schrod, haddock, halibut, finnan haddie, cod, smelts, perch, trout, pickerel; lamb or veal chops; baked potato with a moderate amount of butter; one slice of dry toast with a little butter; broiled chicken or honeycomb tripe; a cup of coffee without cream or sugar.

10 A. M.—Bread with a little marmalade, jam or bees' honey. 1 glass vichy or spring water.

DINNER, 1 P. M.

Raw oysters; soups—clam or beef bouillon; fish as above; roasts—beef, lamb, veal, chicken, turkey; vegetables—spinach, cauliflower, asparagus, Irish potato, green peas, young string beans, tomatoes, water cress; dessert—crackers and cheese (Camembert, cottage); fruit cooked without sugar; cup of tea or glass of water.

4 P. M.—One glass of milk with crackers or a slice of toast.

SUPPER, 6 P. M.

Broiled fish as for breakfast; meat stews—lamb, chicken; chops; a baked potato with a moderate amount of butter; stale bread or dry toast with a little butter; a cup of tea without sugar or a glass of milk, cooked fruit.

9 P. M.—A glass of milk.

SUGGESTIONS

Drink one glass of Celestin's Vichy or water one hour before breakfast and at 12 M.

Eat only the lean meats, once a day. Toasted crackers or pulled bread may be given.

Do not drink anything until the end of the meal.

Take eight glasses of liquid in all during the day.

Take a glass of water at 10 A. M. and 4 P. M.

CATARRHAL JAUNDICE

(Inflammation of the liver and bile ducts.)

As the dietetic treatment of this affection is practically the same as that of gastro-intestinal catarrh, it will not be necessary to go into detail respecting its treatment.

During the period of acute inflammation there is almost complete obstruction of the bile ducts by catarrhal swelling; consequently little or no bile is entering the intestine. Fats, on this account, should be practically excluded, except small amounts of the finely divided emulsions like milk, cream, and a little butter. Often it is better, for a while at least, to do without fat, as it readily undergoes decomposition in the intestine, developing poisonous products that inflame the bowel and may have been originally the cause of the catarrhal jaundice.

As in many of these cases, the pancreatic duct is also occluded with swelling, the protein food is not digested, and it is well to withhold practically all the protein, especially the animal proteins. This element in eggs or milk and cheese may be at least partially digested. Gruels may be given with rice, milk, barley, sago, tapioca, strained oatmeal, etc. All the rough foods containing skins, seeds, etc., which are irritat-

ing, should be prohibited. *Before* the pancreatic duct becomes affected, albuminoids may form a considerable part of the nourishment allowed, together with gruels, milk, buttermilk, eggs, jellies and gelatinous foods. *After* the pancreatic duct becomes involved all meat must be avoided.

Diet List in Catarrhal Jaundice when the Pancreatic Duct is not Involved

Breakfast

Fruit—apples, baked, raw, or stewed, grape fruit, oranges, stewed evaporated apricots; eggs—soft-boiled or dropped on toast, not more than twice a week; the lean part of a lamb chop or a small piece of lean steak; calves' liver; broiled honeycomb tripe; baked potato with a moderate amount of butter; dry toast or stale bread with butter; cup of coffee, with milk if desired.

Dinner

Soups, preferably purees, fish if not taken for lunch, broiled; roasts—beef, lamb, chicken, turkey, boiled tongue; vegetables—lettuce, spinach, stewed celery, cauliflower, beets, carrots, radishes, tomatoes, peas, squash, Irish potatoes, baked, boiled or mashed, asparagus; dessert—fruit, rice pudding, tapioca pudding; one glass of milk, buttermilk or water.

Supper, 6 p. m.

Raw oysters or little neck clams; steamed clams; fish, a small piece of one of the leaner variety, broiled; a small piece of lean cold meat (beef, lamb, chicken, turkey, boiled tongue, lean corned beef); baked potato, dry toast with butter, cup of tea, a glass of water or buttermilk.

Suggestions

Sip a glass of cold water an hour before breakfast, at 11 a. m., 4 and 9 p. m. A glass of Celestin's Vichy may be substituted for the first and last glass of water.

Eat very small meals.

Thin gruel or milk and Vichy may be taken between meals.

Diet List in Catarrhal Jaundice After the Pancreatic Duct has Become Involved

Breakfast

Fruit—apples, baked, raw or stewed, oranges, grape fruit, grapes, shredded pineapple, stewed evaporated apricots; a dropped or soft-boiled egg may be taken not more than three times a week; boiled rice with a little milk and sugar; a baked potato; a slice of bread with a very small amount of butter; one cup of coffee or tea without sugar or cream or a glass of water.

Lunch, 10.30 A. M.—Gruel made from one of the cereals mentioned below; one glass of skimmed milk, buttermilk or Celestin's Vichy, or whites of two eggs.

Luncheon

Raw oysters; vegetable puree (asparagus, green pea, corn, tomato, celery); baked macaroni or spaghetti; stale bread or dry toast with a moderate amount of butter or crackers and cheese (Roquefort, Swiss, cottage); a glass of water or a cup of tea.

Lunch, 4.30 P. M.—A glass of gruel or a glass of skimmed milk or buttermilk, or egg albumen.

Dinner

Soup—purees; potato, baked or mashed; bread, stale or toasted; vegetables—spinach, tomatoes (eaten raw with salt, pepper and a little vinegar, or stewed), peas, squash; dessert—rice, tapioca or sago pudding; fruit as above; a cup of tea or a glass of water.

Lunch, 9 P. M. A glass of gruel with one or two crackers or one glass of milk and Vichy.

Suggestions

Water gruels may be made from rice, barley, sago, tapioca, strained oatmeal, and farina and diluted with one-half water when given.

One glass of Celestin's Vichy should be given an hour before breakfast.

The patient should drink from six to eight glasses of liquid daily, counting in soups, milk, gruels and water.

The purees should be made with not more than one-half milk.

INTERSTITIAL HEPATITIS (CHRONIC INFLAMMATION OF THE LIVER, ALCOHOLIC CIRRHOSIS), AND PASSIVE CONGESTIONS

The majority of patients consulting a physician for so-called "biliousness" have only a gastro-duodenal catarrh, and should require only a day or two of fasting, with saline laxatives to relieve their trouble. Alcoholic cirrhosis requires such a dietetic plan of treatment as takes into consideration the whole gastro-intestinal canal, the liver and pancreas. In this affection the liver has become insufficient because of the loss of a large number of the secreting cells, through development of connective tissue in the substance of the liver; there is stasis in the portal circulation, and therefore the veins of the stomach, intestines and pancreas are so engorged that the function of their respective glands is much impaired. Sooner or later ascitic fluid appears, further handicapping the work of the digestion, as well as embarrassing the heart.

In the early stage of alcoholic cirrhosis, before the appearance of ascites, the patient is best treated by a liberal use of the proteins, more especially of milk, egg albumen, cheese, gelatines and meat, vegetables and fruit, with a careful avoidance of cane-sugar or foods containing a high percentage of starch, as the storehouse of glycogen is too small to contain an excess. The fat should also be considerably restricted and only the finely emulsified fats like cream, butter, bacon, or the yolks of eggs should be given. Great care must be taken to prevent further congestion of the portal circulation by the use of alkaline waters of a laxative nature, and yet the liquid should not be increased

as a rule beyond five glasses. Milk should constitute, in this affection, both food and drink, and at least 1 quart should be given with the meals and between meals. The following table will illustrate a proper diet for such a case before the appearance of ascites. After the latter occurs we should be extremely careful not to allow patients too much liquid, and, as a rule, less solids will of necessity have to be given. One should remember that in these cases there is present, as a rule, interstitial nephritis and enemata of salt solution is our best diuretic, and more milk is needed (often 2 quarts daily). Great care should be exercised to give calories enough to prevent a rapid loss of weight.

Diet List for Interstitial Hepatitis

BREAKFAST, 7.30 A. M.

Fruit—apples or pears, baked, raw or stewed; grape fruit, melons, peaches, plums, grapes, stewed evaporated apricots, berries in season without sugar; eggs—soft-boiled, shirred, dropped on toast, scrambled; fish—schrod, haddock, halibut, trout, cod, white fish, bass, pickerel, perch; lean chops, lamb or veal, broiled honeycomb tripe; broiled chicken; one baked potato with a moderate amount of butter; one glass of milk.

DINNER, 1 P. M.

Raw oysters or little neck clams; steamed clams; fish as for breakfast; roasts—beef, lamb, veal, chicken, turkey, quail; chops and steak as for breakfast; corned beef and boiled tongue; Vegetables—lettuce, spinach, stewed celery, cauliflower, asparagus, tomatoes, greens of all kinds, egg plant, carrots, squash, onions, string beans; dessert—fruit as above, two crackers and cheese (Brie, Camembert, cottage, farmer's skimmed milk); a glass of milk.

SUPPER, 6 P. M.

Purees of vegetables; broiled fish or eggs as above; cold roast meats; boiled lean corned beef; boiled tongue; baked potatoes;

stale bread and butter; cooked fruit, beef honey; crackers and milk with baked sweet apples.

SUGGESTIONS

Drink a glass of milk at 9 P. M.

Drink a glass of hot water at 5.30 A. M. and a glass of Celestin's Vichy at 10 A. M. Milk is often required between meals.

PASSIVE CONGESTIONS OF THE LIVER

The condition is one of general plethora, manifesting symptoms of mild gastro-intestinal catarrh and fullness in the liver region. It is most often due solely to broken cardiac compensation in disease of the mitral valve or to a myocarditis, with dilatation of the right ventricle. It is often also accompanied by congestion in the throat and head—headache, sore throat, due to a slow venous return through the peripheral branches of the superior vena cava. These symptoms are often treated locally as throat affections for a long time without benefit, and are immediately relieved by a good dose of calomel, while permanently cured by proper reduction diet.

Such patients are generally over-fed and over-weight. They are starch and sugar eaters. Their liver cells are full to repletion of glycogen. They should therefore begin the diet by fasting for one or two days, and then be given a list greatly restricted in carbohydrates, with a moderate amount of fat and a maximum amount of protein and fruit. The liquids should usually be restricted to four or five glasses daily. Fruit and vegetables containing a very low percentage of starch should be given freely, because they leave a large residue to go through the bowel which aids in relieving the usual accompanying constipation, also because

they fill the patient up and lessen his desire for the fattening foods. The number of calories per day may in this way be brought down several hundred, until the patient begins to burn up his own fat. The reduction diet list in obesity may be modified to suit this class of patients.

The diet of other chronic liver affections can be readily deduced from those already discussed. Attention should be given especially to coexisting jaundice, pancreatitis, lesions in the stomach, the intestine, heart and kidneys, and the diet should be variously modified to bring about a normal healthy state of all the organs. In cancer, or acute yellow atrophy of the liver, the patient has only a few weeks or months to live, and the diet should of course be symptomatic and as pleasant as possible.

PANCREATIC AFFECTIONS

The diet in these cases depends upon whether the affection is acute or chronic, and hinges on whether the excretory duct of the gland is occluded, or certain functions of the gland are in abeyance because of inflammation.

A calculus or malignant disease may close the excretory duct, or involve the island of Langerhans, and the character of the secretion of the gland may be much altered, the effect of the digestive pancreatic juices upon the intestinal digestion being much impaired thereby or even entirely lost. By this loss, the proteins and fats would suffer much in digestion, while the carbohydrates would be less affected. Meat fibers, fat, and even starch, however, appear in the stools, and every physician well knows the gray appearance of a

stool containing much fat. It should only be giv
in a finely emulsified form like cream, butter, yol
of eggs, and the carbohydrate in the form of grue
purees, etc. The proteins should be considerably
duced, as they are most likely to putrefactive chan
in the intestine, and lead to catarrh which still furt
impairs digestion, and thus favors the progress of t
disease. In the chronic pancreatic affections, Pawl
and many others advise an antidiabetic diet.

DISEASES OF THE KIDNEY

ACUTE NEPHRITIS

We have seen in our discussion of broken compensation in mitral incompetency how important rest is for the heart and the same is true in renal insufficiency. The glomeruli are inflamed and the uriniferous tubules are blocked. Oliguria is, of course, marked, and because of this symptom many a physician has met his Waterloo by at once beginning the use of diuretics and large quantities of milk and water.

Condition of kidney in acute nephritis.

This method will not only fail to cause the kidneys, which are out of commission to functionate, but will promptly lead to an accumulation of fluid in the tissues, and this unfortunate result will be hastened and increased if there is also coexisting, as often obtains, a chronic myocarditis or dilated heart.

Principles of treatment.

Forschheimer says the following principles are involved in the treatment of acute nephritis.

1. "Rest for the kidneys."

2. "Prevention of waste products in the blood," and we might add the elimination of the waste already stored up and in circulation.

3. The treatment of symptoms.

Every acute nephritic with oliguria should be allowed to go two, three, or four days, with only 1 or 2 pints of water daily in frequent small amounts. If nausea exists the water should be given in the form of salt solution per rectum, 1 pint morning and night. During this time if there is much edema it is

Removal of edema.

best removed by saline or other cathartics, and by sweating with hot air. After three or four days about 1 pint of milk and 2 pints of water may be given daily. The milk may be cautiously increased, watching the urine carefully, as to its specific gravity and the total daily excretion; these two points are much more helpful in determining the function of the kidneys than the percentage of albumen, and the number of, and different kinds of casts. Indeed, the more abundant the casts the second week of this disease the better. After two weeks, as a rule, they grow less, as the amount of urine increases. Now lemonade and cream of tartar water may be given, and purees of potato, rice, oatmeal, hominy, and corn-meal gruels may be occasionally substituted twice daily for the milk, which should also be increased. Cream and milk sugar should be added to increase the caloric value of the food.

Liquids in.

Von Noorden adds 375 c.c. of cream to 1500 c.c. of milk, and to this a small quantity of calcium carbonate to unite with the phosphoric acid of the milk and to be excreted by the bowels, thus saving the kidneys. This method brings the calories up to about 3000.

Addition of solids to diet.

F. Klemperer advises continuing this diet until albumen ceases to appear in the urine, which may be four to six weeks. Then he adds white bread, zwieback, butter, and rice, keeping the daily amount of albumen below 60 grams, but increasing the milk and also the drinking water. The albumen is cautiously increased by adding eggs and cheese. Small quantities of vegetables and fruit are also allowed.

The symptom most feared in acute nephritis is uremia, and with respect to it, Klemperer says:

"Though it is not yet proven that uremia is the result of breaking down of the cell albumen of the body and the retention of the disintegrated protein molecules in the circulation, yet Strubell found that nephrectomized dogs fed upon carbohydrates showed milder symptoms of uremia than did dogs under starvation or fed with fats or albumens." Hence, he advises giving vegetables, broths and water freely in acute uremia, leaving albumen out of the diet. **Proteins in uremia.**

To-day for clinical purposes we recognize uremia as seen in acute nephritis to stand for a pathological condition of the blood in which are found in *excess urea the sodium and potassium salts, the coloring matter of the urine and ptomains. In short there is urine in the blood.*

Now it is the common experience that when dropsy is a marked symptom of nephritis the sodium chloride is the predominating toxic agent in the blood and urea may be only slightly in evidence or absent. This has been called the moist form of uremia to distinguish it from the dry form in which the chief toxic agent is urea. It is well to keep this in mind when prescribing for clinical as well as acute nephritis.

What can we do to prevent relapse?

We can see that the patient has a bland diet, plenty of water, avoiding spices (mustard, pepper), an excess of salt, sugar or alcohol, and if he is suffering with scarlet fever, or any other infectious disease, the kidneys will be protected if the patient is kept largely upon liquids, especially milk. However, some starch, fats, vegetables and fruit may be allowed. **Preventing relapse.**

The same treatment also applies to acute exacerbations of chronic nephritis.

mild Mild cases of acute nephritis need not be so restricted in their diet: they may have eggs, raw oysters, milk, toast, bread and butter, broths with vegetables, cauliflower, stewed tomatoes, baked potatoes, breakfast bacon, fish and cooked fruit. As soon as the pulse rate becomes normal a little meat is added and cautiously increased according to the patient's progress.

This affection is so frequently overlooked and treated as migraine, dyspepsia, gastric or intestinal catarrh, or pseudo angina, Ménière's disease, asthma, sudden attacks of dyspnea, nervous insomnia, that it seems necessary to call the reader's attention to the means of avoiding such errors, by a few suggestions:

ence. 1. Remember that chronic nephritis is a very common disease after fifty, and not rare between thirty and fifty.

2. It comes on insidiously as a rule, but there are many exceptions. (a) The history of an acute infectious nephritis in childhood may be elicited with care in taking the history, from which the patient has never completely recovered. (b) It may be a relic of a nephritis of an early pregnancy, or a complication of an earlier typhoid, pneumonia, a sequel to a long cardiac incompetency, or there may be an earlier history of gout, plumbism, alcoholism, etc. The chronic cases following the acute disease are obviously always recognized.

oms. 3. Examine every case of morning headache, neuralgic headache, vomiting, dizziness however slight, periodic diarrhea for other symptoms of chronic nephritis such as:

(a) Cramps in muscles of the calves of the legs, arms, neck and chest (intercostal muscles).

(b) Pollakiuria—pain at the end of the micturition, with very small total amount of urine in twenty-four hours. This symptom often leads to the diagnosis of cystitis.

(c) Polyuria—often present in the interstitial form of nephritis.

(d) Dead fingers—pale, bloodless—more frequently a late symptom, but may be early.

(e) Defective hearing and vision, Ménière's syndrome.

(f) Itching without eruption should always arouse suspicion.

(g) Morning epistaxis.

(h) Cryesthesia—great sensitiveness to cold, especially in feet, legs and loins.

(i) "Electric shocks" on awaking from sleep in the night.

(j) Tortuous temporal arteries, due to high blood tension, and not to arteriosclerosis. (Varies from day to day.)

(k) The loss of the sense of taste and smell.

Nearly all the recent writers, Strümpell, Dieulafoy, Osler, and others, while Trousseau, Neusser, Loomis and William H. Thomson among the earlier, laid great stress upon these early signs. Some of them owe their origin, no doubt, to arteriosclerosis, but they are, nevertheless, symptoms which lead one to suspect nephritis, often before albumen and casts are found.

Chronic interstitial nephritis.

When the patient is in the chronic stage, solid food should be added, taking care to avoid that containing a large percentage of common salt. Not many years ago it was the habit to omit meat in chronic kidney affections, but to-day this custom has been given up

Solid food in diet of chronic case

Diet
cases

[illegible]

Occur

[illegible]

Early
sympto

[illegible]

Diet List in Chronic Nephritis Without Dropsy

[illegible]

[illegible] oranges, grape fruit [illegible] eggs—coddled, soft- [illegible] broiled chicken; [illegible]

honeycomb tripe; fish—salmon, perch, eels, pickerel, white fish, trout, cod, haddock, halibut, schrod; baked potato; stale, pulled or toasted bread with plenty of butter; cup of tea or a glass of milk.

Dinner, 1 p. m.

Raw oysters or little necks or steamed clams; soups (preferably purees)—pea, bean, tomato, potato, asparagus, stewed celery; chops as for breakfast; beefsteak (once a week); roasts—beef, lamb, veal, chicken, tongue or corned beef (boiled six hours); fish broiled or baked in cream; vegetables—potato, spinach, lettuce, stewed celery, cauliflower, cucumbers, cabbage (chopped fine and boiled ten minutes in water containing a little salt), parsnips, carrots, beets, squash, boiled onions, green peas, tomatoes, asparagus, string beans; salads—lettuce, tomato, endive, escarole with French dressing; dessert—apple tapioca, sago, bonny clabber, blanc mange with Devonshire cream, crackers and cheese—Camembert, Brie, Roquefort, cream, old fashioned curd, cottage; one glass of milk or a cup of tea or cocoa.

Supper, 6 p. m.

Eggs; lamb stew with vegetables; baked potato; bread (stale or toasted) with plenty of butter; stewed fruit; one glass of milk or cup of cocoa; stale bread or crackers and milk with blueberries or baked sweet apples.

Suggestions

Drink about six glasses of fluid, all included, daily.

Take one glass of hot water on awaking in the early morning.

Eat small meals.

Vary the diet from day to day.

Do not eat fish and meat, meat and eggs, or fish and eggs at the same meal.

Meat or fish should not be given oftener than once a day.

Three or four glasses of milk should be taken daily either with or between meals.

Do not drink while eating.

Eat slowly, and thoroughly masticate your food

Do not eat beef oftener than once a week.

Take one glass of warm milk at bedtime.

Comparatively Salt-free Diet List When Dropsy is Present

BREAKFAST, 8 A. M.

Fruit—apples, baked, raw or stewed, orange, grapes, stewed evaporated apricots, grape fruit; eggs—soft-boiled dropped, baked, scrambled (without salt); one slice of toast or triscuits; with unsalted butter one glass of milk flavored with coffee.

10 A. M. One glass of milk.

DINNER, 1 P. M.

Roasts—beef, veal, goose, lamb, duck, chicken; vegetables—Irish potatoes, lettuce, beets, cauliflower, asparagus, turnips, water cress, spinach, one slice of toast; cheese (cream, cottage, Camembert, Gruyère, edam); one glass of milk.

4 P. M.—One glass of milk or gruel.

SUPPER

One-half pint of milk soup; an egg; one slice of dry toast; one glass of milk; fruit as above.

9 P. M.—One glass of milk.

SUGGESTIONS

About one-half the patient's diet should be milk and cream, and so long as the dropsy persists we give chiefly milk, eggs and cereals.

Avoid those articles which need to be cooked with salt in order to be palatable.

Various sauces, bread, puddings and various forms of pastry may be made without salt.

Do not eat more than 2 1/2 ounces of meat during the day.

The reasons for giving a comparatively salt-free diet in nephritis may be practically stated thus:

Reasons for salt-free diet.

The presence of salt in the system favors retention of water, which of course may lead to dropsy, thus adding another peril to the patient's life. In cases where there exists an idiosyncrasy which prevents the use of milk, it may be combined in the form of gruels or given in combination with lime water or Vichy (Celestins), and when for any reason milk does not seem to

be well tolerated, water gruels may be substituted; but in all instances sufficient liquid in the form of water must be given to keep the amount of urine above the average required for that individual in health. Probably there is no one symptom in the examination of a patient with chronic kidney disease so essential to ascertain as this one of polyuria, for renal elements will be found as long as the patient lives, and they will vary from time to time no matter what the diet or treatment may be, and the mere presence to-day of a large number of hyaline and granular casts is no indication that they will be found in the next 24-hour specimen. I have been unable to see that the relatively high proportion of protein allowed chronic cases led to any excess in the number of casts. When blood or waxy casts are seen, the diet should be confined to liquids and practically non-nitrogenous substances. *We have not found the percentage of albumen increased in either chronic interstitial or parenchymatous forms by a fair allowance of protein (say, 60 grams); neither have we been convinced that the vegetable protein causes any less work on the part of the kidneys than the animal protein.*

Influence of high proportion of protein on kidney.

PYELITIS AND PYELONEPHRITIS

Pyelitis and pyelonephritis are very often due to the presence of a stone in the kidney, to a primary kidney disease, or to an infection (such as tuberculosis, gonorrhea, colon bacillus from stasis in the large intestine); therefore the dietetic as well as the medicinal treatment must be regulated, first, with reference to the primary affection and, second, to the existing symptoms.

Causes.

When there is tuberculosis, the diet should be es-

Treatment dependent upon cause.

sentially that of the primary affection. When secondary to gonorrhea, it should be symptomatic, and when due to stagnation in the large intestine, the usual diet for constipation should be instituted, first clearing out the bowel with castor oil and a copious suds enema. Olive oil should enter into the diet of such patients, because about 90 per cent. of it goes undigested through the alimentary tract, thus acting as a lubricant. In the short acute stage liquid food is required, but in the chronic stage in which physicians usually see their patients, in addition to the ordinary quart of milk which is allowed chronic nephritis the same solids as recommended in kidney diseases should be added to the liquid diet. In other words, the treatment is practically the same as that for acute and chronic nephritis with perhaps a little more water. If there is no coexisting heart trouble, the water can be considerably increased in these cases. At the present writing urotropine seems very effective in lessening the activity of the bacilli and should be given.

NEPHROLITHIASIS
(Kidney Stone)

Ebstein showed that urinary calculi, when analyzed, consists of an organic framework of albuminoid substance upon which the different salts (uric, oxalic and phosphoric acid) are deposited. The albumin-

Composition of calculus.

substance is the result of inflammatory irritation of the kidney epithelium and insufficient excretion of the inflammatory products of the kidney. The kinds of stone usually found are the uric, oxalic, and phosphoric acid, according to their respective essential

content, but combinations of the two former are frequently found. Now, according to Croftan, the condition necessary for the formation of a stone is the presence of crystals of the above acids with a cement substance like mucus, fibrin, or pus. As these conditions usually coexist with inflammation, irritation and infective processes going on in the kidneys, we frequently find a stone complicating such conditions or as a sequel to them. The treatment of a stone in the kidney consists of two proceedings:

1. Curative by the surgical removal of it.
2. Prophylactic or subsequent treatment.

Treatment] dependent upon kind of stone found.

The latter must vary according to the kind of stone (judged from the examination of the urine), and in either case it must be largely prophylactic, as we have no remedies, medical or dietetic, that will dissolve stones in the kidney. Now, it is not always the case, when we have a uric or oxalic acid stone to deal with, that there is of necessity a great excess of any one of these acids in the urine, as the sediment of either does not depend entirely upon their percentage in the urine, for Carl Neuburg has shown that the uric or oxalic acid sediment may be great when the respective acids in the urine are small, or *vice versa*. However, it is safe to assume that, given the same amount of cementing substance (inflammatory mucus and pus), the less uric or oxalic acid sediment the patient has the less liability there will be of the formation of a stone; hence the diet must be directed to two ends.

First, to diminish the formation of these acids.

Second, to neutralize them, or increase their solubility.

Dietetic treatment.

As we believe the dietetic treatment of these affec-

tions should be quite different we will consider them separately. To treat the uric acid diathesis we are accustomed to prescribe a diet of low uric acid potentiality, like milk, egg albumen, cheese, a little meat, vegetables, fruit and bread, omitting especially the nucleinic foods which are rich in purin bodies, meat extracts, etc. For the second purpose we give the calcium salts in the form of lime water in milk, in this way securing the addition of a large quantity of liquid which is, in most cases, very desirable. At the same time, the calcium salts increase the solubility of uric acid, as they favor the formation of sodium diphosphate. Again, chemists have found that the calcium salts combine with phosphoric acid in the blood and form calcium phosphate, which is eliminated through the bowel, thus sparing the kidneys.

Diet for uric acid.

As a prophylactic diet for the uric acid diathesis, the following list will be found serviceable, as it is comparatively free from nuclein and rich in vegetables and fruit, with a sufficient amount of fat; the latter, however, may be varied according to the needs of the system. When the presence of a stone in the kidney can be diagnosed, of course an operation must be seriously considered.

Diet in Uric Acid Diathesis

BREAKFAST, 7 TO 8 A. M.

Fruit (raw or cooked) in season; fish—schrod, haddock, halibut, finnan haddie, flounder, smelts, white fish, pickerel, trout, perch; broiled honeycomb tripe; fish or meat hash; eggs, soft-boiled, dropped on toast, scrambled, shirred, coddled; one baked potato; stale bread or dry toast with butter; one cup of weak tea or a glass of milk.

11 A. M.—One glass of milk and lime water equal parts.

LUNCHEON, 1 P. M.

Raw oysters; vegetable purees without meat stock; fish as for breakfast; fowl stewed with vegetables, and fish or eggs when not taken for breakfast; vegetable salads with French dressing; baked potato; stale bread or dry toast with a moderate amount of butter; a glass of water or a cup of weak tea; crackers and milk; fruit.

DINNER, 6 P. M.

Clam bouillon, fish as for breakfast, either broiled or baked; roast mutton, chicken, turkey; corned beef or tongue, boiled mutton, chicken; chops; fresh vegetables in season; vegetable salads with French dressing; dessert—apples, baked or stewed with little sugar, fruit; a glass of water or a glass of milk.

9.30 P. M.—One glass of milk and lime water.

SUGGESTIONS

Eat a different kind of fruit at each meal.

Vary your meals from day to day.

Drink a glass of water at least four times daily on an empty stomach.

Either protein—fish, eggs or meat—is enough for one meal.

Saccharine or sugar of milk may be used to sweeten the food instead of sugar if desired.

Do not eat highly seasoned foods.

Celestins Vichy may be given as a substitute for one-half of the drinking water.

OXALURIA

A. E. Taylor says: "The term Oxaluria as used by the physician does not mean the amount of oxalic acid in the urine but the amount of oxalate crystals in the urinary sediment, and there is no relation between the one and the other, *i.e.*, there may be no oxalic acid present when there is much of the oxalate sediment, or when the latter is absent there may be much oxalic acid present. Why the crystals form in one case and not in another is not known. The calcium oxalate is

the most insoluble of all the salts of oxalic acid. Next comes the magnesium salts and finally the potassium and sodium salts.

"Acidity increases their solubility. Fruit and vegetables contain oxalates and are absorbed in the stomach and duodenum. From the neutral or alkaline lower bowel there is little if any absorption and the salts are precipitated. Hence the administration of acid increases alimentary oxaluria, while alkalis diminish it. Oxalic acid is formed by fermentation in the intestinal tract and it is probable that bacteria form it also from amino-acids as well as from carbohydrates. It has been found that when an animal is fed upon a pure protein or milk diet oxaluria persists." From this we are at a loss to recommend any special diet for oxaluria as there seems to be no scientific basis for one; hence we will merely mention such foods as have been by common consent of clinicians excluded in the diet of oxaluria, with the suggestion that the diet should be symptomatic till we know more physiological chemistry.

The following articles of diet are the chief ones to be excluded in the diet of oxaluria:

Cocoa	Pepper	Spinach	Sweet-breads
Chocolate	Sorrel	Green haricots	Broad beans
Tea	Rhubarb	Dwarf peas	
	Cucumber	Dried figs	

All strongly flavored foods.
All condiments.
All aromatic foods.
Liquors and brandies.

PHOSPHATIC ACID STONE

Diet when phosphates are increased.

Phosphatic calculi exists only in alkaline urine; hence, the importance of acidifying the urine with

benzoic acid, nitromuriatic acid, or dilute phosphoric acid as soon as possible. After the urine has become acid, the diet alone will generally suffice to prevent its again becoming alkaline. As the phosphatic stone is often found in inflammatory disorders of the genito-urinary tract where there is stasis of the urine, Croftan and N. B. Potter have strongly urged the use of antiseptic remedies, like urotropin, and we cannot too strongly support this procedure. In many cases of phosphatic calculi there seems to be a neurotic history and the diet should largely conform to the underlying cause. If a uric acid stone is covered with a phosphatic crust the uric acid diathesis must be treated as well. In some instances the causative factor may not be apparent, and then the dietetic treatment will remain symptomatic. It is always safe, however, to maintain the acidity of the urine in the treatment of these cases.

Urotropin in addition to diet.

A diet list which will cover the ideas herein suggested is appended.

Diet of Phosphatic Calculus

Breakfast

Fruit—apples (baked, raw or stewed), grapes, orange twice a week, stewed evaporated apricots, berries of all kinds in season, melons without sugar; eggs—soft-boiled, dropped on toast, baked, shirred, coddled; fish—broiled, schrod, haddock, halibut, finnan haddie, smelts, perch, trout, mackerel, bluefish, salmon, pickerel; fish or meat hash; broiled honeycomb tripe; broiled chicken; baked potato; stale bread or dry toast; cup of coffee or tea or a glass of milk.

Luncheon

Soups; fish or eggs; fruit or vegetable salad with French dressing; baked, boiled or mashed potato; bread and butter with bee's honey, jam or marmalade; one glass of water or milk.

Dinner

Raw oysters or boiled clams: soups; purees of vegetables; fish as above, boiled or baked; boiled meat; roasts—beef, lamb, veal, white meat of chicken or turkey, partridge, quail, venison; beefsteak; chops as for breakfast; vegetables—Irish potato, spinach, cauliflower, string beans, tomatoes (cooked), asparagus, squash, carrots, beets; salads with French dressing; dessert—light puddings, custard, blanc mange, Junket, apple sago and tapioca, crackers and cheese—Camembert, Brie, cottage, old-fashioned curd; one cup of tea or a glass of milk.

Suggestions

Drink one glass of water at 11 A. M., 4 and 9 P. M.
Do not drink while eating.
Eat meat once a day.
Do not eat fruit more than once a day.

DISEASES OF THE BLOOD

ANEMIA

Simple anemia a symptom only.

Simple anemia is generally treated in text-books on medicine by itself, but it is a mere symptom of some disease or morbid condition like chlorosis, tuberculosis, cancer, new growth, nephritis, suppurative process, intestinal parasites, pyloric stenosis, gastro-intestinal catarrh, malaria, syphilis, etc., and it is important to seek for the primary disease and adapt our diet to the relief or cure of the cause of the anemia. The proper diet will be found under the discussion of the various causes. A few words, however, may be said concerning the anemia after external and internal hemorrhage, postoperative, etc. The quantity of blood lost is soon made up by the liquids drunk, but if the hemorrhage is profuse, salines should be given per rectum and under the skin; otherwise the quality of the blood, which is much impaired, may remain so for a long time. The diet should begin with milk and lime water or beef juice, and as soon as possible strengthened to pure milk, gruels, and solids, and pushed as fast as the patient's digestion will permit.

Diet.

External, internal, post-op. hem., etc. Salines and diet.

Necessity for watching function of stomach and bowels.

In such instances, as well as in all *secondary* anemias, the condition of the gastro-intestinal tract must be most carefully watched with regard to its function, and the greatest care should be used lest constipation or diarrhea arise and cause us to withhold for a day or two all food, thus losing valuable time in restoring the

normal quality of the blood. Test meals must be given occasionally to ascertain the motor sufficiency of the stomach and the presence or absence of HCl. When the former is lessened, the tincture of nux vomica with bitters will often be of great aid, and, of course, the reduction or absence of HCl will call for that acid with or without pepsin to be given with the food, while an excess of HCl will be readily controlled by a free use of protein which is our sheet-anchor in the treatment of all anemias. For the same purpose, the fat may be increased if necessary. The diet, as a rule, is similar to that of chlorosis, and needs no further consideration.

PROGRESSIVE PERNICIOUS ANEMIA

This affection was first described by Addison, who called it idiopathic, although the symptoms he described have since been observed accompanying other well-known affections. Nevertheless, there is yet a wide-spread idea prevailing that there is a primary disease of the blood-forming organs, of a pernicious type, quite distinct from the symptomatic anemia, and until the cause of this type is discovered we can only treat symptoms referable to the organs participating in this affection. Moraczewski found that nitrogen, phosphate, chlorine and calcium were poorly assimilated, and nitrogen retention in the system is characteristic of this disease. Hence, Nothnagel says, it is not so much a question of food as of bad assimilation. Rosenqvist found that the nitrogen retention in progressive pernicious anemia corresponded with the retention and escape of the bothriocephalus latus from the intestine.

Faulty assimilation and nitrogen retention.

Eichhorst and Osler call attention to a severe form of anemia during pregnancy and parturition.

Some of the causes given.

John Cowan in Sutherland's "Diet and Dietetics," also Quincke and Peters, say that it is probable that progressive pernicious anemia is the result of an abnormal hemolysis in the portal tract, as at autopsy iron is found in abnormal amount in the periphery of the hepatic lobules, while Dr. William Hunter (*ibid*) traces the origin of the disease to an infection of the gastro-intestinal tract and can be traced to a pyorrhea alveolaris. Croftan calls attention to atrophy of the gastric or intestinal glands as a cause, and mentions the importance of examining the blood for the malaria plasmodium, filaria sanguinis hominis, and distoma hæmatobium.

Treatment.

The treatment must begin with rest in bed out of doors, and a thorough laxative, castor oil or calomel, as a rule. Arsenic in increasing doses is our mainstay in combatting this disease and should be continued in small doses during the remissions so common in this affection.

Milk.

Milk oftentimes is not well borne, but should be tried in all cases. When it has to be abandoned, kefir, koumiss, buttermilk or lactic acid milk may be tried. Milk and cereal gruels are often well digested.

HCl and pepsin.

Not infrequently, there is a great disgust or loathing for meat; especially is this true when there is absence of HCl in the stomach. In such cases pepsin and HCl should be administered after the meals, or the animal protein foods can be given in the form of milk, raw or peptonized, junket, whey, bonny clabber, the special kinds of cheeses (Camembert, Brie, Cream, Neufchatel), beef and egg albumen, fish, meat soups with vegetables. The vegetable proteins are usually

better tolerated, but they should not be entirely depended upon. Fats in the form of butter, cream, etc., should be given. Generally, a diet of mixed solids is best borne by these patients, except in the last stage, and should be pushed as fast as the stomach and bowels will tolerate it. Great aid will be given in the dietetic treatment of this disease by frequent analysis of the stools for meat fiber, undigested fat, and starch.

Mixed diet.

Examination of stool an aid to dietetic treatment.

Diet List in Progressive Pernicious Anemia

BREAKFAST, 7 A. M.

Fruit—apples (baked, raw or stewed), apple sauce, stewed pears, peaches, apricots, prunes, berries of all kinds in season; steak or chops; breakfast bacon; broiled honeycomb tripe; broiled chicken; calves' liver and bacon; fish (any kind in season) broiled or baked in cream; baked potato with plenty of butter; toasted bread with butter; coffee with an egg beaten up in it; milk or cocoa.

10 A. M.—Koumiss or milk.

DINNER, 1 P. M.

Soups (preferably purees)—potato, celery, tomato, pea, corn; roasts—beef, lamb, chicken, quail, partridge; vegetables—Irish potato, lettuce, spinach, stewed celery, cauliflower, parsnips, beets, carrots, squash, string beans, new green peas, tomatoes, cucumbers (cut thin as tissue paper); stale bread and butter; cooked fruit; light puddings—tapioca, apple tapioca, junket, bonny clabber, apple sago, baked custards of all kinds, blanc mange; one cup of tea or cocoa.

4 P. M.—Milk, egg or beef albumen.

SUPPER, 6 P. M.

Soups as for dinner; clam or fish chowder; fish or eggs if not taken for breakfast; stews—lamb, beef, chicken; baked potato with butter; stale bread, dry toast, or pulled bread with plenty of butter; fruit as for breakfast (preferably cooked); one cup of tea, cocoa or milk.

9 P. M.—One glass of milk or koumiss.

SUGGESTIONS

Beef albumen may be given in doses of 2 ounces twice daily.

Eat slowly and thoroughly masticate the food.

Do not drink during the meal.

Buttermilk, kefir or koumiss should be taken between meals and at bedtime when milk is not well borne.

At different periods in the day the white of an egg may be given in orange juice two or three times, or milk in some form.

CHLOROSIS

In this disease which affects girls in their teens, for some reason which we do not yet know, the blood-forming organs do not manufacture enough red corpuscles, and the individual red cells contain less hemoglobin than normal, while the blood plasma is increased in amount, although the specific gravity remains the same. Hard working girls, who are not well nourished, and live in poorly ventilated apartments, and otherwise unhygienically, comprise by far the larger number of sufferers from this affection. Not infrequently, however, we find chlorotics in the upper classes, among girls, for instance, who are usually inactive and overfed, who, as a rule, are fat. The disease has been thought to be due to some neurosis, especially of the vasomotor type. Others believe it is a gastro-intestinal disease or arises from autointoxication, but it is more probable that the latter affections are the result of the anemia which the blood dyscrasia causes.

Symptoms.

The symptoms may be very slight or severe, and even alarming, so in all conditions frequent blood examinations are necessary. Patients may manifest only a slight dyspnea on exertion, with mild symptoms of nervous dyspepsia and constipation, or there may be great exhaustion, hyperacidity, nausea, vomiting,

and obstinate constipation. Indeed, the first call for a physician may be for vomiting of blood. In all cases, however mild, the patient should be put to bed from one to six weeks in a well-ventilated, sunny room or, better, in a tent. If there are stomach symptoms, however slight, the stomach should have absolute rest for one or two days, giving liquids if necessary by the bowel. Relieve the constipation by enemata and laxatives; then give a milk and lime water or milk and Vichy diet until the stomach symptoms have been allayed, when the solids may be arranged according to the requirements of the individual case. If mild, the patient may be quite quickly put on to a liberal diet of protein of 150 grams per day or more. If lean, a generous allowance of fat and carbohydrate may be given freely, while the two latter should be below the normal if the patient is obese. Von Noorden advises frequent meals and a good allowance of the proteins for breakfast, as they are more quickly taken up into the body tissues than the carbohydrates, and the last to be absorbed are the fats. Therefore, when the patient is weak in the morning and quick support is desirable, a substantial meat breakfast should be given. For a long time we have found that chlorotic patients do better when the carbohydrates and fats are restricted and the animal proteins increased. F. Müller proved that no diet would cure chlorosis without the aid of iron and arsenic, to first stimulate the blood-forming organs, and when these remedies were given, with a good allowance of nitrogenous food, rapid and complete recovery took place. As long as the stomach is very sensitive, we give frequent meals, but as soon as the

Rest in bed.

Milk diet.

Solid diet.

Iron and arsenic.

meals can be sufficiently large, we prefer three regular ones. When the patient is very thin, of course, the fats, as well as the proteins, are increased, and the carbohydrates which are not irritating, like cereal, gruels, toast, grape or milk sugar, spinach, asparagus, green peas, vegetable soups, vegetables chopped finely, fruit (cooked), are given. When the patient is obese, we restrict the fat and carbohydrate until the weight comes down to normal, and the reader is referred to the chapter on obesity.

LEUKEMIA

This is an affection of the bone marrow, spleen and lymphatic glands, accompanied with an increase of the white corpuscles of the blood. In Von Leyden's Handbuch Ernahrung Therapie, Nothnagel states that metabolism is increased in leukemia, and the cause of the affection cannot be sought in the coexisting anemia, but probably in some poisons affecting the blood protoplasm. All observers agree that the food should be ample in this disease and especially rich in protein. It must also be given with special attention to the gastro-intestinal tract. As these patients usually grow thin, fats must be freely administered. In the main, the diet is similar to that of chlorosis. As a rule, milk is well borne and may constitute a considerable part of the diet, but other foods must be given, and should be as concentrated as possible. The coarser foods, which leave a large bulky residue to go through the bowels, should be avoided; in this way the patient may often be saved a troublesome diarrhea. Animal proteins are especially well borne in this disease.

Cause.

SCURVY

The cause of this disease is not well known, but it is most common among people who live in unhygienic surroundings—in damp and filthy quarters without sunlight, and in persons who have a monotonous occupation without sufficient recreation. Overwork and worriment must be considered as important factors. These patients are often underfed and have insufficient variety in their diet and live mostly on canned food.

Diet.

The affection yields readily to a change in the above conditions, especially when the patients are put upon a proper diet of fresh meat, green vegetables, and fruit. Even a little orange juice added daily to a baby's food is often all that is necessary, coupled with fresh air and sunshine, while an adult may need only the juice of one lemon or a fresh vegetable daily added to the regular diet to bring about a cure. One of the most frequent symptoms of this disease, stomatitis, requires that the food should be liquid and semi-solid on account of the extreme tenderness of the gums and the liability to bleeding, and a proper local and medicinal treatment should be given. When the mouth ceases to be tender a mixed diet should be freely given.

NERVOUS DISEASES

ORGANIC NERVOUS DISEASES

We know of no special diet that will modify or cure these affections, and it is not necessary to look further for the reason than to refer to the original cause of the disease; that is, to recall the fact that organic diseases of the brain and spinal cord are usually traumatic, circulatory, infectious, or toxic. For examples, we need only to mention cerebral softening and epilepsy after injuries, hemiplegias from malignant endocarditis, thrombosis from vascular disease, cerebral tumors of a tubercular or syphilitic nature, partly vascular and partly infectious, while tabes and general paralysis of the insane owe their origin to syphilitic organisms. Acute anterior poliomyelitis well illustrates the rôle an infection plays in spinal affections, and we have to look for toxins as the cause of disseminating cerebro-spinal sclerosis.

Our attention should first be given to the nervous phenomena as symptoms of a basal disease of the cardio-vascular system, the kidneys, a specific infection, a chronic intoxication of some kind, or a tumor, if no history of trauma can be ascertained; hence our remedies must be, first, symptomatic and, second, causal.

In the case of hemiplegia from whatever cause, if the patient is unconscious, we must give only liquids by mouth, preferably milk, given often, in small

Diet when unconscious.

quantities. If there is great difficulty in swallowing, it is better to give peptonized milk, meat juice, and egg albumen by high enema. Care should be taken to wash out the colon daily. After the patient regains consciousness, gruels may be added to the milk; egg and meat albumen may be given, always avoiding more than 4 ounces at one time, as large quantities are apt to cause cerebral congestion; therefore the frequent feeding is safer. The liquids should be lukewarm, neither hot nor cold. After a few days of improvement, the diet should be broadened and some solids (eggs, fish, and meat, cooked fruit, spinach and vegetable purees) may be added to the liquid.

After regaining consciousness.

Small, frequent feeding.

Solids.

Two important points.

Two rules should always be kept in mind when treating hemiplegias:

1. To keep the bowels open, causing a movement every day with cooked fresh fruit and vegetables, also vegetable salads. If this is not possible, milk of magnesia, sodium phosphate or epsom salts may be given.

2. Avoid large meals and all indigestible food. More can be done, oftentimes, by treating the underlying cardiac, vascular, and kidney affections to prevent further attacks. When these are found, the patient should be put upon the diet which has been given in previous chapters, together with the proper therapeutic medicinal remedies.

EPILEPSY

Causes.

As yet, we know very little about the various causes of epilepsy. Sir James Taylor says, in Sutherland's System of Diet and Dietetics, "The necessary condition of the epileptic fit is an unstable state of certain

cells in the brain cortex—a tendency in those cells to discharge, so as to give rise to convulsive movements of the muscles which they subserve or in such a way as to leave other contiguous cells, on a lower level of development, free from the restraining influence of the higher cells. Such irritable cells act as a torch to cause neighboring healthy cells to discharge when under the influence of various excitants." Most observers agree that emotional disturbance is one of the most common excitants of an epileptic fit. Fright, unusual excitement, or any depression may cause it. A blow or fall, causing both physical and psychical shock, may bring on an attack. Stimulation or depression through the circulation is often an exciting cause. It has been observed that most attacks occur during sleep, by day or night, probably due, as Prof. Jolly of Berlin (see Von Leyden's *Hand. der Ernarung Therapie*, Band II, Auflage 2, 2nd Edition) says, to the fact of a cerebral hyperemia when occurring soon after a meal or cerebral anemia when it takes place just before waking and the stomach is empty.

Toxic conditions often cause epileptic seizures, and Prof. Jolly calls special attention to absinthe in this rôle. I wish to report several cases of girls in their teens, in whom a goiter appeared shortly before the first attack, and in the absence of any other cause I am inclined to regard the perverted secretion of the thyroid gland as the probable chemical toxin.

The author is quite in accord with the views of the above writers that epileptics do the best on a mixed diet, avoiding too much meat and too large meals, as well as indigestible food. *Always awaken patients with nocturnal epilepsy early in the morning, to give*

Mixed diet.

some light nourishment, like a glass of milk or an egg. We should omit the most stimulating animal extracts —the purin bodies. As regards the salt-free diet in epilepsy, we can only corroborate the views expressed by the authors mentioned, and say that it has been found applicable to only a few patients allowing us to give smaller doses of the bromides, but in this affection, as in all others, each case must be studied and treated on its own merits. The greatest danger arises from emotional excitement, overeating, irregularities in meals, improperly cooked food, and improper mastication, together with constipation. A few patients seem to do well on a vegetarian diet. In no disease should more attention be given to the patient's individuality than in epilepsy.

Salt-free diet.

CHOREA (MINOR)

In the treatment of this disease, if there is no coexisting cardiac affection, our aim should be to secure comparative rest and exclusion, under a nurse, who is outside of the family circle, in a sunny, well-ventilated apartment, or open-air tent when practicable. When the muscles of chewing and swallowing are involved, the food must be liquid, and very slowly and carefully given for fear of food entering the larynx. The diet should consist of milk, beef albumen, thin gruels. Egg albumen may be given with the milk. As soon as the spasms in the muscles have subsided, however, the strength of the food must be increased by bread and butter, green vegetables, fruit and meat. In rare cases at first, a patient may need to be fed a few times with a nasal tube, and per rectum.

Rest and isolation.

Liquid diet.

Mixed diet.

Gowers and Taylor call attention to the importance

of feeding most choreics before administering a sedative, since, when the latter precaution has not been taken, the sedative has been known to cause death. They also advocate quite strenuously the use of alcohol in the form of brandy or whiskey, in extreme cases. Perhaps no other authors have had as good opportunity of studying chorea as the aforesaid, for in the large hospitals of London we were greatly impressed with the prevalence of chorea and rickets. In private practice in this locality we have not seen any indication for the use of alcohol. In our hospitals, however, it may be useful for a few days.

Sedatives.

Alcohol.

PERIPHERAL NEURITIS

This is an affection of one or more nerves of the periphery of the body. When not due to an injury, it is usually the result of a toxemia of the blood or infection. The toxemia may be due to a chemical toxin from a disorder of metabolism; *e.g.*, gout or diabetes, or a metallic poison, like lead or mercury, introduced with food or otherwise; or, it may be due to the excreted toxin of the bacilli of diphtheria or tuberculosis. However, one of the most common sources of peripheral neuritis is alcohol, and, as the basis of the other causes have been taken up elsewhere, attention is only called here to the dietetic treatment of alcoholic peripheral neuritis. The victims of this affection usually consult us when looking comparatively well as regards color and amount of fat; indeed, they are often overweight, although some are underweight. Since these patients usually have a gastric catarrh, we are told that they have no appetite, and their food distresses them, while they do not lose weight. Of

Causes.

course, this tallies with the scientific fact that alcohol serves both as a food and a fat sparer. Now, as tuberculosis is a frequent complication of alcoholism, it is important to examine all cases of alcoholic neuritis carefully for tuberculosis before instituting the diet. Whether tuberculosis is present or not, if the patient is overfat he should be reduced to within 5 pounds of his normal weight, and to normal if tuberculosis is not present. Of course, in either case, if there is also advanced cardiac disease, he should be brought 5 or 10 pounds below his average weight in health. On the other hand, if he is below the normal, the weight should be increased to correspond as nearly as possible to that of health in order to secure the best metabolism. In the latter class we find our greatest difficulty, as we have a wasting disease to fight, aside from neuritis.

Indications for diet.

At first the alcohol should of course be cut off, and if possible the patient should be treated in the open air, to favor appetite and improve metabolism. As a rule milk, either pure or combined with lime water or Vichy, should be given until there is subsidence of gastric catarrh. Gradually cream and cereals, egg albumen, and beef juice should be added. As soon as possible fish and meat, also meat and vegetable stews, considerable bread and butter may be given, or baked potato, served with cream or butter; broiled bacon is a good way of introducing fat. Special attention should be given to arranging the dietary in many cases, so that the fat sparers, protein and carbohydrates will be in excess of the demand, thus the small quantity of fat which the patient may be able to take is stored up in the system, and the weight thereby increased.

Diet

NEURASTHENIA, HYSTERIA, HYPOCHONDRIA

This group comes under the head of what are usually called the functional nervous diseases, and may well be discussed together, because, as Prof. F. Jolly said, neurasthenia so often forms the root out of which the other affections are developed.

Now, this does not mean that the two former affections may not develop independently of each other in fact, it is safe to say that pure hysteria is much oftener hereditary than neurasthenia or any other affection with which we are familiar, but it is so common to see it develop upon a long-standing neurasthenia that it is easy to appreciate the fact which Dr. Jolly has stated. These affections are all so commonly complications of injuries and organic disease that they have to be treated in such instances largely for the underlying basal disease.

Difficulty in differentiating between neurasthenia and hysteria.

So much misunderstanding seems to exist among physicians as to neurasthenia and hysteria, and the dfferentiation is so uncertain, that the writer upon either topic in one part of our country is misinterpreted in another; that is, what is called neurasthenia in the south or west may be interpreted as hysteria in the north and east; hence it may not be out of place to study briefly the causation and symptoms of these two affections, so that the student and busy practitioner may be able to quickly differentiate them.

Causes of neurasthenia.

Neurasthenia means nerve weakness. We may be able to trace its cause back to the embryo; training and environment in childhood and school-life; the diseases to which the patient has been subjected, as well as the various occupations of later life. Among them may be mentioned those which carry the

thoughts of business and study into the night, thus depriving the patient of the necessary rest and sleep; also those which are provocative of irritation, hurry, and great anxiety. Other causative factors may be mentioned, as alcoholism, syphilis, the various infections, hemorrhage and chronic diseases of all kinds.

The cases due to traumatism will be considered later.

Symptoms. The symptoms of the neurasthenic are numerous, but we will mention only the most important which will aid in differentiating it from hysteria.

1. As a rule there are no objective symptoms which are pathognomonic.

2. Irritability and excitability. The patient is usually excited by the least physical or mental irritation.

3. Fatigueability. The patient is able to endure very little, either mentally or physically; *i.e.*, his eyes tire easily when reading, etc., although the ambition may be great.

4. He is self-centered, studying his sensations and always criticising and judging his own motives and acts.

Headache. 5. Headache, which is the most variable and beggars description. Any anxiety may bring it on immediately, and it often disappears as quickly. Law students just before the bar examination and brokers when under excitement often have it. It is differentiated from all other headaches from the fact that the patient cannot find words to adequately describe it; it is invariably enormously exaggerated, while they suffer from extreme anxiety because of it.

6. Insomnia, often marked and difficult to overcome.

7. Dizziness, usually slight, may often be so alarm-

ing that the patient cannot be persuaded to go out alone.

8. Anxiety over business cares and the various sensations arising from the different organs of the body.

Fears.

9. Fears are very common in the neurasthenic, especially of open or closed places, crowds, being alone, epidemic diseases, cancer, etc., and other things too numerous to mention. It is safe to say that this is one of the most common and characteristic symptoms of neurasthenia.

Hyperesthesia and paresthesia.

10. Changes in the sensibility of the skin. There may be slight change (hyperesthesias); paresthesias are, however, much more common, such as sensations of crawling, waving, heat or cold, itching. The special senses like sight and hearing are not infrequently involved. The patient complains of bright spots, stars or glimmering before the eyes; hears all kinds of noises in the head, like ringing, puffing, blowing and hissing sounds.

11. Tremor. This is usually very fine, rapid and vibratory in character, similar to that seen in Basedow's disease.

Vasomotor symptoms.

12. Blushing of the face and sensations of pressure of blood in the head are so marked in some cases that merely to have the attention directed to the head and face will immediately develop them. Among the vasomotor symptoms, dermographie is very common.

Palpitation and pain in heart region.

13. Palpitation. It is hard to find a neurasthenic who is not more or less disturbed by this most distressing symptom. In fact, he is so conscious of the beating of the heart against the chest wall that he becomes frightened, and by watching its pulsations

soon fails to perceive them all and then becomes convinced that his heart is skipping. Fear in such cases becomes so great that precordial distress and even air hunger may occur, and pains may extend into the arms; paresthesia of the hands, with pallor and coldness, set in, and unless the physician is extremely careful he may suspect that the patient is suffering from angina pectoris. But if he seeks for the other symptoms of neurasthenia, he will not long hesitate in his diagnosis, always remembering that neurasthenia is most prevalent before arteriosclerosis has developed.

Pain.

14. Certain pains limited to the spine are quite common, especially to the cervical and the region of the eleventh and twelfth dorsal spine and the coccyx. These so-called spinal cases may have active knee-jerks, with slight suspicion of ankle clonus. The so-called railway spine might come under this type. A sexual type of neurasthenia has been described, but it is so well known that it need not be more than alluded to here.

If a patient has headache, quick mental and physical fatigue, accompanied with irritability, insomnia, fobias, great anxiety, palpitation, tremor (as described) with or without objective signs, no one would doubt the diagnosis of neurasthenia.

HYSTERIA

Causes of hysteria.

Hysteria is usually an hereditary disease; indeed, it is probable that the affection rarely ever develops in persons who have no hereditary taint, but it would certainly be hard to account for epidemics of hysteria appearing in patients only who are predisposed to it by heredity.

Hysteria, of course, may develop in anyone who is affected with organic disease or whose nervous system has become exhausted by neurasthenia. A person who has a predisposition to hysteria is much more likely to develop it under the above conditions, hence the causes of neurasthenia just enumerated may be sufficient to develop hysteria in one so inclined. Trauma is also a common cause.

Prophylaxis.

Too much importance cannot be attached, therefore, to the care of children hysterically inclined, as very much can be done to prevent its development later in life.

Symptoms of hysteria—objective and subjective.

The symptoms of hysteria, in contradistinction to those of neurasthenia, are markedly objective, and, therefore, the attention of the reader will be especially directed to the most important.

I. The objective symptoms:

1. Cramps of individual muscles or general convulsions.

2. Paralysis (loss of voice; loss of reflexes; knee-jerks; plantar reflex; corneal reflex; etc.).

3. Anesthesia of both skin and sensorium.

4. Analgesia—absence of pain sense.

5. Limitation of field of vision.

6. Loss of color sense (color blindness). Among these objective symptoms it is well to know that the convulsions may be limited to a few superficial muscles, or the internal muscles of the body, *i.e.*, to the muscles of the larynx, esophagus, bowels, the sphincters of the bladder and rectum; consequently, any or all of the organs whose functions are presided over by the above muscles may be affected; thus we have loss of voice, globus hystericus, spasms of the

Convulsions.

esophagus, hysterical diarrhea, and hysterical micturition.

Anesthesia. 7. Anesthesia likewise may only affect a small area of the body, as one arm, leg, the forehead, neck, the cornea, or certain portions of the skin. Such anesthesia is rarely bilateral, and it does not always limit itself to a part of the system supplied by one or more clearly defined nerves. Anesthesia is such a marked symptom of hysteria that Pitres was able to demonstrate it objectively in thirty-eight out of forty cases.

Special senses. Some of the special organs of sense, like sight, hearing, taste and smell, may be subject to anesthesia, and their functions thereby may be impaired or lost. Associated with this anesthesia is loss of pain sense, and it is well to remember that there may be double amaurosis in hysteria, although it is rare.

Pain. 8. Pain is always present in hysteria, and may be of any degree of intensity and affect any part of the body. Headache often occurs, taking the form of hyperesthesia of a certain area of the scalp. When marked, this constitutes the well-known clavus, which may last for days and be accompanied with dizziness.

Severe pain in the mammæ, with distinct redness and swelling of the breast gland, has even led to amputation of the breast in hysterical patients (see Charcot and Gilles' de la Tourette), and pain in the ovary has been frequently mistaken for appendicitis.

Hysterical zones 9. Hysterical zones are very common, and it is often possible to bring about a spasm or convulsion by pressure upon them.

10. The spinal processes of the vertebral column are often very sensitive to pressure, but these hyperesthesias are psychical.

11. Paralysis may be partial or complete in this affection, and care must be taken not to confuse an hysterical with an organic palsy, which may, in either case, be a monoplegia, a hemiplegia, a diplegia, or a quadruplegia. **Paralysis.**

II. The subjective signs of hysteria: **Differentiation of neurasthenia and hysteria.**

1. Suggestibility.

All hysterical patients are open to suggestion, consequently they have always been the subjects of hypnotism. However, they do not even need to be put into the hypnotic state, for it is easy to suggest ideas directly or indirectly to an hysterical patient and find a ready response. As a rule, such patients are bright and often very intellectual. It is easy to make them laugh or cry. The symptoms noted in women at the climacteric are partly neurasthenic and partly hysterical, as the vasomotor system plays such a rôle at this time.

2. Will power.

The will power is defective in that there is want of self-control, and a tendency to yield to their own inclinations; as Gowers says, "Self-consciousness dominates the patient's thoughts and actions and finds its expression in manner, glance, and tone. There is generally exaggeration in the description of suffering, and the sympathy excited is a source of gratification to a patient whose sufferings often secure a relief from other annoyances which to her are greater, and the attention she receives is a new stimulus to her self-consciousness. The motives become stronger to yield to than to resist, morbid tendencies which are thus unconsciously cultivated."

3. Patients are very excitable and quickly become

angry or ashamed. They laugh or cry upon the slightest provocation.

4. They often have hallucinations suggested in their dreams, and show somnambulistic and hypnoidal conditions.

5. They are either depressed mentally and apathetic, or they may be exalted and maniacal.

If in the light of the foregoing we compare these two affections, it is clearly evident:

1. That hysteria is characterized by well-marked objective symptoms (stigmata), while practically all the symptoms of neurasthenia are subjective.

2. That hysteria is much more common in females and in the Hebrew race, while neurasthenia predominates in males.

3. Mental inhibitions and obsessions are very common in hysteria, while the former are rarely seen in neurasthenia, and the latter are unknown.

Hysterical patients, though often apathetic, as a rule are open to suggestion, and therefore may be readily influenced by hypnotism or suggestion without hypnosis. On the other hand, neurasthenics are not, as a rule, good subjects for hypnotic suggestion. The latter are also argumentative and can more readily be reasoned with.

Hypochondria. When a patient has become introspective and depressed by self-analysis and accusation he is said to be suffering from hypochondria. He likes to talk about his sensations, and occasionally it becomes almost a monomania. However, it seems far better not to speak of hypochondria as a distinct affection, but rather to consider it a symptom of neurasthenia or other neurosis.

TRAUMATIC NEUROSES

These affections are so common and so often lead to legal suits that every physician should be perfectly familiar with all their peculiarities and symptoms.

Hysteria and neurasthenia after injury.

Injuries, however slight, may be followed by neurasthenia or hysteria, or a combination of the two may result, especially when there is a nervous or toxic basis preceding the trauma. Neurasthenia is much the more common, although often the psychical symptoms are so prominent in the picture that the real symptoms of neurasthenia are concealed. It is always well to remember that the central nervous system may be injured; hence, every examination of an accident case should clear up this point if possible. If organic disease can be ruled out, then the functional nervous affection may be easily arranged under one of the foregoing heads.

Causes.

Fright from a slight accident (like a fall in or from a trolley car or elevator, bruising or burning a hand, foot or some other part of the body or a slight jar, especially in a person who has been previously neurotic) may suffice to cause a traumatic neurosis. Indeed, the fright alone may produce it, and the nature of the preexisting neurosis (that is, neurasthenia or hysteria) will determine the peculiar form of the affection arising from the injury.

Symptoms.

The symptoms of traumatic neurosis may come on at once after the accident, or weeks and months later. Among the most common are the following:

Pain.

1. Pain, usually in the head or back, sometimes both. The patient may be restricted in certain movements of the head because they cause pain.

This corresponds in character to neurasthenic pains in respect to their vagueness and variability.

Psychical. 2. When the brain has sufficient shock or the head is injured, psychical symptoms appear in the foreground. The patient is filled with anxiety over his condition; he has lost his position, and will never be able to resume business; becomes melancholic and apathetic; may cry easily; is very excitable; complains of loss of memory; loses interest in what is going on in the world and becomes self-centered.

Dizziness. 3. Another alarming symptom may appear in injuries to the head, namely, *dizziness*. It may cause serious falls, and in some cases even clouding of the intellect.

Muscle changes. 4. *Muscle changes.* In many instances there is a *myasthenia. The patient complains of want of muscle power and quick fatigue. There may be tremor of the hands, which is increased by excitement while under observation, also a paretic condition of the muscles in hysterical cases, or even paralysis, or clonic or tonic spasms.* This may be confined to muscles of the extremities or involve one-half of the body, although the face muscles are usually spared. There is no mouth-biting, frothing, or involuntary micturition. There is rarely a paraplegia. There will often be found limitation of the field of vision, loss of color sense, amaurosis or loss of voice.

Anesthesia and analgesia. 5. Perhaps the most characteristic symptom seen in traumatic neurasthenia is the change in the sensibility of the skin. In the neurasthenic type there will be paresthesias and hyperesthesias, which have been heretofore described, while in the hysterical type anesthesia and analgesia predominate. These

symptoms usually so alarm the patient that he fears paralysis.

6. Anorexia, dyspepsia, and diarrhea are also very common.

7. Vasomotor changes—tachycardia, arrhythmia cordis, emotional blushing of the face or cyanotic discoloration of circumscribed spots of the skin, dermographia, changes in the color of the hair—are often observed. **Vasomotor changes.**

As regards the treatment of neurasthenia, it may be well to divide the cases into two classes. **Treatment, two classes.**

1. The class which gives a neurotic history from childhood, and because of worriment, business or domestic trouble, loss of sleep, loss of relatives, fright or trauma, there is a further slump in the nervous system and the patient breaks down.

2. The class which is neurotic from early life, but later from toxic affections, due perhaps to autointoxication, indigestion, diarrhea, gout, faulty metabolism, coupled with any, or all, of the symptoms of class one. Finally, because of headache or palpitation, accompanied with great lassitude and loss of flesh perhaps, the patient gives up and consults a doctor.

Now, if the exhaustion and loss of flesh are quite marked, as in the second class just described, or in patients with anorexia nervosa (first described by Sir Wm. Gull), we advise a modified Weir-Mitchell plan of treatment.

The patient should be isolated in a cheerful, well ventilated, sunny apartment, and put to bed, having a strange nurse to attend him. After one day of fasting, during which the gastro-intestinal tract should be **Isolation and diet.**

conscious and does not possess the requisite knowledge to eat. In such cases he should be fed with a stomach tube until he will eat. This is usually for a very short time, however, and later a diet of properly mixed elements is found to be best, as in neurasthenia.

Avoidance of too rapid reduction.

One point should be remembered in the treatment of these functional nervous cases, namely: Do not remove their fat too quickly for fear of breaking down their own body proteins and setting them free in the circulation, thereby making the patients feel worse and of course much weaker.

The diet of traumatic neurasthenia is practically the same as the above.

Dr. Jolly calls special attention to the dietetic therapy of diabetes as particularly good for the coexisting neurasthenia, as well as that complicating diabetes, and we have often seen neuralgia and neuritis clear up while treating diabetes.

GRAVES' OR BASEDOW'S DISEASE

Cause.

A few words concerning this disease may help the young physician who rarely sees a case. The cause is unknown, but there is a perverted function of the thyroid gland, and one of its most alarming symptoms is violent diarrhea, perhaps accompanied with vomiting often jeopardizing the life of the patient. On account of this symptom, some writers have evolved a theory of intestinal autointoxication as the probable cause of the hyperthyroidism. To feed a patient with this symptom is a perplexing problem to the novice, and I must confess that I was a long time in practice before I essayed to stop the gastro-enteric crisis with a subcutaneous injection of morphia or, better still, some

good preparation of opium by the mouth, and when that failed to stop the nausea, to give large doses of the strontium bromide per rectum. This method of treatment will in a few hours secure sufficient sedative effect to enable us to begin the use of food, which, of course, should at first be arranged according to the patient's habits, care being taken in the selection of foods that are easily digested, like milk, eggs, gruels, cooked fruits, vegetable purees, etc. Patients suffering with this disease should be fed very liberally, with special reference to food that does not excite diarrhea or tachycardia. As a rule all coarse vegetables must be eschewed and a well-balanced diet arranged, with emphasis laid upon rest after meals, followed by light open-air activity, with freedom from all emotional disturbance, and every means to secure good sleep should be used.

Opium and bromide in.

Diet.

RECEIPTS

Devonshire Cream

"The milk should stand twenty-four hours in winter, half the time in warm weather. The milkpan is then set on the stove, and should remain until the milk is quite hot, but not boiling, or there will be a thick skin on the surface. When it is sufficiently done, the undulations on the surface look thick, and small rings appear.

"The time required for scalding cream depends on the size of the pan, and the heat of the fire, but the sooner it is done, the better. The pan should be placed in the dairy when the cream is sufficiently scalded, and skimmed the following day. This cream is so much esteemed that it is sent to the London markets in small square tins, and is exceedingly delicious, eaten with fresh fruit.

"The Devonshire butter is made from this cream, and is usually very firm."

Tamarind Whey

Stir two tablespoonfuls of tamarinds into a pint of boiling milk, strain. This forms a refrigerant and lightly laxative drink. Calories = 320.

White Wine Whey or Posset

To 1/2 pint boiling milk add 1 wine-glass of sherry and strain through a muslin cloth. Sweeten with

powdered sugar according to taste. A useful diuretic drink in colds and febrile disorders. For a child give a tablespoonful every two or three hours. Calories = 241.

Meat Biscuits

Mix together 1 pound flour, 1 pound of meat, 1/4 pound of suet, 1/2 pound of potatoes with a little sugar, onion, salt, pepper and spices. Bake. A palatable meat biscuit weighing about 1 1/4 pounds, containing 10 to 12 per cent. water, is thus obtained which keeps quite unchanged for four months. Calories = 4000.

Beef Albumen

Chop 1 pound of lean round steak into dice. Put in a crock, and add 1 pint of cold water; set in refrigerator eight hours; cook on stove twenty minutes, strain and add salt and pepper to taste.

Home-made Koumiss

Boil fresh milk, and when nearly cold put into quart bottles, leaving room to shake. Add 1/2 ounce granulated sugar and a piece of Vienna yeast the size of a hazel nut, cork with new corks, tie down, keep cool, lay the bottles horizontally, but shake twice daily. Ready to drink on the sixth day, or earlier in hot, later in cold weather. The koumiss can be made thinner by using skimmed milk.

Home-made Lime Water

Pour 2 quarts of hot water over fresh unslacked lime (size of a walnut), still until slacked, let stand till clear and bottle.

Two heaping teaspoonfuls mustard.

One-half cup olive oil.

Mix with the water in which the beans have been boiled.

Mix all together and bake all day as usual.

Iced Coffee with Cream and Sugar

One pint sweet cream, 1 ounce finely ground coffee, 2 1/2 ounces sugar. Cook the cream, add the coffee and sugar. Calories = 1185.

Instead of the coffee, a heaping teaspoonful of Russian tea or 2 ounces of cocoa cooked with milk may be used.

Iced Coffee with Cream and Yolk of Egg

To the above add the yolks of two eggs. One-half the cream is cooked with the coffee, the other half beaten up with the egg. Strain the coffee and cream, mix and put on the ice. Calories = 1299.

Cream-of-tartar Drink

Dissolve 1 to 1 1/2 drams of cream of tartar in 1 pint of boiling water and flavor with lemon peel and sugar. When cold, strain and take ad libitum as a refrigerant drink and diuretic.

Albumenized Milk

One cup (4 ounces) milk, white of one egg, 1/8 ounce sugar. Shake in a covered jar or lemonade shaker, 1 cupful milk, a tablespoonful lime water and the white of an egg. Sweeten, flavor as desired and serve at once. Calories = 101.

Hot Egg-nog

Yolk of one egg, 1/8 ounce sugar, one glass of hot milk, 1 ounce brandy or old whiskey. Beat the yolk of one egg; add a teaspoonful or two of sugar and a glass of hot milk; strain, and add a tablespoonful of brandy or old whiskey, or flavor with nutmeg or wine. Calories = 162.

Imperial Drink

Add a teaspoonful of cream of tartar to a pint of boiling water; into this squeeze the juice of half a lemon or more if desired. Sweeten to taste and serve cold. Useful in fevers and in nephritis.

Caudle

One egg, 1 1/2 ounces wine, 1/8 ounce sugar, 1/2 pint gruel, 1 slice toast. Beat up an egg to froth; add a wineglassful of sherry wine and sweeten with a teaspoonful of sugar; if desired flavor with lemon peel. Stir this mixture into 1/2 pint gruel; over this grate a little nutmeg and serve with hot toast. Calories = 376.

Beef Juice

Broil quickly pieces of the round or sirloin of a size to fit the opening in a lemon squeezer. Both sides of the beef should be scorched quickly to prevent the escape of the juices, but the interior should not be fully cooked. As soon as they are ready the pieces of meat should be squeezed in a lemon squeezer previously heated by being dipped in hot water. As it drips the juice should be received into a hot wine glass; it should be seasoned to the taste with salt and a little cayenne pepper, and taken while hot.

Chemical Composition of Food Materials

Food materials	W. per cent.	P. per cent.	F. per cent.	C. per cent.	Fuel value per pound
Animal Food					
Beef, fresh.					
Ribs, lean	71.3	19.5	8.3	.....	715
Ribs, fat	52.0	16.5	31.1	.....	1620
Loin, lean	67.0	19.7	12.7	.....	900
Loin, fat	54.7	17.5	27.6	.....	1490
Round, medium fat	65.5	20.3	13.6	.....	950
Sweetbreads as purchased.	70.9	16.8	12.1	.....	825
Tongue	70.8	18.9	9.2	.....	740
Beef, cooked.					
Roast	48.2	22.3	28.6	.....	1620
Loin steak, broiled	54.8	23.5	20.4	.....	1300
Beef, corned.					
Corned beef	51.8	26.3	18.7	.....	1280
Tongue, whole	51.3	19.5	23.2	.....	1340
Veal, fresh.					
Loin, medium fat	68.9	20.5	10.4	.....	820
Liver	73.0	19.0	5.3	.....	575
Lamb, fresh.					
Forequarter	55.1	18.3	25.8	.....	1430
Lamb, cooked.					
Chops, broiled	47.6	21.7	29.9	.....	1665
Mutton, cooked.					
Leg, roast	50.9	25.0	22.6	.....	1420
Sheep's kidneys, as purchased.	78.7	16.5	3.2	.....	440
Pork, fresh.					
Ham, fresh	50.1	15.7	33.4	.....	1700
Loin chops	50.7	16.4	32.0	.....	1655
Pork.					
Liver	71.4	21.3	4.5	1.4	615
Pork, salted and smoked.					
Ham, medium fat	40.3	16.3	38.8	.....	1940
Bacon, lean	31.8	15.5	42.6	.....	2085
Bacon, medium fat	18.8	9.9	67.4	.....	3030
Bacon, smoked	20.2	10.5	64.8	.....	2930
Sausage.					
Pork	39.8	13.0	44.2	1.1	2125

Chemical Composition of Food Materials.—*Continued*

Food materials	W. per cent.	P. per cent.	F. per cent.	C. per cent.	Fuel value per pound
Animal Food.—*Continued*					
Poultry, fresh.					
Chicken	74.8	21.5	2.5	.....	505
Fowls	63.7	19.3	16.3	.....	1045
Goose, young	46.7	16.3	36.2	.....	1830
Turkey	55.5	21.1	22.9	.....	1360
Poultry and Game, cooked.					
Capon	59.9	27.0	11.5	.....	985
Turkey, roast	52.0	27.8	18.4	.....	1295
Turkey, roast, light and dark meat and stuffing.	65.0	17.1	10.8	5.5	870
Fish, fresh.					
Cod	82.6	16.5	0.4	.....	325
Eels, salt water, head, skin and entrails removed.	71.6	18.6	9.1	.....	730
Hake, entrails removed	83.1	15.4	0.7	.....	315
Halibut, steaks or sections	75.4	18.6	5.2	.....	565
Herring	72.5	19.5	7.1	.....	660
Mackerel	73.4	18.7	7.1	.....	645
Mullet	74.9	19.5	4.6	.....	555
Salmon	64.6	22.0	12.8	.....	950
Smelt	79.2	17.6	1.8	.....	405
Trout, brook	77.8	19.2	2.1	.....	445
Turbot	71.4	14.8	14.4	.....	885
Fish, Preserved and Tinned.					
Haddock, smoked	72.5	23.3	0.2	.....	400
Herring, smoked	34.6	36.9	15.8	.....	1355
Mackerel, salt, dressed	43.4	17.3	26.4	.....	1435
Salmon, tinned	63.5	21.8	12.1	.....	915
Sardines, tinned	52.3	23.0	19.7	.....	1260
Shellfish, etc., fresh.					
Crabs, whole	77.1	16.6	2.0	1.2	415
Crayfish, abdomen	81.2	16.0	0.5	1.0	340
Lobster, whole	79.2	16.4	1.8	0.4	390
Mussels, in shell	84.2	8.7	1.1	4.1	285

Chemical Composition of Food Materials.—*Continued*

Food materials	W. per cent.	P. per cent.	F. per cent.	C. per cent.	Fuel value per pound
Shellfish.—*Continued*					
Oysters, in shell	86.9	6.2	1.2	3.7	235
Scallops	80.3	14.8	0.1	3.4	345
Turtle, green	79.8	19.8	0.5	1.2	390
Shellfish, etc., tinned.					
Lobster	77.8	18.1	1.1	0.5	390
Eggs (hen's).					
Uncooked	73.7	13.4	10.5	.....	720
Boiled	73.2	13.2	12.0	.....	765
White, boiled	86.2	12.3	0.2	.....	250
Yolk, boiled	49.5	15.7	33.3	.....	1705
Dairy Products, etc.					
Butter	11.0	1.0	85.0	.....	3605
Cheese, American, pale	31.6	28.8	35.9	0.3	2055
Cheese, American, red	28.6	29.6	38.3	.....	2165
Cheese, Brie	60.2	15.9	21.0	1.4	1210
Cheese, Camembert	48.6	21.0	21.7	.....	1472
Cheese, Cheddar	27.4	27.7	36.8	4.1	2145
Cheese, Cheshire	37.1	26.9	30.7	0.9	1810
Cheese, Cottage	72.0	20.9	1.0	4.3	510
Cheese, Neufchatel	50.0	18.7	27.4	1.5	1530
Cheese, Roquefort	39.3	22.6	29.5	1.8	1700
Cheese, Skimmed milk	45.7	31.5	16.4	2.2	1320
Cheese, Swiss	31.4	27.6	34.9	1.3	2010
Milk, condensed, sweetened	26.9	8.8	8.3	54.1	1520
Milk, whole	87.0	3.3	4.0	5.0	325
Milk, skimmed	90.5	3.4	0.3	5.1	170
Buttermilk	91.0	3.0	0.5	4.8	165
Miscellaneous.					
Gelatin	13.6	91.4	0.1	.....	1705
Calf's-foot jelly	77.6	4.3	.....	17.4	405
Lard, unrefined	4.8	2.2	94.0	.....	4010

Chemical Composition of Food Materials.—*Continued*

Food materials	W. per cent.	P. per cent.	F. per cent.	C. per cent.	Fuel value per pound
Vegetable food. Flours, meals, etc.					
Oatmeal, boiled	84.5	2.8	0.5	11.5	285
Oatmeal, gruel	91.6	1.2	0.4	6.3	155
Rice, boiled	72.5	2.8	0.1	24.4	525
Rice, flaked	9.5	7.9	0.4	81.9	1685
Shredded wheat	8.1	10.5	1.4	77.9	1700
Macaroni, cooked	78.4	3.0	1.5	15.8	415
Bread, pastry, etc.					
Bread, brown	43.6	5.4	1.8	47.1	1050
Rolls, French	32.0	8.5	2.5	55.7	1300
Rolls, Vienna	31.7	8.5	2.2	56.5	1300
White bread	35.3	9.2	1.3	53.1	1215
Toasted bread	24.0	11.5	1.6	61.2	1420
Zwieback	5.8	9.8	9.9	73.5	1970
Butter crackers	7.2	9.6	10.1	71.6	1935
Water crackers	6.4	11.7	5.0	75.7	1835
Gingerbread	18.8	5.8	9.0	63.5	1670
Sponge cake	15.3	6.3	10.7	65.9	1795
Lady fingers	15.0	8.8	5.0	70.6	1685
Macaroons	12.3	6.5	15.2	65.2	1975
Pie, apple	42.5	3.1	9.8	42.8	1270
Pie, mince	41.3	5.8	12.3	38.1	1335
Pudding, tapioca	64.5	3.3	3.2	28.2	720
Sugar, starches, etc.					
Honey	18.2	0.4	.....	81.2	1520
Starch, arrowroot	2.3	.....	.....	97.5	1815
Starch, sago	12.2	9.0	0.4	78.1	1635
Starch, tapioca	11.4	0.4	0.1	88.0	1650
Vegetables.					
Artichokes	79.5	2.6	0.2	16.7	365
Asparagus	94.0	1.8	0.2	3.3	105
Beets, fresh	87.5	1.6	0.1	9.7	215
Cabbage	91.5	1.6	0.3	5.6	145
Carrots, fresh	88.2	1.1	0.4	9.3	210

Chemical Composition of Food Materials.—*Continued*

Food materials	W. per cent.	P. per cent.	F. per cent.	C. per cent.	Fuel value per pound
Vegetables.—*Continued*					
Cauliflower	92.3	1.8	0.5	4.7	140
Celery	94.5	1.1	0.1	3.3	85
Cucumbers	95.4	0.8	0.2	3.1	80
Leeks	91.8	1.2	0.5	5.8	150
Lentils, dried	8.4	25.7	1.0	59.2	1620
Lettuce	94.7	1.2	0.3	2.9	90
Mushrooms	88.1	3.5	0.4	6.8	210
Onions, fresh	87.6	1.6	0.3	9.9	225
Parsnips	83.0	1.6	0.5	13.5	300
Peas, green	74.6	7.0	0.5	16.9	465
Peas, dried	9.5	24.6	1.0	62.0	1655
Potatoes, raw	78.3	2.2	0.1	18.4	385
Potatoes, cooked, boiled	75.5	2.5	0.1	20.9	440
Potatoes, cooked, chips	2.2	6.8	39.8	46.7	2675
Potatoes, cooked, mashed and creamed.	75.1	2.6	3.0	17.8	505
Radishes	91.8	1.3	0.1	5.8	135
Rhubarb	94.4	0.6	0.7	3.6	105
Spinach, fresh	92.3	2.1	0.3	3.2	110
Tomatoes, fresh	94.3	0.9	0.4	3.9	105
Turnips	89.6	1.3	0.2	8.1	185
Vegetables, tinned.					
Peas, green	85.3	3.6	0.2	9.8	255
Tomatoes	94.0	1.2	0.2	4.0	105
Pickles, condiments, etc.					
Catsup (tomato)	82.8	1.5	0.2	12.3	265
Caviar	.....	32.0	15.5	2.0	
Horse-radish	86.4	1.4	0.2	10.5	230
Olives, green	58.0	1.1	27.6	11.6	1400
Olives, ripe	64.7	1.7	25.9	4.3	1205
Pickles, mixed	93.8	1.1	0.4	4.0	110
Fruits, berries, etc., fresh.					
Apples	84.6	0.4	0.5	14.2	290
Apricots	85.0	1.1	.....	13.4	270

Chemical Composition of Food Materials.—*Continued*

Food materials	W. per cent.	P. per cent.	F. per cent.	C. per cent.	Fuel value per pound
[illegible]					
[illegible]	75.3	1.3	1.6	22.0	460
[illegible]	86.3	1.3	1.0	10.9	270
[illegible]	80.9	1.0	0.8	16.7	365
[illegible]	88.9	0.4	0.6	9.9	215
[illegible]	85.0	1.5	.....	12.8	265
[illegible]	79.1	1.5	.....	18.8	380
[illegible]	77.4	1.3	1.6	19.2	450
[illegible]	81.9	0.6	0.6	16.6	
[illegible]	89.5	0.6	.....	9.3	185
[illegible]	86.9	0.8	0.2	11.6	240
[illegible]	84.4	0.6	0.5	14.1	295
[illegible]	89.3	0.4	0.3	9.7	200
[illegible]	78.4	1.0	.....	20.1	395
[illegible]	85.8	1.0	.....	12.6	255
[illegible]	90.4	1.0	0.6	7.4	180
[illegible]	92.4	0.4	0.2	6.7	140
[illegible]					
[illegible]	[illegible]	1.6	2.2	66.1	1350
[illegible]	[illegible]	4.7	1.9	62.5	1290
[illegible]	[illegible]	2.4	1.7	74.2	1495
[illegible]	[illegible]	2.1	2.8	75.4	1615
[illegible]	[illegible]	1.3	0.3	74.2	1475
[illegible]	[illegible]	2.1	[illegible]	73.3	1400
[illegible]	[illegible]	2.1	3.3	76.1	1635
[illegible]	[illegible]	[illegible]	0.2	20.8	220
[illegible]	[illegible]	[illegible]	0.3	28.0	355
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Chemical Composition of Food Materials.—*Continued*

	P. per cent.	F. per cent.	C. per cent.	Alcohol per cent.
Beverages.				
Beer	4.3	.....	0.8	4.0
Claret	0.2	.....	11.0	10.0
Madeira	0.2	.....	3.0	20.0
Port	0.18	.....	5.8	18.0
Sherry	0.2	.....	5.0	17.0
Champagne	0.2	.....	12.0	11.0
Brandy	.....	.....	.....	70.0
Coffee	0.16	0.5	1.4	
Tea	0.3	.....	0.6	
Cocoa	14.0	47.0	18.5	
Chocolate	5.0	15.0	75.0	

As a further aid to ready reference the following brief tables are given:

The Quantities of Ordinary Foods which yield 100 Calories with the Distribution of the Heat Value between Protein, Fat and Carbohydrate. (*Irving Fisher*)

Food materials	Weight of food yielding 100 calories		Percentage of total caloric value yielded by protein, fat or carbohydrate			
	Grms.	Ozs.	P.	F.	C.	
Cooked meats.						
Chicken	90	3.2	79	21	...	Ordinary serving.
Beef, boiled, lean	62	2.2	90	10	...	Large serving.
Beef, roast, fat	32	1.2	25	75	...	Small serving.
Sirloin	40	1.4	31	69	...	Small serving.
Mutton, boiled	34	1.2	35	65	...	Small serving.
Ham, boiled	32	1.1	28	72	...	Ordinary serving.
Ham, boiled, fat	27	1.0	19	81	...	Small serving.
Bacon	15	0.5	6	94	...	Ordinary serving.
Uncooked.						
Mackerel	57	2.0	50	50	...	Ordinary serving.
Oysters	100	3.6	10	1	89	One dozen.
Dairy products.						
Milk	140	4.9	19	52	29	Small glass.
Milk, skimmed	255	9.4	37	7	56	1 1/2 glass.
Milk, condensed, sweetened.	30	1.1	10	23	67	1 1/2 glass.
Whey	360	13.0	15	10	75	2 glasses.
Butter	12.5	0.4	05	99.5		
Cheese	22	0.8	25	73	2	1 1/2 cubic inches.
Eggs	59	2.1	32	68	...	1 large egg.
Cream	49	1.7	5	87		
Cereals, vegetables, nuts and fruits.						
Bread, white	38	1.3	13	6	81	Thick slice.
Bread, brown	43	1.5	9	7	84	Thick slice.
Wheat flour	27	1.0	15	5	80	
Rice	28	1.0	9	1	90	
Rice, boiled	87	3.1	10	1	89	Ordinary serving.

The Quantities of Ordinary Foods which yield 100 Calories with the Distribution of the Heat Value between Protein, Fat and Carbohydrate. (*Irving Fisher.*)—*Continued*

Food materials	Weight of food yielding 100 calories		Percentage of total caloric value yielded by protein, fat or carbohydrate			
	Grms.	Ozs.	P.	F.	C.	
Cream rice pudding	75	2.6	8	13	79	Small serving.
Tapioca, cooked..	108	3.8	1	1	98	Ordinary serving.
Potatoes, boiled...	102	3.6	11	1	88	1 large serving.
Potatoes, baked...	86	3	11	1	88	1 good sized serving.
Cabbage.....	310	11	20	8	72	
Lettuce.....	505	18	25	14	61	
Peas.....	178	6.3	25	3	72	2 servings.
Beans (tinned), baked.	75	2.7	21	18	61	
Chestnuts.....	40	1.4	10	20	70	
Brazil nuts.....	14	0.5	10	86	4	3 nuts.
Almonds.....	15	0.5	13	77	10	8 almonds.
Dates (edible portion).	28	1	2	7	91	3 large dates.
Figs, dried.....	31	1.1	5	....	95	1 large fig.
Prunes, dried.....	32	1.1	3	....	97	3 large prunes.
Raisins.....	31	1.1	3	9	88	
Grapes.....	140	4.8	5	15	80	
Bananas.....	100	3.5	5	5	90	1 large banana.
Apples.....	206	7.3	3	7	90	2 large apples.
Apples, baked.....	94	3.3	2	5	93	
Apple pie.....	38	1.3	5	32	63	1/3 ordinary serving.
Oranges.....	270	9.4	6	3	91	1 very large.
Water melon.....	760	27	6	6	88	
Tomatoes.....	430	15	15	16	69	4 ordinary size.
Marmalade.....	28	1	0.5	2.5	97	3 teaspoonfuls.
Sugar.....	24	0.9	....	....	100	1 1/2 lumps.

Average Fuel Value of Some of the Common Foods

Averages	Protein	Fat	Carbohydrate	Cal. in 1 oz. = 32 grm.
Meat	15	19	.....	67.3
Fish	15	1.5	.....	21.3
Cheese	25	33	2.5	118.7
Egg—albumen	15	0.2	.....	17.9
Soups	2.5	1.5	5	12.6
Milk	3.5	4	5	20.3
Vegetables	1.5	1	8	15.7
Breads	9	2	52	75.9
Crackers	10	8	71	114.9
Pastry	7	9	65	107.1
Fruit	1	0.7	14	19.1
Nuts	20	25	6	95.8
Butter	1.0	85	.....	252.0

The Approximate Composition of Beef Juices

	Water	Proteins and gelatin	Extractives	Calories in 100 grm.
Bovinine	81.09	13.98	3.40	57.31
Brand's meat juice	59.15	15.45	16.55	114.75
Puro	36.60	30.33	19.16	124.35

The Approximate Composition of Peptone Preparations

	Water	Insoluble proteins	Peptones	Albumoses	Extractives and other substances	Calories in 100 grm.
Carnrick's peptonoids.	2.13	12.22	0.88	3.17	77.03	381.0
Fairchild's panopeptone.	81.00	.....	3.00		15.00 (Sugar chiefly.)	73.3
Liebig's peptone.	31.90	.....	33.40		24.60	237.8
Somatose	14.25	.....	62.65		2.62	275.7

Combination foods. Pemmican is a good instance of fat and protein in combination. It is the dried product of the best beef and fat, 50 parts of the former to 40 of the latter, and is most nutritious.

I hope the foregoing pages are sufficiently lucid to emphasize the *necessity* of eating a *well-balanced ration* as respects the *protein, carbohydrates and fats*, and that these elements can be furnished by many different articles varying considerably in cost; *e.g.*, if one needs proteins of high caloric values he need not be a millionaire and buy porterhouse steak as he can buy a chuck piece of beef at one-fourth the price and with vegetables make a pot roast of a higher caloric equivalent than the above kind of steak; or the amount of nutriment of a piece of meat may be increased by the method of cooking; *e.g.*, a low price cut of beef may be stewed and all the fat and juice utilized while by broiling or frying much would go to waste. The same applies to fruit. It is quite unnecessary to buy premium apples at five cents each when those of inferior grade can be bought two for a cent and dried or canned for future use. They furnish as many calories per pound as those of the more fancy kind. The same is true of most of the other fruits. Likewise, vegetables and pulses, as peas and beans, are cheap and have a very much higher protein and carbohydrate value than lettuce, cucumbers, tomatoes, etc. Hence with a little care given to the cost price of different vegetables and fats, a good nutritious diet can be had even at the present prohibitory prices.

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