is much reduced in quantity. The digestion may be much delayed, and on washing out the stomach as late as seven hours after eating, portions of food are still present. The prolonged retention favors decomposition, the stomach becomes distended with gas, and this, with the chronic catarrh, may induce gradually an atony of the muscular walls. The absorption is slow, and iodide of potassium, given in capsules, which should normally reach the saliva within fifteen minutes, may not be evident for more than half an hour.

Constipation is usually present, but in some instances there is diarrhœa, and undigested food passes rapidly through the bowels. The urine is often scanty, high-colored, and deposits a heavy sediment of urates.

Of other symptoms headache is common, and the patient feels constantly out of sorts, indisposed for exertion, and low-spirited. In aggravated cases melancholia may develop. Trousseau called attention to the occurrence of vertigo, a marked feature in certain cases. The pulse is small, sometimes slow, and there may be palpitation of the heart. Fever does not occur. Cough is sometimes present, but the so-called stomach cough of chronic dyspeptics is in all probability dependent upon pharyngeal irritation.

The symptoms of atrophy of the mucous membrane of the stomach, with or without contraction of the organ, are very complex, and cannot be said to present a uniform picture. The majority of the cases present the symptoms of an aggravated chronic dyspepsia, often of such severity that cancer is suspected. In one of the cases which I examined the persistent distress after eating, the vomiting, and the gradual loss of flesh and strength, very naturally led to this diagnosis, but the duration of the disease far exceeded that of ordinary carcinoma. In the cirrhotic form the tumor mass may sometimes be felt. In atrophy of the stomach, whether associated with cirrhosis or not, the clinical picture may be that of pernicious anæmia. As early as 1860, Flint called attention to this connection between atrophy of the gastric tubules and anæmia, an observation which Fenwick and others have amply confirmed.

Diagnosis.—The use of the stomach-tube and the chemical examination of the contents of the stomach obtained in this way have given us special information with reference to the various forms of gastritis and the modes of differentiating them. The soft-rubber stomach-tube, provided with a funnel-shaped dilatation, is the most satisfactory to use, as it is very readily passed, and if used by the patient is not likely to cause damage. It should be open at the end and possess one or two lateral openings.

Ewald distinguishes three forms of chronic gastritis: (1) Simple gastritis; (2) mucous (*schleimige*) gastritis; (3) atrophy.

In (1) the fasting stomach contains only a small quantity of a slimy fluid, while after the test breakfast the HCl is diminished in quantity and lactic acid and the fat acids are usually present.

In (2) the acidity is always slight and the condition is distinguished from (1) chiefly by the large amount of mucus present.

In (3) the fasting stomach is generally empty, while after the test breakfast HCl, pepsin, and the curdling ferment are wholly wanting.

Treatment.—When possible the cause in each case should be ascertained and an attempt made to determine the special form of indigestion. Usually there is no difficulty in differentiating the ordinary catarrhal and the nervous varieties. A careful study of the phenomena of digestion in the way already laid down, though not essential in every instance, should certainly be carried out in the more obstinate and obscure forms. Two important questions should be asked of every dyspeptic—first, as to the time taken at his meals; and, second, as to the quantity he eats. Practically a large majority of all cases of disturbed digestion come from hasty and imperfect mastication of the food and from overeating. Especial stress should be laid upon the former point. In some instances it will alone suffice to cure dyspepsia if the patient will count a certain number before swallowing each mouthful. The second point is of even greater importance. People habitually eat too much, and it is probably true that a greater number of maladies arise from excess in eating than from excess in drinking. Particularly is this the case in America, where the average man is abstemious in the matter of alcohol, but imprudent to a degree in all matters relating to food. Moreover, people have not had time to learn the art of cooking, and much of the indigestion, particularly in the country districts, may be charged to the barbarous methods of preparing the food. The treatment may be considered under the headings of dietetic and medicinal.

(*a*) *General and Dietetic.*—A careful and systematically arranged dietary is the first, sometimes the only essential in the treatment of a case of chronic dyspepsia. It is impossible to lay down rules applicable to all cases. Individuals differ extraordinarily in their capability of digesting different articles of food, and there is much truth in the old adage, "One man's food is another man's poison." The individual preferences for different articles of food should be permitted in the milder forms. Physicians have probably been too arbitrary in this direction, and have not yielded sufficiently to the intimations given by the appetite and desires of the patient.

A rigid milk diet may be tried in obstinate cases. Much depends upon whether the patient is able to take and digest milk properly. In the forms associated with Bright's disease and chronic portal congestion, as well as in many instances in which the dyspepsia is part of a neurasthenic or hysterical trouble, this plan in conjunction with rest is most efficacious. If milk is not digested well it may be diluted one third with soda water or Vichy, or five to ten grains of carbonate of soda, or a pinch of salt may be added to each tumblerful. In many cases the milk from which the cream has been taken is better borne. Buttermilk is particularly

suitable, but can rarely be taken for as long a time alone, as patients tire of it much more readily than they do of ordinary milk. Not only can the general nutrition be maintained on this diet, but patients sometimes increase in weight, and the unpleasant gastric symptoms disappear entirely. It should be given at fixed hours and in definite quantities. A patient may take six or eight ounces every three hours. The amount necessary varies a good deal, but at least three to five pints should be given in the twenty-four hours. This form of diet is not, as a rule, well borne when there is a tendency to dilatation of the stomach. The milk may be previously peptonized, but it is impossible to feed a chronic dyspeptic in this way. The stools should be carefully watched, and if more milk is taken than can be digested it is well to supplement the diet with eggs and dry toast or biscuits.

In a large proportion of the cases of chronic indigestion it is not necessary to annoy the patient with such strict dietaries. It may be quite sufficient to cut off certain articles of food. Thus, if there are acid eructations or flatulency, the farinaceous foods should be restricted, particularly potatoes and the coarser vegetables. A fruitful source of indigestion is the hot bread which, in different forms, is regarded as an essential part of an American breakfast. This, as well as the various forms of pancakes, pies and tarts, with heavy pastry, and fried articles of all sorts, should be strictly forbidden. As a rule, white bread, toasted, is more readily digested than bread made from the whole meal. Persons, however, differ very much in this respect, and the Graham or brown bread is for many people most digestible. Sugar and very sweet articles of food should be taken in great moderation or avoided altogether by persons with chronic dyspepsia. Many instances of aggravated indigestion have come to my notice due to the prevalent practice of eating largely of ice-cream. One of the most powerful enemies of the American stomach in the present day is the soda-water fountain, which has usurped so important a place in the apothecary shop.

Fats, with the exception of a moderate amount of good butter, very fat meats, and thick, greasy soups should be avoided. Ripe fruit in moderation is often advantageous, particularly when cooked. Bananas are not, as a rule, well borne. Strawberries are to many persons a cause of an annual attack of indigestion and sore throat in the spring months.

As stated, in the matter of special articles of food it is impossible to lay down rigid rules, and it is the common experience that one patient with indigestion will take with impunity the very articles which cause the greatest distress to another.

Another detail of importance which may be mentioned in this connection is the general hygienic management of dyspeptics. These patients are often introspective, dwelling in a morbid manner on their symptoms, and much inclined to take a despondent view of their condition. Very little progress can be made unless the physician gains

their confidence from the outset. Their fears and whims should not be made too light of or ridiculed. Systematic exercise, carefully regulated, particularly when, as at watering places, it is combined with a restricted diet, is of special service. Change of air and occupation, a prolonged sea voyage, or a summer in the mountains will sometimes cure the most obstinate dyspepsia.

(*b*) *Medicinal.*—The special therapeutic measures may be divided into those which attempt to replace in the digestive juices important elements which are lacking and those which stimulate the weakened action of the organ. In the first group come the hydrochloric acid and ferments, which are so freely employed in dyspepsia. The former is the most important. It is the ingredient in the gastric juice most commonly deficient. It is not only necessary for its own important actions, but its presence is intimately associated with that of the pepsin, as it is only in the presence of a sufficient quantity that the pepsinogen is converted into the active digestive ferment. It is best given as the dilute acid taken in somewhat larger quantities than are usually advised. Ewald recommends large doses—of from 90 to 100 drops—at intervals of fifteen minutes after the meals. Leube and Riegel advise smaller doses. Probably from 15 to 20 drops is sufficient. The prolonged use of it does not appear to be in any way hurtful. The use, however, should be restricted to cases of neurosis and atrophy of the mucous membrane. In actual gastritis its value is doubtful.

The digestive ferments: These are extensively employed to strengthen the weakened gastric and intestinal secretions. The use of pepsin, according to Ewald, may be limited to the cases of advanced mucous catarrh and the instances of atrophy of the stomach, in which it should be given, in doses of from 10 to 15 grains, with dilute hydrochloric acid a quarter of an hour after meals. It may be used in various different forms, either as a powder or in solution or given with the acid. The powder is much more certain. Pepsin wine is generally inert, as there is little of the ferment taken up by alcohol. It is important to use a reliable article. Much that is in the market is valueless.

Pancreatin is of equal or even greater value than the pepsin. Pains should be taken to use a good article, such as that prepared by Merck. It should be given in doses of from 15 to 20 grains, in combination with bicarbonate of soda. It is conveniently administered in tablets, each of which contains 5 grains of the pancreatin and the soda, and of these two or three may be taken fifteen or twenty minutes after each meal. Ptyalin and diastase are particularly indicated when the acid is excessive. The action of the former continues in the stomach during normal digestion. The malt diastase is often very serviceable given with alkalies.

Of measures which stimulate the glandular activity in chronic dyspepsia lavage is by far the most important, particularly in the forms characterized by the secretion of a large quantity of mucus. Luke-warm

water should be used, or, if there is much mucus, a one per cent salt solution, or a three to five per cent solution of bicarbonate of soda. If there is much fermentation the three per cent solution of boric acid may be used, or a dilute solution of carbolic acid. It is best employed in the morning on an empty stomach, or in the evening some hours after the last meal. It is perhaps preferable in the morning, except in those cases in which there is much nocturnal distress and flatulency. Once a day is, as a rule, sufficient, or, in the case of delicate persons, every second day. The irrigation may be continued until the water which comes away is quite clear. It is not necessary to remove all the fluid after the irrigation.

While perhaps in some hands this measure has been carried to extremes, it is one of such extraordinary value in certain cases that it should be more widely employed by practitioners. When there is an insuperable objection to lavage a substitute may be used in the form of warm alkaline drinks, taken slowly in the early morning or the last thing at night.

Of medicines which stimulate the gastric secretion the most important are the bitter tonics, such as quassia, gentian, columbo, cundurango, ipecacuanha, strychnia, and cardamoms. These are probably of more value in chronic gastritis than the hydrochloric acid. Of these strychnia is the most powerful, though none of them have probably any very great stimulating action on the secretion, and influence rather the appetite than the digestion. Of stomachics which are believed to favorably influence digestion the most important are alcohol and common salt. The former would appear to act in moderate quantities by increasing the acid in the gastric juice, and with it probably the pepsin formation. Others hold that it is not so much the secretory as the motor function of the stomach which the alcohol stimulates. In moderate quantities it has certainly no directly injurious influence on the digestive processes. Special care should be taken, however, in ordering alcohol to dyspeptics. If a patient has been in the habit of taking beer or light wines or stimulants with his meals, the practice may be continued if moderate quantities are taken. Beer, as a rule, is not well borne. A dry sherry or a glass of claret is preferable. In the case of women with any form of dyspepsia stimulants should be employed with the greatest caution, and the practitioner should know his patient well before ordering alcohol.

The importance of salt in gastric digestion rests upon the fact that its presence is essential in the formation of the hydrochloric acid. An increase in its use may be advised in all cases of chronic dyspepsia in which the acid is defective.

Treatment of Special Conditions.—Fermentation and flatulency. When the digestion is slow or imperfect, fermentation goes on in the contents, with the formation of gas and the production of lactic, butyric, and acetic acids. For the treatment of this condition careful dieting may suffice, particularly forbidding such articles as tea, pastry, and the coarser vegetables. It is usually combined with pyrosis, in which the acid fluids are brought into the mouth. Bismuth and carbonate of soda sometimes suffice to relieve the condition. Thymol, creosote, and carbolic acid may be employed. For acid dyspepsia Sir William Roberts recommends the bismuth lozenge of the British Pharmacopœia, the antacid properties of which depend on chalk and bicarbonate of soda. It should be taken an hour or two after meals, and only when the pain and uneasiness are present. Glycerine in from twenty to sixty minim doses, the essential oils, animal charcoal alone or in combination with compound cinnamon powder, may be tried. If there is much pain, chloroform in twenty-minim doses or a teaspoonful of Hoffman's anodyne may be used. If obstinate, lavage is indicated and is sometimes striking in its effects. Alkaline solutions may be used.

Vomiting is not a feature which often calls for treatment in chronic dyspepsia; sometimes in children it is a persistent symptom. Creosote and carbolic acid in drop doses, a few drops of chloroform or of dilute hydrocyanic acid, cocaine, bismuth, and oxalate of cerium may be used. If obstinate, the stomach should be washed out daily.

Constipation is a frequent and troublesome feature of most forms of indigestion. Occasionally small doses of mercury, podophyllin, the laxative mineral waters, sulphur, and cascara may be employed. Glycerine suppositories or the injection of from half a teaspoonful to a teaspoonful of glycerine is very efficacious.

Many cases of chronic dyspepsia are greatly benefited by the use of mineral waters, particularly a residence at the springs with a careful supervision of the diet and systematic exercise. The strict *régime* of certain German Spas is particularly advantageous in the cases in which the chronic dyspepsia has resulted from excess in eating and in drinking. Kissingen, Carlsbad, Ems, and Wiesbaden are to be specially recommended.

IV. NEUROSES OF THE STOMACH.

(1) **Gastralgia; Gastrodynia.**—Severe pains in the epigastrium, paroxysmal in character, occur (*a*) as a manifestation of a functional neurosis, independent of organic disease, and usually associated with other nervous symptoms (it is this form which will here be described); (*b*) in chronic disease of the nervous system, forming the so-called gastric crises; and (*c*) in organic disease of the stomach, such as ulcer or cancer.

The functional neurosis occurs chiefly in women, very commonly in connection with disturbed menstrual function or with pronounced hysterical symptoms. The affection may set in as early as puberty, but it is more common at the menopause. Anæmic, constipated women who have worries and anxieties at home are most prone to the affection. It is more frequent in brunettes than in blondes. Attacks of it sometimes occur in robust, healthy men. More often it is only one feature in a condition of