

the acid gastric juice. Alkalies, although they afford relief, do not effect a cure, except in those cases of acidity of a temporary character due to fermentation of starchy and saccharine food, and accompanied by catarrh of the bile-ducts, and then the alkali most effective is the phosphate of soda. When acid is deficient, good results may be obtained by the use of alkalies before meals, on the well-recognized principle that an alkaline fluid in the stomach will favor the diffusion from the blood of its acid-forming constituents. When abnormal fermentations constitute the chief or only source of discomfort, the most serviceable remedy is carbolic acid, alone or in combination with bismuth. Gaseous eructations are best relieved by the same means. Freshly-burned charcoal, finely divided, is a good remedy, though only palliative, acting merely as an absorbent. After suitable treatment for the relief of the local condition, tincture of nux vomica is an excellent stomachic, especially adapted to the chronic catarrh of spirit-drinkers. The bitters in general, with or without the mineral acids, are applicable under the same conditions. It should never be forgotten that all special stimulants to the gastric mucous membrane are injurious, and should never be employed until the morbid state is removed. To employ them without proper regulation of the diet is simply to add another source of irritation. It can not be too strongly impressed on the reader that rest, which is essential to the treatment of any diseased organ, is equally necessary to the stomach when it is suffering; but, as some aliment is absolutely necessary to life, the stomach can never be put into a state of complete repose. Hence the need of a most careful regulation of the diet, so that the condition of rest may be, as nearly as possible, attained. Alimentation by the rectum is a precious resource under these circumstances. Finely-powdered beef, meat-extracts, peptonized foods, eggs, etc., to which the digestive ferments are added, can be administered by the rectum. Defibrinated blood is, no doubt, in the greatest proportion of cases, the most valuable aliment for rectal use.*

ATONIC DYSPEPSIA.

Definition.—By atonic dyspepsia is meant a form of indigestion due to a depressed state of the stomach. It is that form of functional derangement usually called dyspepsia.

Causes.—It is often inherited. It is a disease of advanced life, and is then accompanied by those senile changes belonging to that period, and is a consequence of them. It is a symptom in depressed

* Full particulars are given in the author's "Treatise on Materia Medica and Therapeutics," fifth edition.

states of the system generally, as, for example, in exhausting discharges, as hæmorrhages, leucorrhœa, profuse suppuration, etc. It is produced by all those circumstances comprehended under the term bad hygiene. The most influential factors are improper and excessive alimentation, and severe mental and physical exertion immediately after eating.

Morbid Anatomy.—This malady has not, properly speaking, a morbid anatomy: besides anæmia and deficient secretion, there are no changes. Various alterations have been noted, as atrophy of the tubules, fatty degeneration, increase of the connective tissue, etc. But these changes belong to other states, of which atonic dyspepsia is merely a symptom.

Symptoms.—A sense of weight and uneasiness, lasting throughout the process of digestion, suspended for a short period when food is taken, is usually the initial symptom. A feeling as if a foreign body were lodged behind the sternum, or higher up in the œsophagus, often with a sense of oppression or dyspnœa, is frequently experienced. Acute pain is rarely felt, but there is usually some flatulent colic, and pressure fails to develop pain, but rather affords relief to uneasy sensations. Digestion is impaired in respect to all classes of foods, farinaceous, saccharine, and fatty; and hence, during the process of digestion, flatulence from the formation of carbonic acid and eructation of rancid fats are frequently present. More or less intestinal disturbance accompanies the stomach symptoms, and constipation almost always occurs. The appetite is usually feeble, and the disinclination for food includes all the varieties. There is little thirst, and the ingestion of fluid gives rise to distress. The tongue is too large, and is marked along its borders by the teeth, and is at the same time pale and flabby. The mucous membrane of the mouth is also pale and the gums are soft and spongy; the tonsils are apt to be enlarged, the uvula relaxed, the voice husky, and there is frequent clearing of the throat. The bodily condition generally is that of depression; the pulse is weak, excitable, and easily compressed; palpitation occurs quickly on exertion and frequently without effort of any kind; intermission of the pulse-beat is by no means uncommon, and attacks of pseudo angina pectoris take place, and they may have an alarming character, especially in persons after middle age affected with degenerative changes in the vascular system. Flatulent distention of the abdomen induces oppression of the chest, but dyspnœa may occur without such cause, being due to a nervous state. The skin is usually pallid and earthy, moist and clammy, and the extremities cold. The urine is pale, of low specific gravity, and loaded with the phosphates. The mental condition is in harmony with the general state—that is, depressed. There is great inaptitude for mental exertion,

an impaired state of the memory and attention, and irritability of temper. Drowsiness supervenes after eating, while sleep at night is restless and unrefreshing.

Diagnosis.—Atonic dyspepsia differs from chronic gastric catarrh in respect to the amount of pain, vomiting, and tenderness on pressure, which are less, and the depression which is greater, in the former than in the latter.

Treatment.—In this as in other stomach disorders, the first step consists in regulation of the diet. It is useful to commence the dietetic management by the milk-cure. Next, as rapidly as possible, nutritious but easily digested articles must be added. As the digestive powers are feeble, food must be given in small quantity but frequently. As the foods disagree, irrespective of their quality, obviously quantity and frequency of ingestion are the points to be considered. As the powers of digestion are depressed, the special aids to this function are indicated: pepsin, lacto-pepsin, in combination with muriatic acid; pepsin and bismuth with aromatic powder; tincture of nux vomica, strychnine, and the bitters, especially calumba, with or without muriatic acid; the mild chalybeates, as *massa ferri carb.*, the citrate, malate, or tartrate of iron, etc., are the most appropriate of the medicinal agents. A small quantity of acid wine at dinner is a good stimulant to the digestive function. A moderate dose of whisky, taken before meals, is a capital remedy to promote the appetite and the digestion; but it is a dangerous remedy, for it so overcomes the feeling of depression as to be very grateful, and there is therefore a constant temptation to repeat the dose. As, in these cases, there is usually more or less mental depression, change of scene, travel, and agreeable occupation, contribute materially to the cure.

GASTRALGIA.

Definition.—Gastralgia is a painful state of the sensory nerves of the stomach, induced by various sources of irritation, and free from fever.

Causes.—Doubtless the chief factor is a peculiar state of the nervous system, the neurotic temperament, so called, or the nervous state or hysteria. This condition of the nerves existing, various substances, which under ordinary circumstances would not excite the least distress, now cause severe pain. It is highly probable that the abuse of tea and coffee has no little influence in causing the disease.

Symptoms.—The characteristic symptom of gastralgia is the occurrence of severe paroxysmal pain, felt in greatest intensity at or about

the epigastrium, and radiating thence upward over the chest and downward through the abdomen. The pain also is felt in the back, and seems to pierce through the body, and it shoots upward to the shoulders. The pain is not increased but diminished by pressure, and the patient instinctively lies or presses firmly on the abdomen, or demands to be rubbed or beaten on the back. In the severest cases, the pain is so excessive as to produce profound prostration; the pulse is small, rapid, and weak, the surface is cold and covered with a cold sweat, and the features are shrunken. In almost all cases, the action of the heart is disturbed, owing to the intimate nervous communications between the two organs; the pulse is small and weak or intermitting. The duration of the attacks is very variable, lasting for a few hours, for a day or two, or continuing for months with intermissions or remissions. Usually the attacks are of short duration, and terminate with eructations of gas, with vomiting, or the more acute pain subsides, leaving a sense of soreness, and occasional lighter pains, which may continue for several days. The attacks may be regularly intermittent, in cases of uterine disease, and when caused by malaria. During the interval, the function of digestion may proceed undisturbed, and the nutrition of the body continue at the normal. Various disorders of the nervous system are usually present, as—palpitations, *migraine*, hysterical phenomena, notably the globus, etc. In males, hypochondria, associated with oxaluria, is not infrequent.

Course and Duration.—Gastralgia is an essentially chronic malady, in that the attacks are prone to return from time to time, and the associated disorders continue in the interim to plague the patient. Those cases dependent on malaria, or on the presence of indigestible food, may be cured with comparative facility, but the ordinary cases are not readily cured. Notwithstanding the obstinacy of these cases, gastralgia is not dangerous to life.

Diagnosis.—Gastralgia is to be differentiated from myalgia affecting the abdominal muscles, intercostal neuralgia, hepatalgia, neuralgia of the solar plexus, ulcer of the stomach, and cancer. In myalgia the pain is restricted to the affected muscles, and has not the acute and lancinating character of gastralgia, and is unaccompanied by nausea and vomiting. As respects intercostal neuralgia, it is to be noted that the pain is in the left hypochondrium, that painful points can be developed by pressure in the course of the nerve-trunk, and at the spine, and that this affection is unaccompanied by nausea and vomiting. To separate gastralgia from neuralgia of the solar plexus is in some cases extremely difficult; but attention to the following points may prevent error: in gastralgia, there is a history of previous stomachal disorders; in neuralgia of the solar plexus, the inhibition of the heart's action is greater, and the systemic depression is more profound. Hepatalgia

and hepatic colic are to be separated by the situation of the pain in the right hypochondrium, by the tenderness in the region of the gall-bladder, by the symptomatic fever, and by the jaundice. From cancer, gastralgia is differentiated by the age of the subject, by the character of the vomited matters, the persistence of the pain, the cachexia, the emaciation, and the tumor; from ulcer, by the fixedness of the pain, its constant presence with soreness, the vomiting of blood, etc.

Treatment.—During a paroxysm, the first point is the relief of pain. This may be most effectively and promptly accomplished by the hypodermatic injection of morphine, and frequently so small a dose as one twelfth of a grain suffices. As there is always danger of opium-habit in these cases, this fascinating remedy must be used with caution. Opium or morphine is frequently prescribed with bismuth and aromatic powder. Morphine is also used endermically—that is, applied to a blistered surface, about a square inch of the skin being denuded. By enema is an efficient mode of administering the anodyne. When, from any cause, morphine can not be given, the pain, as also the nausea and vomiting, may be arrested by creosote or carbolic acid. This remedy may also be administered with bismuth in an emulsion—a combination of the most efficient kind. Equal parts of tincture of iodine and carbolic acid, of which a drop may be administered every hour in a little cold water, is a most valuable agent, not only for the relief of pain, but to stop the vomiting. In many cases nitro-glycerin has an excellent effect. The centesimal solution is the most appropriate form for administration—one drop every half-hour being given until relief or the characteristic effects are produced. Arsenic (one drop of Fowler's solution) and opium (two to five drops of the tincture) are not unfrequently highly serviceable for the relief of the paroxysms, but they are more generally useful for the accompanying condition of the mucous membrane, and the end organs of the nerves of the stomach. There is no remedy so constantly curative of the local causes of the attacks, and so efficient in preventing their return, as arsenic. For the condition of things between the attacks, next to arsenic, stand the oxide and nitrate of silver. For the strictly intermittent cases, occurring at a fixed hour, quinine is invaluable; but the author has seen cases which were not removed by quinine, but ceased promptly when salicylic acid was administered. When attacks of gastralgia are due to indigestible food, the first duty is to empty the stomach. If vomiting is going on, it may be encouraged by large draughts of warm water; if vomiting has not occurred, it should be induced by an emetic, preferably by apomorphine administered hypodermatically, to avoid irritation of the stomach. If acid and fermenting materials remain to keep up the disturbance, they should be removed by irri-

gation of the stomach, or by mild laxatives of the saline and antacid character. It is generally better to remove the contents of the stomach before administering anodynes. The subjects of gastralgia are usually of the nervous, hysterical, and hypochondriacal type, and require chalybeate and supporting remedies. As the stomach in such subjects is easily offended, only the milder preparations of iron can be given—such as the carbonate, the citrate, lactate, etc.; but, in some persons of a habit feeble and relaxed, the more astringent preparations do better—for example, the sulphate and the chloride. Excellent results are often obtained from the use of the mineral acids, notably the muriate, and especially when administered conjointly with the tincture of nux vomica (Fox). The long-continued use of arsenic in a small dose—one drop *ter in die* of Fowler's solution—is more effective, according to the author's experience, than any remedy mentioned. As attacks of gastralgia are, very frequently at least, excited by indigestible food, it is highly important to regulate the diet. Furthermore, in these subjects the digestion has been enfeebled by the depressed state of the nervous system. The best results are therefore obtained by a careful regulation of the hours of eating, the quality of the food, and the mental and bodily exercise. In most cases, probably, the treatment should be begun by the milk-cure, and subsequently a dietary should be constructed suitable to the needs of individual cases. In some instances, the frequent use of a small amount of food is more serviceable than the taking of ordinary meals. When the digestion is feeble merely, pepsin and lactic or muriatic acids are most useful. When acidity and heartburn exist, due to the fermentation of the starches and sugars, the mineral acids must not be given after meals, but before, for chemical reasons already explained.

ULCER OF THE STOMACH.

Definition.—By the term ulcer is meant a solution of continuity involving the mucous membrane and one or more of the layers of which the wall of the stomach is composed, with defined margins having a greater thickness than the adjacent healthy tissues. Symptomatically, the stomach-ulcer is characterized by pain, disorders of digestion, and vomiting of blood.

Causes.—Ulcer of the stomach is a comparatively common disease, and is found to exist in five per cent. of the deaths from all causes. It is present in proportionately greater numbers after thirty-five, because it is an essentially chronic malady; but it is, really, more frequent in youth and middle life, from fifteen to thirty, and it is comparatively often seen in housemaids of twenty—an age, too, at which

rupture occurs in greater proportion than at any other. It is probable also that women are more subject to the disease than men, and that rupture occurs more frequently in the former than in the latter. The most influential factors in its pathogeny are, variation in the tonus of the gastric vessels and mechanical arrest of the circulation at the point where the ulcer forms (thrombosis, embolism). There is usually, in these cases, disease of the arterial tunics (atheroma and endarteritis), which finally causes coagulation of the blood and arrest of the blood-stream in a nutritious artery; obstruction of the portal circulation may induce thrombosis, hæmorrhagic infiltration, etc. The result of a sudden and severe diminution in the amount of blood passing to a part, or of its entire arrest, is to diminish the alkalescence of the deeper layers of the mucous membrane, and to permit the corrosive and solvent action of the gastric juice. It has long been recognized that amenorrhœa, anæmia, chlorosis, the puerperal state, prolonged lactation, and tuberculosis, are also etiological factors, and probably because, in these states, a necrotic process is readily induced, under favorable local conditions.

Irritation of certain parts of the brain is followed by ecchymoses and erosions of the mucous membrane of the stomach. Burns of the chest and abdomen sometimes cause ulceration of the duodenum. A peculiar state of the nervous system must, therefore, be regarded as one of the causes of this disease.

Pathological Anatomy.—Ulcers corresponding in every respect to those of the stomach are found rarely at the lower part of the œsophagus, at the first part of the duodenum (associated with burns on the surface?), and in the cæcum, as the author has shown. In twenty per cent. of the cases of stomach-ulcer, they are multiple, but rarely as many as five existing at one time; in eighty per cent. of the cases, the ulcer is solitary. Not all parts of the stomach are equally liable to the ulcerative process. In four fifths of all cases the ulcer or ulcers are found on the posterior wall, the lesser curvature, and about the pylorus. In size they vary greatly, according to age, and probably, according to their nature; but they are not smaller than a dime, and never attain greater dimensions than six inches by three. In shape they are round or oval, more frequently round. So great is the difference in size, quality, and appearance between the so-called acute perforating ulcer and the round, indurated, and chronic ulcer, that it is difficult to realize that they are merely stages of the same process. The former is about the size of a dime, or shilling-piece, is round and has smooth edges without induration and increased thickness, frequently covered with a clot or containing a mass of slough adherent, and extending in depth to the submucous connective tissue. Ulcers of this description are usually found in young subjects—housemaids notably—have a great tendency to perforate, and are not unfrequently

produced by obstruction to the portal circulation (hæmorrhagic erosion, thrombosis, etc.). The latter or chronic form is large in size, having walls of great thickness and indurated, composed of connective and granulation tissue deposited at various times, giving to it a stratified appearance. After many years, such an ulcer presents a crater-like aspect, with shelving sides, and terminates by a small apex in muscular, sub-muscular, or peritoneal layer, or in a perforation. The connective and granulation tissue, of which the crater-like internal surface is composed, is also deposited at the base, and in this way perforation may be prevented. Facts are wanting to demonstrate an intermediate or transition stage between the two forms of stomach-ulcer. In the course of development of the chronic ulcer, the anatomical elements of the mucous membrane, including the tubular glands, are destroyed, and in rare instances villous or polypoid growths appear in the neighborhood of the new formation. In very rare instances the mucous membrane may be largely preserved, and the ulcerative action excavate a cavity beneath. Several small ulcers may coalesce, unite in their long diameters, and thus form an oval excavation along the lesser curvature, or make a girdle around the pylorus. Ulcers of the stomach tend to spontaneous cure. In many instances of death from other causes, ulcers, either healing or cicatrized, have been found when no symptoms had existed during life, in any sense indicative of their presence. In the process of cicatrization, if the ulceration has not extended beyond the muscular layer, the repair is by union of granulations, and the cicatrix forms a puckered depression. When there is more extensive loss of substance, involving all but the peritoneal layer, there is very great contraction, and a large cicatrix with radiating lines of thickened connective tissue remains. The peritoneal surface is drawn in, giving to that membrane a puckered appearance. If the ulcer had been large, oblong, and formed by the coalescence of several smaller ulcers, and situated near the pylorus, narrowing of that orifice, and consequent dilatation of the rest of the organ, were necessary results. Sometimes the base of the ulcer forms adhesions to neighboring organs in the process of cicatrization, causing ever afterward serious interference with the movements of the stomach, and therefore impairing its functions. Secondary cavities are, occasionally, formed by a local peritonitis arising from perforation, the contents of the stomach being prevented escaping into the general cavity of the peritonæum by a limiting inflammation which secures firm adhesion to neighboring organs, to the omentum, pancreas, liver, the adjacent lymphatics, the transverse colon, the kidneys, the diaphragm, and the abdominal walls. If cicatrization take place after these attachments have formed to adjacent organs, they are embraced in the cicatricial tissue, and very great deformity, with serious impairment of function, result. Unfortunately, these conservative adhesions are

not always formed: the ulcerative action may continue, cavities be created in the manner already indicated, or communications be established between the stomach and colon, or a fistulous sinus be made through the walls of the abdomen externally, or the diaphragm be perforated and the thoracic cavity entered. When perforation takes place, there being no limiting inflammation, nor adhesion to adjacent viscera, the contents of the stomach are suddenly precipitated into the general cavity of the abdomen, exciting general peritonitis. Ulcers situated on the anterior wall of the stomach are specially exposed to this danger, since in that situation adhesions can not easily be formed. The larger vessels of the stomach being deeply placed, escape the eroding action of the ulcer, unless the ulceration has proceeded deeply, nearly to the point of perforation. Furthermore, in the process of extension of the ulceration, the vessels resist longer, and become occluded, before yielding to the erosion. Now and then, arterial twigs are entered by a slough, or veins about the ulcer, which have become varicose, as is frequently the case, are destroyed by a superficial ulceration. Relapses are comparatively frequent. The cicatricial tissue, having low vitality, ulcerates from slight causes.

Changes, which have apparently some relation to the morbid process in the stomach, occur in other organs. It is clear, however, that certain diseases of the arterial system, as endocarditis, endarteritis, have an immediate connection, for embolism and thrombosis are important factors in the pathogeny of ulcer. In about one half of the cases, there is coincident pulmonary disease, very often tuberculosis. It is a popular notion that stomach-ulcers are transformed into cancer; it is true that cancer sometimes develops at the site of an old ulcer.

Symptoms.—There are three important symptoms of stomach-ulcer—pain, indigestion, and vomiting (hæmatemesis). It should be known that some very acute cases occur without symptoms. In apparently perfect health, an individual has a perforation of the walls of the stomach; an acute peritonitis is immediately lighted up; intense pain, vomiting of blood, and profound prostration occur, and death takes place in a few hours or in a day or two. The author has met with such a case. More usually ulcer of the stomach is a chronic malady and characterized by the existence for many months or years of the three symptoms mentioned. Although the pain varies in intensity and differs much in different cases, yet, on the whole, there is remarkable correspondence. In the largest number of cases the pain is felt in front, in or just below the xiphoid appendix; or in the left hypochondrium in the intercostal space between the sixth and seventh rib, occasionally; more frequently above the umbilicus, in the neighborhood of the pylorus. Posteriorly, and this position is even more important, the pain is felt in the region of the last dorsal or first lumbar vertebra, or under the angle of the scapula. The pain in front and behind seems to be continuous, as

if it passed directly through the body. This is its distinctive character—a fixed, gnawing, burning pain, boring through from front to back, and occupying a space which the finger may cover. More or less pain radiates from this central and fixed pain, and is felt in the chest behind the sternum, in the intercostal nerves, in the cervico-brachial plexus, etc. Very great tenderness is experienced on pressure over the vertebra behind and the seat of pain in front. Corsets or a tight dress can not be borne, and, in sitting, the patient seeks a position more or less bent, to avoid the pressure of internal organs against the sore spot.

Besides these, already described, the patient suffers with attacks of gastralgia, sometimes of extreme violence, but they do not occur with any regularity. When the gastralgia comes on, the fixed pain is increased in severity, and pain of extraordinary violence radiates through the abdomen and chest. During these paroxysms, the action of the heart becomes very feeble, and the vital forces much depressed. An alarming syncope, or general convulsions, may ensue if the patient possess a highly sensitive reflex organization. As the attacks are usually due to the presence of indigestible food, they cease when the stomach is empty; but they also arise from cold, fatigue, mental and moral emotion—to the causes, indeed, of neuralgia elsewhere. The pain of stomach-ulcer—the fixed pain—is increased by taking food. In a majority of cases the increase of pain is experienced as soon as food enters the stomach; in a smaller proportion the exacerbation occurs in from fifteen minutes to a half hour; in others, the most severe suffering takes place when food is supposed to be passing through the pylorus, in about three hours after eating. The character of the food influences the production of pain—indigestible, especially irritating, articles causing greater suffering than bland articles. The increase of pain persists until the food is rejected by vomiting or passes the pyloric orifice. The pain caused by the presence of food in the stomach should not be confounded with the attacks of gastralgia, which may arise from hygienic and moral causes as well as improper food. Some cases of stomach-ulcer are free from distress of any kind; in fact, they continue for months and years with no more local disturbance than is produced by chronic gastric catarrh; but these must be regarded as exceptional. Vomiting is a frequent but not an invariable symptom; in a few instances it never occurs; in others it comes on late in the course of the disease. The vomiting is preceded and accompanied by pain, but, when the stomach is emptied, the pain ceases. Occasionally attacks of vomiting and pain occur when the stomach is empty; some glairy mucus, with or without blood, only, coming up with a good deal of straining, showing that the disturbance of the stomach is not due merely to the presence of food. If the vomiting persists, and there be much retching, some bilious matter may

finally be brought up. But the great factor is unquestionably food, and especially undigested food; but more or less gastric catarrh is a constant element in cases of ulcer of the stomach. The time when the vomiting occurs may indicate the position of the ulcer. If the ingestion of food is followed immediately by pain, the ulcer is probably in the vicinage of the cardia. If situated in the greater curvature, there may be but little vomiting, and that will take place in about an hour after food; when near the pylorus, vomiting is an invariable symptom, and the pain is great, but the pain and vomiting do not come on until two or three hours. It must be admitted that these statements as to the time of the vomiting and the position of the ulcer are only approximately correct. Vomiting of blood is the most characteristic single symptom, but is not pathognomonic. It is absent in about one third of the cases. Hæmatemesis may occur only at the monthly period as a vicarious discharge, or merely as an accompaniment of the regular flow. Pain coming on after eating, vomiting of food mixed with blood, and then of blood only, is an extremely significant combination of symptoms. The vomited matter may consist only of blood, red or brownish red, when it comes up immediately; if retained for a short time, it appears in clots more or less blackish if acted on by the stomach-juices. When held in the stomach for some time, and the amount is small, it may present the well-known "coffee-ground" appearance; but if the quantity is large, and has been acted on by the gastric juice, and churned up by the movements of the stomach, it will then have a brownish-black, uniformly granular, and homogeneous aspect. As the vomiting usually occurs quickly after the blood is poured out, the ordinary and characteristic appearance is that of reddish blood partly coagulated. Coffee-grounds, blackish and brownish-black masses or particles, belong rather to cancer. The nutrition may or may not be impaired in gastric ulcer. The small perforating ulcer is often met with in young girls of rather full habit but lymphatic in type. The chronic ulcer of long standing, if small, may not affect the digestion sufficiently to lower the body-weight; but, if large, the digestion-space is so much abridged, that there must be a constant waste, which the primary assimilation is unable to supply. Much depends on the amount of loss by vomiting, and this is influenced somewhat by the inherent irritability of the stomach. The frequent recurrence of hæmorrhage also seriously impairs the nutrition and induces a cachectic state and a peculiar tint of the skin, which may be confounded with the earthy hue of carcinoma. The tongue may be clean, somewhat furred, red at the tip and at the edges, fissured, but there is no characteristic appearance. As a rule, there is obstinate constipation. Amenorrhœa is a frequent complication, due partly to the vicarious hæmatemesis and partly to the profound anæmia to which some patients are reduced.

Course and Duration.—The behavior of the acute and perforating ulcer has been sufficiently discussed. The chronic and common form has a very variable duration. Well-authenticated cases have existed ten years—an example of which the author has had under observation. From three to five years is a comparatively common period of duration. The chief reasons for their long-continued existence are, their essentially chronic character and the frequent changes in their condition—now increasing, now improving, almost cicatrized, then a change in the constitutional state of the patient, or indiscretion in food will re-excite ulceration in tissue almost or entirely repaired. At various periods in the course of the chronic ulcer there may occur a chill followed by fever, exquisite tenderness of the epigastric and umbilical regions, nausea, vomiting, constipation, a quick, small pulse, etc., symptoms of a local and limiting peritonitis. Some cases of chronic ulcer run an entirely latent course; that is, there are no more pronounced symptoms than those of dyspepsia.

Termination.—A large proportion terminate in recovery—complete cicatrization, without any subsequent impairment of the functions of the stomach. The cure may be partial; there may be adhesions contracted to adjacent organs, which alter the shape and impair the motions of the stomach; contraction of the pyloric orifice, leading to dilatation and gradual inanition. The ulcer may cause death in various ways: there may be a gradual failure from pain, vomiting of food, vomiting of blood, and by the growth of lesions in other organs (cardiac disease, tuberculosis, etc.). Death may occur by hæmorrhage—according to Brinton five in one hundred so terminate. A considerable proportion—13·4 per cent.—die by perforation and consequent peritonitis. This unfortunate accident is announced by a sudden and great depression in the powers of life, and death by shock, or the prompt development of fatal peritonitis.

Diagnosis.—Notwithstanding a diagnosis may be made with great certainty in cases presenting typical symptoms, it may be very difficult in other cases. The maladies presenting similar symptoms are, ulcer and chronic gastric catarrh, gastralgia, hepatic colic, cancer, and chlorosis. In chronic gastric catarrh the pain after food is much less, and, in fact, in very many cases the distress is alleviated by taking food; vomiting is occasional, and there is no vomiting of blood. The paroxysms of gastralgia may be the same as in ulcer, but the behavior of the two diseases, otherwise, is very different. Gastralgia is in paroxysms entirely, and between them the patient suffers but little, and does not always have pain after eating, vomiting, and relief by the rejection of food and the vomiting of blood. In hepatic colic the pain radiates from the region of the gall-bladder, suddenly terminates when the calculus reaches the intestine, and is followed by jaundice. During the attack, owing to the congestion of the portal system, there may be