action of the heart becoming exceedingly feeble, the surface cold, etc. Jaundice may also be present. When this is the case, it would be impossible to differentiate between ulcer of the duodenum and hepatic colic. Hæmorrhage may take place by emesis or by stool. In duodenal ulcer it may, in consequence of the size of the vessel (the ascending vena cava, for example), be so large as to cause death immediately. The blood, unless in large amount, is much changed in character by the action of the intestinal juices, as has been pointed out. The diagnosis may be aided by a study of the hæmorrhage, the part discharged by vomit having the characteristics of hæmatemesis, that passed by stool presenting the appropriate changes. As regards treatment of ulcer of the duodenum, the plan proposed for gastric ulcer is applicable. (See Ulcer of the Stomach.) Ulcers similar in character to the duodenal, but due to those alterations of the vessels which occur in amyloid degeneration, are occasionally found in other parts of the small intestines. The symptoms are obscure, and the diagnosis a mere matter of suspicion. The patient affected with an ulcer of this kind suffers with the changes wrought by amyloid degeneration, in the liver, kidney, spleen, and other organs. There are emaciation, pallor, œdema, diarrhœa, etc., and there may be soreness in a particular locality, and hemorrhage, to indicate the nature of the intestinal disease, but obviously these are far from conclusive. The general condition is the point to which attention must be directed in these cases, yet no subject in therapeutics is more unsatisfactory than the amyloid disease.

The Nature, Symptoms, and Treatment of Ulcers of the Cæcum and Appendix Vermiformis.—Ulcers in these situations are usually of mechanical origin, produced by the retention of hardened fæces, by the impaction of an intestinal or biliary calculus, or of another foreign body, such as a grape-seed, a cherry-seed, a pin, etc. These foreign bodies lodge more frequently in the appendix vermiformis, but they may become impacted in a fold of the mucous membrane of the cæcum, especially of the posterior wall, for this has a fixed position. The pressure of the foreign body excites inflammation, then softening, and finally perforation. The position of the ulcer affects the result enormously. If it perforate the posterior wall of the cæcum, which is not covered by the peritoneum, the foreign body and other contents of the bowel escape into the loose connective tissue, where an inflammation ending in an abscess is set up. Then the history is that of fecal abscess. Occasionally a primary inflammation develops in the pericæcal connective tissue, an abscess forms, and a communication is established with the bowel. The author has had the opportunity to study a case of this kind which lasted two years, and at the autopsy a large pus-cavity in the iliac fossa behind the cæcum communicated with the cæcum by a considerable orifice. As the discharges of matter through the bowel had been paroxysmal, it is probable that the original opening was small.

If the foreign body is lodged in the appendix, inflammation is excited, and a perforating ulcer quickly formed. In some cases the whole appendix is inflamed and converted into a diffluent mass. As the ulcer extends, the peritoneum is quickly reached. One of two results must then take place: either a local peritonitis with adhesions, limiting the mischief to that locality, or a sudden rupture into the general cavity of the peritoneum. If the process is slow, the peritoneum forms adhesions to the neighboring surfaces; if rapid, the time is not sufficient to accomplish this. When a limiting inflammation is thus developed, a cavity is formed, containing the matters which have escaped from the appendix, including any foreign body lodged there, fecal matters, sloughs of the ulcerated surface, serum, and pus. In a short time the process of extrusion begins, the pus makes its way downward under Poupart's ligament, along the sheath of the femoral vessels, and points in the usual situation. In two thirds of the cases the purulent collection takes this direction; in others it points over the crest of the ilium, and posteriorly, in the lumbar region. Besides the ulcers of merely mechanical origin, the cæcum is the seat of that form of ulcer known as the catarrhal—a fact which the author believes he was the first to demonstrate.* It is a fortunate circumstance that these catarrhal ulcers, which have such a strong tendency to perforate the bowel, are usually situated on the posterior wall; doubtless in accordance with the now well-known law that those parts most exposed to injury in the performance of their functions are also most liable to disease. As may be seen by referring to the article on "Typhlitis," the symptomatology and treatment are the same as for ulcer, and indeed there is no well-marked distinction between them clinically, except it may be the vague symptoms of ulcer which precede the perforation for an indefinite period. The rectum is also the seat of ulceration of the catarrhal type. This has already been pointed out, and its symptomatology demonstrated, but more frequently ulcers of the rectum have a mechanical origin, are brought on by impacted fæces, the lodgment of a fish or other bone, of seeds, etc. Perforation ensues, an abscess is formed, which points alongside the rectum, in the perinæum and elsewhere, leaving troublesome fistulæ. An ulcer of the rectum, healing, may produce narrowing and deformity of the bowel, seriously impairing its functions. But these ulcers of the rectum do not heal readily, for obvious reasons—the frequent muscular movements, the passage of rough matters over them, the constant presence of irritating solids, fluids, and gases, etc.

As regards the treatment of ulcer of the rectum, there are two points—to keep the bowels soluble without frequent motions, and to make topical applications of the solid nitrate of silver. To this might

* "On Typhlitis and Perityphlitis," "Amer. Jour. of Med. Sci.," October, 1866, p. 351.

be added a third—stretching the sphincter. This can be done by a bivalve rectal speculum, working with a screw, when the parts are exposed for the applications to the surface of the ulcer.

The Nature, Symptoms, and Treatment of Tuberculous Ulcers.—Ulcers of tubercular origin are not limited to any anatomical division of the intestine, but they occur most frequently in the lower end of the ileum, to which, indeed, they may be entirely confined. They may occupy the whole extent of the mucous membrane from the stomach to the rectum ; they may be confined to the cæcum, appendix, and colon.

The deposit of miliary tubercle takes place in the follicles, which become crowded and obstructed, so that the cells undergo fatty degeneration and atrophy. The miliary tubercle, in preparation for extrusion, becomes caseous, softens, and carries with it the surrounding textures, thus forming an ulcer, which widens by the addition of new miliary tubercle, destined to undergo the same process of caseation, softening, and extrusion. The situation of the ulcers has reference chiefly to the distribution of the vessels, which is transversely, and on this anatomical fact has been based a means of distinguishing between tubercular and catarrhal ulcers. This is true only of the early stage of the tubercle deposit, and can no longer be depended on when, as subsequently happens, the formation of the ulcers takes place longitudinally also. By coalescence their form is greatly altered. The extension of tubercle-ulcers through the muscular layer of the bowel is very slow, and takes place chiefly along the lymphatics, ultimately reaching the peritoneum. Indeed, it is easy to trace with the naked eye the tubercle-masses crowding the lymph-vessels and the lymph-spaces adjacent. Deposits then cloud the peritoneum, a patchy exudation forms, and adhesions connect the neighboring serous surfaces, and so usual is this result that perforation by a tubercle-ulcer is rather uncommon. Tuberculosis of the intestinal mucous membrane is a local manifestation of a general state ; hence, when these ulcers exist in the intestines, tubercular deposits will be found elsewhere. The most characteristic symptom of tubercular ulcerations is an obstinate diarrhœa, which resists every means of treatment, and is only palliated. The stools are usually yellowish, are very thin, and contain pus, small sloughs of the mucous membrane, etc., and are very fetid in odor. Colicky pains attend them, and tenesmus also, when, as is frequently the case, the rectum is involved. The stools contain also small, whitish lumps (sago-grains), masses of mucus extruded from those spaces which had contained the follicles. Clots of blood, an admixture of pus and blood, and of liquid fæces and blood, are also contained in the evacuations. The approach of the ulcers to the peritoneal surface is recognized by the increased pain, and the tenderness to pressure at various points. The general condition of the patient is highly significant. Emaciation proceeds rapidly. The evening temperature is high (103°–105° Fahr.), and the fever is distinctly septicæmic in type. There is, at the same time, pulmonary mischief going on, as a rule, in these cases. Investigation will disclose the fact that an hereditary tendency exists. The treatment consists in the use of opium and astringents, vegetable and mineral. In the course of treatment of an ordinary case, all the resources of the materia medica in remedies of this kind will be exhausted. Under the heading of "Intestinal Catarrh" will be found some remarks on treatment equally applicable in this malady.

CANCER OF THE INTESTINES.

Forms and Site.—The three forms—scirrhus, medullary, and colloid—which affect the stomach, occur also in the intestines. As has been stated already in regard to cancer of the stomach, the origin of the neoplasm is epithelial, and the initial change (always, however, preceded by a pronounced local hyperæmia) is a proliferation of the cells of the follicles. The new cells extend downward and develop in greatest abundance in the submucous layer. The growth takes an annular direction, and in the contraction, which always results, the lumen of the bowel is encroached on and stenosis produced. As a rule, those parts of the bowel most active functionally, and in a situation to be most readily injured in the performance of their functions, are most apt to be the seat of cancer ; the rectum, the cæcum, and the flexures of the colon, are these parts.

Cancer of the intestine is usually primary. It is a disease of advanced life (after forty), although the soft variety, the medullary, may occur at any age.

Symptoms.—There are three symptoms which have a high degree of significance : pain in a fixed situation ; a gradually developing cachexia ; the presence of a tumor. Until these symptoms appear, the diagnosis will be largely conjectural. The pain is at first a mere vague uneasiness ; gradually a sensation of soreness with some tenderness to pressure is developed, and finally there are two kinds of pain—a dull, heavy, tensive soreness, and acute, sharp, lightning-like pains. The pain may radiate somewhat from a center, but the most important characteristic of the cancer-pain is its fixed position. From the moment pain is felt in a part the patient declines in strength and weight, and experiences a feeling of fatigue quite irrespective of any exertion. The complexion slowly changes, until ultimately the fawn-color becomes well marked. The lips are then bluish white, the surface dry and scurfy, the skin wrinkled, the hair dry and dead-like. In cancer of the stomach and intestines the patients usually suffer from a profuse salivary flow without apparent cause. Sometimes just above the clavicle may be felt enlarged lymphatic glands. When the emaciation has removed the fat from the abdomen, a tumor can be felt. Although

cancer may form anywhere, it is at certain points where we may expect to detect a tumor—the points of election already mentioned. In six cases of cancer of the intestinal canal, observed by the author with special reference to this account of the disease, there were two of the rectum, two of the cæcum, one at the sigmoid flexure, and one at the angle of the transverse and descending colon. If the tumor is scirrhus, it is felt as a hard, nodular mass ; if encephaloid, an irregular growth, partly hard and partly elastic ; if colloid, a more diffused, less irregular and softer mass, not well defined. Very great mistakes are made as to the size of a tumor, or indeed as to its presence, in cases of cancer. As the stenosis increases, accumulations take place behind the point of narrowing, and then hard lumps of fæces may easily be confounded with a nodular tumor. Subsequently the passage of the fæces will give a very different impression, and the real tumor may be detected with difficulty or not at all. The author has observed this state of things in cancer of the cæcum and of the flexures. The symptomatology of intestinal cancer varies with the site of the neoplasm. When situated at the cæcum, pain is felt in the right iliac fossa ; there the tumor may be detected, and there the patient experiences the sensations due to the passage of gas and fæces through a narrowed orifice. Large accumulations of lumps of fæces and gas may occur at times, presenting the appearance of a large tumor, and may disappear spontaneously in a day or two, or be made to disappear by gentle pressure and friction, when they pass through the orifice with a sensation of burning pain to the patient and with gurgling quite audible to those around. The same phenomena occur at the flexures when cancer is developing. In the rectum there is severe, burning pain, of a most agonizing kind, whenever the bowels are moved, or indeed in sitting or standing long, and pains radiate through the hips, thighs, and testes. Usually tenesmus is present, and a constant desire to go to stool, when every attempt at defecation causes unendurable pain, so that the patient, if possible, postpones the painful act as long as he can. The exploration of the rectum by the finger will furnish valuable information : hard nodules will be encountered, and masses may be detached from the ulcerating surface for microscopic examination. In one case the author found protrusion of the rectum and cancer-masses projecting through the anus, while the surrounding tissue (the rectal fossæ) were covered over with enlarged veins and filled with nodes of stony hardness. The least attempt at exploration caused intolerable anguish, and the passage of fæces was accomplished by no less suffering. The stools at first only indicate, if they are solid, that they were forced through a narrowed orifice ; they may be loose or constipated. In the progress of the cases, mucus, muco-pus, pus and blood, foul-smelling gangrenous masses, and parts of the neoplasm, successively appear and mark the stages in the growth of the cancer. With the

increasing stenosis the bowels are less completely emptied ; great accumulations finally take place ; and, ultimately, death may be brought about by the protracted constipation. When cancer is situated in the first part of the duodenum, it will finally be accompanied by jaundice and the symptoms of gastric cancer at the pylorus, so that it will be impossible to diagnosticate its position correctly—a failure of little moment.

Rupture of the intestine may be caused by an extension of the growth to the peritoneum.

Course, Duration, and Termination.—Cancer goes on steadily to a fatal termination, with now and then some delusive appearances of improvement. The course and duration vary somewhat with age, powers of resistance, and situation of the neoplasm. Cancer of the colon, unless it develops in a way to cause obstruction of the bowel at an early period, is not so quickly fatal as cancer of the cæcum. Cancer of the duodenum interferes so much with digestion and assimilation, and with the hepatic functions, that it causes death by exhaustion comparatively early. A severe hæmorrhage from cancer in any situation may determine a fatal result. The duration varies according to the mode of termination ; from one to three years may be regarded as the range. The termination may be by hæmorrhage, by perforation and peritonitis, by exhaustion, or by an intercurrent disease—as pneumonia, pleuritis, pericarditis, etc.

Diagnosis.—When there is no pain, but a feeling of uneasiness, no tumor has formed, no cachexia developed, a diagnosis will be impossible. From catarrh and ulcer of the intestines, cancer is to be differentiated by the age of the subject, the presence of a tumor, and the gradual appearance of a cachexia. The tumor of cancer may be confounded with floating kidney, aneurism, fecal accumulations, and other growths. Floating kidney is a movable tumor, felt in different positions, in which there may be occasional bowel attacks but no persistent disease, and there is no cachexia. Aneurism is a pulsating tumor, with an expansile movement, and the pulsation in one or both femorals is retarded by it and altered in character. An apparent pulsation is imparted to a cancer of the colon by lying over the aorta ; but, if moved away by external palpation, or by a change in the position of the patient, the pulsation ceases, and at no time are the femorals affected. A cancer of the cæcum and of the sigmoid flexure may also come into relation to aneurism of the iliac arteries. The same rules apply as above given.

A fecal tumor with colic may cause the merely local symptoms of cancer ; but the history of the case, it may be the age of the subject, will decide, and the cachexia will be wanting. The use of purgatives will settle the question.

Prognosis.—No means are now known by which cancer can be

arrested in its course, much less cured, so that the prognosis is entirely unfavorable.

Treatment.—Although there are no curative measures to be undertaken, much can be done to alleviate the distresses of the unfortunate subjects. The most easily digested food, and the varieties which can be utilized by the digestive organs without leaving any residuum, should be directed. The bowels should be kept in a soluble state to prevent accumulations, and to avoid friction of the hardened fæces on an irritable surface. To relieve the pain anodynes become necessary, but the physician must carefully guard their administration, owing to the enormous quantity which the patient will use if left to his own inclination. The author must repeat the statement which he has already made in regard to the utility of arsenic in cancer to relieve pain and retard the growth.

INTESTINAL HÆMORRHAGE.

Causes, Symptoms, and Diagnosis.—The subject of gastric hæmorrhage, which has been fully treated, is occupied with the same questions, except the difference in position, as intestinal hæmorrhage; and therefore only a comprehensive but concise statement is necessary here.

Hæmorrhage from the intestines arises from all those morbid states which increase the blood-pressure in the portal system—as obstructive diseases of the heart and great vessels, of the lungs, and of the liver, especially; from rupture of the vessels themselves occurring in the various kinds of ulceration of the mucous membranes, and from morbid states of the blood itself, as purpura, etc. The symptoms produced by an intestinal hæmorrhage will vary with the immediate cause, with the amount of blood lost, and with the condition of the patient at the time. If considerable, the face becomes deadly pale, the eyes glassy; there is a rushing and roaring in the ears; the pulse becomes weak, or ceases at the wrist; consciousness is lost, and a convulsive shudder passes through the muscular system, and death may ensue, without any escape of blood externally: or there may be mere faintness, and consciousness not lost; a sudden and irresistible desire to have an evacuation of the bowels is felt, and blood in clots and partly fluid, or a blackish, semifluid, tarry mixture may be passed. When the hæmorrhage is from the descending colon, the blood discharged—if passed immediately—is unaffected by the intestinal juices, but, if it come from a point high up in the small intestines, it will appear as an homogeneous, tarry fluid, but may, of course, be mixed with fæces. When the blood escapes in small quantity, and slowly, there will not be any systemic evidences of the loss, except a slowly developing anæmia, and the appearance of the blood in the stools will take place in the form already described. When the blood escapes from the rectum it may be passed

before, with, or after the fæces, which may be covered with blood, but are not mixed with it. The rectum offers great facility for the determination of the source of the hæmorrhage, and an examination will show whether the bleeding is from hæmorrhoids or from an ulcerated surface. When an ulcer of the rectum exists, the passage of the fæces will cause some blood to flow, which will often be found on the top of the fæces, together with some pus. The importance of intestinal hæmorrhage will depend, first, on the nature of the malady which is its cause; and, second, on the amount of blood lost. If typhoid, or cancer, for example, the importance of the hæmorrhage—unless itself sufficient to cause death—is merged completely in the importance of the malady associated with it.

Treatment.—In the remedial management of intestinal hæmorrhage, the same principles and methods are applicable as were recommended in the cognate disease—gastric hæmorrhage. The most absolute quiet must be maintained, mustard-plasters and ice-bags applied to the abdomen, barium chloride ($\frac{1}{4}$ gr. at a dose), ergotin injected subcutaneously, and alum-whey drunk freely. If time is afforded, the usual iron styptics can be administered by the stomach, or if the source of the hæmorrhage is low down they can be administered more efficiently by the method of irrigation or by enemata. The author having known of an instance of fatal hæmorrhage induced by an injection of a solution of Monsel's salt, given to arrest a hæmorrhage, he advises caution. An intestinal hæmorrhage is a mere symptom; the treatment of it is necessarily a part of the disease with which it is associated. If it occur during the course of typhoid, very different management will be requisite from that necessary in purpura, or in cirrhosis, etc. Only general rules can therefore be indicated here.

ENTERALGIA: NEURALGIA OF THE INTESTINES—COLIC.

Definition.—The term enteralgia is applied to a neuralgia of the intestines, of a functional character, and is therefore a neurosis, and should be studied with the group of *neuroses*, but it is convenient to take it up at this point.

Causes, Symptoms, and Diagnosis.—Except for the difference in site, the story of gastralgia might be repeated here. A more condensed description than would otherwise be proper will now suffice.

The causes of this affection can be comprehended in two groups: an irritable state of the nerves themselves; irritation, by various objects, of the terminal filaments of the nerves (end-organs) in the mucous membrane of the intestinal canal. In the first group must be placed that condition of the nervous system existing in hysteria, hypochondriasis, and in the various cachexiæ—paludal, plumbic, cupric, syphilitic, etc.; and in the second, improper food, coarse and irritant

articles, as husks of grain, seeds of fruits, etc.; hardened fæces, impactions of fæces, fermentation and flatulent distention of the bowels; cold, etc.

An attack of colic may come on gradually with a feeling of uneasiness in the bowels, some nausea, eructations of gas, etc., or it may begin abruptly and develop full force at once. When it occurs by either mode, there is felt about the umbilicus a peculiarly severe and depressing pain, having the well-known griping quality. There are numberless gradations in the severity of the attacks, from a little griping pain felt for a few minutes, up to a seizure of such severity that the patient may appear as if collapsed. In any case of moderate severity, the suffering during the time the attack lasts is great—the patient groans or cries with anguish, the body is doubled up, and the fists are pressed deeply in the abdomen, or the abdomen is lain upon with the whole weight. Meanwhile the pulse is small and weak, the surface cool or cold, the face has an anxious and suffering expression, and is covered with a cold sweat. The abdomen may be hard and tympanitic or retracted, and occasionally tender, instead of pressure giving relief. The kidneys secrete a large quantity of pale urine, and a frequent desire to micturate is usually felt. Vomiting generally occurs, and affords some relief, but an action of the bowels, which is always sought for, removes all the pain, at least for the time. Sometimes the attack terminates by a discharge of flatus, by eructation or by the bowels, and then relief is experienced.

The duration of the attacks is variable—they last from a half hour to several hours, and a succession of attacks is not unusual, carrying the case on for several days. When the attacks are plumbic, the colic is known as dry, and obstinate constipation is a prominent symptom—the pain continuing until this is removed. The history of the individual, his occupation as a painter, and the behavior of the case itself, will indicate the nature of the attack. When it is paludal (malarious), the attacks will be distinctly periodical. If syphilitic, the pain will occur in the evening, and leave the patient unmolested during the day. The duration of those cases having their origin in a cachexia will depend on the treatment; for, if the underlying morbid cause fail to be recognized, they may be prolonged indefinitely.

Enteralgia may at once be distinguished from all inflammatory affections by the absence of fever, and of tenderness on pressure, and by the early termination of the seizure, leaving the *status in quo*. It is distinguished from gastralgia by the situation of the pain, and by the relief obtained by an escape of flatus and by an evacuation of the bowels, instead of by vomiting. It is distinguished from hepatic colic by the seat of the pain in the latter, by the tenderness over the gall-bladder, by the appearance of bile-pigment in the urine, and afterward of jaundice. It is distinguished from nephritic colic by the following

symptoms which indicate the latter: by the pain along the course of the ureter, by the pain in and retraction of the corresponding testicle, by the strangury and bloody urine, etc.

The colic of gaseous accumulation is differentiated from the other forms by the fullness and tympanitic distention of the abdomen, and by the passage of gas in both directions. This is the colic of infants. The colic of fecal accumulation is recognized by the fullness of some particular part, and the occurrence of pain in the same locality, frequently the cæcum and ascending colon, and at the sigmoid flexure. The colic of lead is associated with the lead-cachexia, with pallor and anæmia, with a blue line along the margin of the gum, with a slow pulse, with a retracted abdomen, etc. The enteralgia of chronic malarial poisoning is known by its prompt occurrence at a fixed time, as has been pointed out.

The prognosis is favorable in genuine colic.

Treatment.—The important point is to remove the cause which gives rise to the disturbance—if some irritant matters or fecal accumulation, an active purgative is indicated. The flatulent colic of infants is quickly and safely relieved by the bromide of potassium and oil of anise in an emulsion—five grains of the former and the eighth of a drop of the latter, every half hour until relieved. For the immediate relief there is no remedy comparable to the hypodermatic injection of morphia and atropia. By relaxing spasm, the injection favors the action of laxatives or purgatives. For the treatment of the colic of some cachexiæ, the appropriate remedies for the cachexia will be necessary: for example, quinia in intermittent colic, iodide of potassium in nocturnal colic, and alum in lead-colic. For the hysterical colic, a combination of Hoffman's anodyne and fluid extract of valerian is effective. Enemata of asafœtida mixture may also be used. For chronic enteralgia of the bowel—an extremely obstinate affection—arsenic, probably, stands in the front rank. The neuralgiæ are, however, considered more fully in another place, to which the reader is referred.

CONSTIPATION.

Definition.—As the term *constipation* is usually employed, it signifies a state of the intestinal canal in which the alvine evacuations too seldom occur. Obstruction of the bowels, whether due to impaction, concretions, tumors, or other causes, is treated of in a separate chapter.

Causes.—Omitting from consideration all the conditions inducing obstruction, the causes of constipation are resolved into three groups: 1. Those arising in deficient secretion; 2. Those due to imperfect action of the muscular layer of the bowel; 3. Those dependent on derangement of the nervous apparatus. When from any cause the