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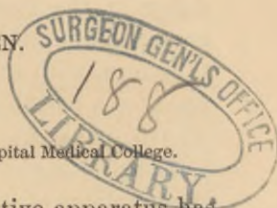
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CONSTIPATION IN CHILDREN.

BY

J. LEWIS SMITH, M.D.,

Clinical Professor of Diseases of Children in Bellevue Hospital Medical College.



THE gastro-intestinal portion of the digestive apparatus has a double function. First, it receives and retains the food during the process of digestion; it furnishes the most important of the liquids by which digestion is effected, and it absorbs those products of digestion which are required for the nutrition of the body, while it serves as a barrier against the admission of refuse matter. Secondly, it has an excretory function, so that a large part of the waste and noxious products of the system are eliminated from its surface. Having, therefore, a relation so close and fundamental to the general nutrition, it is necessary, for the normal activity of the organs and the maintenance of health, that its functions should be regularly and fully performed. But retention of fecal matter beyond the normal period is one of the most common ailments both in infancy and childhood, and occasionally it constitutes a grave disease.

Constipation is of two kinds, namely, *symptomatic* and *idiopathic*.

Symptomatic Constipation. Causes.—Many of these are obstructive. The more common of them are the following: (a) Congenital stenosis, or occlusion of the anus or rectum. The anus is not formed, or it terminates in a cul-de-sac, while the lower end of the large intestine forms another cul-de-sac. These two cul-de-sacs, lying opposite each other, one looking upward and the other downward, may be separated from each other by a small interspace, a fibrous septum, so that relief can be obtained by a puncture or incision, or they may be widely separated, so that there is no possible mode of relief, and death is inevitable, unless the fecal matter escapes through a congenital fistulous passage upon one of the adjacent mucous surfaces, which mode of relief was present in forty per cent of the cases of this obstruction collected by Leichtenstern. Excep-

tionally this malformation occurs in the sigmoid flexure, while the rectum is normal. The stenosis, if slight, may produce little delay in the evacuations, except when hardened masses or coarse, indigestible substances descend upon it, and it may, therefore, with careful selection of diet, cause little inconvenience for a lengthened period, while much stenosis causes early obstructive symptoms.

Rarely the stenosis is at the ileo-cecal orifice. Thus, in the Transactions of the Lond. Path. Soc. for 1870, is the history of a case in which there was such narrowing of the ileo-cecal orifice, believed to be congenital, that a No. 9 catheter could barely be passed through it. The patient lived till his thirty-second year, having suffered from an early age with frequent attacks of colic and constipation. After his death, the ileum next to the ileo-cecal valve was found to have a diameter of seven inches, while the large intestine was much atrophied, and its entire lumen contracted from the long disuse. Occasionally, the narrowing occurs a little above the ileo-cecal orifice, and more rarely in the duodenum, at the point of union of the pancreatic or bile-duct with the intestine. In the last situation, the obstacle sometimes appears to be hypertrophied *valvulæ conniventes*, the edges of two opposite folds becoming more or less adherent. Such congenital intestinal obstructions, whether, as is probable, produced by inflammations in the fetus or from simple perverted nutrition; whether arising from syphilitic cachexia or other cause, of course, retard the evacuations, according to their locations and the degree of closure. The same degree of stenosis in the colon or rectum obviously causes more constipating effect than in the small intestine, since the excrementitious substance is firmer in the former than in the latter, and the latter have more mobility by which to overcome obstacles.

(b) *Intestinal Displacements.*—These produce obstructions of a very painful and dangerous kind. Intussusception and external hernia are too well known to require description. Both are apt to produce complete obstruction if not soon relieved, but there are cases of intussusception in children in which the displaced intestine remains pervious, and the evacuations occur with more or less regularity; and the same is true of

one form of hernia, namely, the congenital, which, although painful, seldom produces serious obstruction.

Painful and dangerous occlusion and consequent arrest of alvine evacuations occasionally results from the imprisonment of a loop of intestine in an opening, usually congenital, in the mesentery or diaphragm, or from the knotting of one portion of intestine with another, as described by Leichtenstern, or again from the twisting of the intestine. Thus, in the *Centralb. f. d. med. Wissensch.* for April 24th, 1879, Epstein and Soyka relate the case of a new-born infant that died in the second week after birth with symptoms of obstruction. At the autopsy, a portion of the small intestine with its mesentery was found twisted upon its axis, from right to left, without any marked evidence of inflammation.

(c) Substances which have been swallowed, or substances whose nuclei have been swallowed, and which consist of a deposit of carbonate and phosphate of lime, or substances which have been produced entirely in the system, and which lodged in narrow parts of the intestine, cause obstruction. Such substances, some of which occur most frequently in children, and others in elderly people, produce acute constipation. Indigestible matter contained in the food, as seeds or the parenchymatous portions of fruits, occasionally collect in considerable quantity and obstruct the intestine. A large gallstone, having escaped from the common bile-duct, occasionally obstructs the intestine, either at the ileo-cecal valve or, more rarely, at some other point. But this seldom occurs in children.

In one instance, and in only one, have I known obstinate constipation to be produced by worms. The patient was a girl of about four years, in whom constipation came on suddenly, and was accompanied by distention of abdomen and great suffering. This continued nearly one week, when a mass of intertwined round worms was expelled with immediate relief. The records of medicine also contain cases in which neoplasms, growing from the coats of the intestines internally, have attained such size as to retard the evacuations.

(d) Abscesses and tumors, especially when occurring in the pelvis, also sometimes cause constipation by pressing upon the intestine, and obstructing or narrowing the passage through it.

Thus, in 1868, Mr. Thomas Smith related to the London Path. Society the case of an infant, aged fourteen months, in whom both alvine and urinary evacuations were retarded by a cancerous tumor growing between the rectum and bladder, and ending fatally in three months after the occurrence of the first symptoms.

(e) Peritonitis, during its continuance, is known to constipate the bowels. It is supposed that inflammatory edema occurs around the muscular fibres of the middle coat, by which their contractility is impaired. Hence the lax state, the meteorism, and inaction of the intestines in this disease. When the peritonitis abates, the normal action is restored, and the evacuations occur regularly, if the free surface of the peritoneum have undergone no unfavorable change. But unfortunately peritonitis often produces more lasting injury, so as to interfere seriously with the intestinal movements, and produce an habitually torpid state of the bowels. This occurs from adventitious bands of inflammatory origin, which lie across the intestines, compressing them at the points of contact, and restraining their movements, and from adhesion of the intestinal loops.

The most marked cases which I have observed of this were children who had had tubercular peritonitis. The following was an interesting example:

Charles, aged 4 years, was returned to the N. Y. Foundling Asylum on April 16th, 1877, to be treated for tumor albus of the left knee, and for general ill-health. His parentage and early history were unknown. The nurse in the city, to whom he had been intrusted when quite small, stated that he had no sickness when with her, except sore eyes, and that about April 1st, 1877, the enlargement of the knee was first observed. The head of the boy was large, and the abdomen much distended, but without any decided tenderness on pressure; its entire lower part had a purplish color. Percussion over it gave a dull sound, except upon and near the epigastrium, where there was some resonance; umbilicus prominent; circumference of body over abdomen, 23 inches; pulse 128; axillary temperature 99°. It was stated that he had no stool without medicine, and that, usually, one tablespoonful of castor oil was required to produce it. The urine contained no albumen, and was apparently normal. As the appearance indicated struma, a mixture of cod-liver oil, syrup of the lacto-phosphate of lime, and iron was prescribed, to be given three times daily, and directions were given to rub cod-liver oil over the abdomen also three times each day, for five minutes each time. Some nodules were felt, on pressure upon the abdo-

men, which we suspected were enlarged mesenteric glands. From the day on which the friction and kneading of the abdomen was commenced, the stools began to occur, in the average, about twice daily. The kneading proved the safest, as well as most efficient, method of producing defecation.

On May 4th, the circumference of the trunk over the most prominent part of the abdomen was reduced to twenty-two inches. The records on May 11th state: "same treatment is continued; has tolerable appetite, but is pallid, and his flesh flabby and soft." On May 22d, the circumference of the trunk gave 22 $\frac{1}{4}$ inches. The tumor albus remained about the same.

I saw the patient again during attendance in the asylum, in August and November. The record in November states that he is feeble and failing; is becoming weaker and thinner; breath and exhalations from the surface offensive; he is kept quiet on account of the knee. From this time he gradually failed, and died April 11th, 1878. There was no cough to attract attention; and instead of constipation, a diarrhea of some weeks' continuance preceded death.

Autopsy.—Lungs healthy, except a little exudation over the summit of right lung; bronchial glands cheesy; numerous tubercles, some of them cheesy, upon the parietal and visceral surface of the peritoneum. Loops of the intestines were united to each other by old adhesions, and the small intestines were generally bound down by bands into a "uniform conglomeration;" mesenteric glands enlarged and cheesy; a large ulcer upon the surface of the rectum, and numerous small, round ulcers upon the surface of small and large intestines, apparently occupying the site of the lymph follicles.

Occasionally, a false band, the result of peritonitis, lies across the intestines, without restraining their movements, and producing no marked symptoms, and probably no symptoms at all, until a loop happens to pass underneath it, when, if not soon released, it is apt to become strangulated, with complete obstruction to the passage of fecal matter. This displacement might properly be classified with the internal hernias described above. In my own person, at the age of twelve years, such an accident occurred about two months after the peritonitis. Upon the abatement of the inflammation, a sensation of traction had been noticed in the umbilical region, almost daily during exercise, and the displacement was indicated by the extreme pain which characterizes such cases, and which ceased suddenly, when the parts were released after about eighteen hours.

Idiopathic Constipation. Causes.—These are quite numer-

ous. The more prominent of them are the following. First, too little liquid in the excrement, so that it is too firm for ready evacuation. There may be too little liquid taken in the ingesta, or too scanty secretion of the liquids which mix with the food, as those of the pancreas, liver, and mucous follicles, or there may be too great an absorption of liquid through the coats of the intestines and too active an excretion of water from the skin, kidneys, or lung. The firmer the fecal matter the greater the tendency to constipation. Those who lose a large amount of water, as in diabetes, night sweats, or from occupations which expose to heat, or from residence in a hot climate, are especially liable to constipation, except as the loss of liquid is compensated by an increased amount of drink.

The character of the food, apart from the amount of liquid which it contains, obviously has a marked influence upon the consistence and frequency of the stools. Occasionally, the intestines act sluggishly from insufficiency of food. Thus, the infant sometimes hangs an unusually long time on the breast, and the mother or wet-nurse believes it to be a hearty nurser, when there is really deficiency of milk, and the stools are scanty and infrequent from lack of material. Again, constipation is not uncommon in infants who nurse heartily, and seem to obtain a sufficient quantity of milk, and the cause of it is not in the state of the digestive organs, but in the milk. We find that now and then breast-milk has a constipating effect, although we discover nothing to cause this result in the mother's diet or health. The comparison of ordinary milk with colostrum may furnish a clue to the explanation. Colostrum is known to be more laxative than ordinary milk, and it differs from it chemically in containing more butter, sugar, and salts. Hence the theory seems plausible that, when breast-milk is constipating, these elements occur in less than the normal quantity. And we shall see hereafter that treatment suggested by this theory obviates the constipation.

The use of a diet which consists chiefly of assimilable substances, as animal food, and from which, after the digestive process, little coarse and stimulating residuum remains, is obviously apt to produce a sluggish state of the bowels. On the other hand, coarse food, as fruits with their seeds, coarsely ground meal, etc., which stimulate the peristaltic action and

the secretions, increase the number and frequency of the alvine discharges.

Habit also exerts a decided influence upon defecation. One who, for whatever reason, neglects or resists the desire for a stool, soon becomes less conscious of the daily recurring need, and establishes a constipated habit. Constipation is more apt to occur in those who lead a quiet life than in those who are active. This is probably a more frequent cause of constipation among school children than is commonly supposed.

While it is important that the diet and glandular secretions should be such that the feculent matter has proper consistence, for easy propulsion along the intestinal tube, the important agent by which alvine evacuations are effected is obviously muscular contraction. The muscular fibres of the intestines produce the vermicular and peristaltic movements, by which the excrement is carried forward, and the abdominal muscles, by their powerful contraction, are the chief agents of expulsion. Now any pathological state which impairs the innervation of these muscles, or renders it abnormal, destroying the proper balance between "exciting and inhibiting impulses," is apt to cause constipation. Hence meningitis, myelitis, and certain other diseases of the cerebro-spinal axis, especially such as cause paraplegic symptoms, are commonly attended by a sluggish state of the intestines, either from tonic contraction of the muscular fibres of the middle coat, as in meningitis, or paralysis of them.

But there are cases in which there seems to be a constitutional tendency to constipation—a tendency quite independent of the usual conditions. Thus I have met children who were bright and active, free from obstruction or disease which might retard the evacuations, apparently far from having sluggish muscular contractility, and so far as I could see with proper diet, and yet with defecation, except as it was produced by measures employed, occurring no oftener than each second, third, or fourth day.

But it must be borne in mind that what is constipation in one child may not be in another, for occasionally one does well with only one evacuation every second or third day, while a large majority require daily defecation, in order to the maintenance of perfect health.

In the adult, the sacculi or pouches which occur in the walls of the colon, produced by contraction of the longitudinal bands, acting at right angles to the direction of the circular fibres, and consisting of the internal and external tunics, without the muscular, become the receptacles for fecal matter in those who are constipated, and obviously tend to increase the constipation. In children these sacculi are much less developed relatively, and in young infants, whose intestines lack the longitudinal bands, are absent, so that this anatomical condition by which the passage of fecal matter is delayed, is unimportant as a cause of constipation in the young.

Constipation has a tendency to perpetuate itself, since retained feculent matter becomes more consistent and firmer, and the contractile power of the muscular tunic becomes weakened by long distention. Obviously, also, an abnormal length of the large intestine, so that it doubles on itself, whether congenital or the result of constipation, and a malposition, which diminishes the space occupied by the colon, and therefore increases its flexures, have a tendency to produce constipation.

Symptoms.—When there is a mechanical cause, which retards the passage of fecal matter, the acuteness of symptoms and the suffering are generally proportionate to the degree of obstruction. Symptomatic constipation occurring in an obstructive disease, whether adhesions, peritoneal bands, intussusception, knots or twisting of the intestine, incarceration in a false passage, or from biliary or intestinal stones, or fecal masses, is attended by severe symptoms, such as intense colicky pain, vomiting, loss of appetite, and rapid prostration. The ingesta accumulate above the point of obstruction, producing distention of the intestine with fecal matter and gas, while below the point of obstruction the intestine is soon empty. The symptoms indeed have the severity, and the state involves the danger, present in ordinary strangulated hernia; while, from being internal and therefore less accessible for treatment, the danger is even greater. If the intestinal tract is narrowed, whether by a false ligament, the result of an old peritonitis, or other cause, and there is still perviousness, so that excrementitious matter passes by the obstruction, though slowly, and with more or less difficulty, the patient may be comparatively comfortable, if the food be such that no hard masses remain; but

according to the degree of stenosis, and the amount and coarseness of the fecal matter, symptoms occur referable to the obstruction. If the excrement is propelled with difficulty through the narrowed part, the muscular coat above the obstruction gradually becomes more developed, from hypertrophy of the muscular fibres, just as the heart enlarges from obstructive disease of its valves, while below the obstruction the intestine atrophies, and its calibre diminishes from disuse. Colicky pains, accumulation of fecal matter above the obstruction, distention of abdomen, eructation of gas, vomiting, impaired appetite, and consequent decline of the general health are common results. There is constant danger in these cases that the narrow passage may become obstructed by fecal matter, if it happen to contain hard masses, or coarse indigestible substances. The gravest form of constipation is obviously that due to mechanical agencies which act as obstacles, but as the obstacles are numerous, differently located, and of different character, so there is great difference in the gravity of the cases.

Idiopathic constipation generally comes on gradually. It at first attracts little attention and is neglected. The symptoms, of course, vary greatly according to the degree and stage of constipation. In mild cases, the retention is only in the rectum, or rectum and sigmoid flexure, and there are no marked symptoms except a sensation of fulness or distention of these parts, which one or two evacuations relieve. Between these mild cases and the graver forms of constipation, there is every intermediate grade, attended by symptoms proportionately severe. It is surprising sometimes to observe how long patients live with extreme constipation, though with constant suffering and ill-health. And, which I wish especially to be noticed in this connection, a large proportion of the fatal cases of idiopathic constipation occurring in adults, and recorded in the literature of the profession, began early in life, even in infancy, at which time they probably might have been relieved by proper remedial measures, and a life of suffering prevented. This important practical fact shows the need of greater attention on the part of parents and nurses to the state of the bowels in children, that their sluggish action may be corrected before it becomes habitual, and those anatomical changes of distention and mus-

cular paralysis occur, which are with difficulty corrected. Thus among the older authenticated cases is one related by Dr. Copland, in his medical dictionary, from Renauldin.

A medical officer in the French service was always costive from birth, he ate largely, but seldom passed a stool oftener than once in one or two months, and his abdomen assumed a large size. At the age of forty-two, his constipation was usually prolonged to three or four months. In 1806, after medicines had been taken to procure a stool, which had not been passed for upward of four months, abundant evacuations continued for nine days, and contained the stones of raisins taken a twelvemonth before; but the constipation returned. In 1809, the enlarged abdomen became painful, vomiting supervened, and he died at the age of fifty-four, having seldom, through life, passed more than four, five, or six stools in the year. On opening the abdomen, a fibrous partition obstructed the rectum, about an inch from the anus.

A case quite as remarkable, and of recent date, occurred in the practice of Dr. Strong, of Westfield, N. Y., and was reported by him in the *Amer. Journ. of Med. Sci.* in 1874 and 1876.

This patient, at the age of two years, usually had one stool in two weeks, and several years later only one in six weeks. When an adult he was treated by Dr. Strong, who found great distention of the abdomen, so that the lower ribs were pressed outward in nearly a horizontal direction, and the thoracic organs upward so that the apex beat of the heart was about one inch above the nipple. At this time, months elapsed between the stools, the longest interval being eight months and sixteen days. Defecation when it did occur lasted from two to four days, and was attended by violent gastric and intestinal pain, vomiting and prostration. At one of these prolonged stools, forty pounds of feces, resembling, as it usually did, chewed brown paper, were evacuated, the quantity being accurately ascertained by weighing the patient before and afterwards. He had appetite and was able to do certain kinds of farm work during the year preceding his death, which occurred at the age of twenty-eight years. At the autopsy the colon was found to have a length of six feet and three inches, and a circumference of thirteen inches, while the lungs were pressed upward and backward, as when compressed by a pleuritic exudation.

While such extreme cases are infrequent, all physicians of experience are consulted from time to time by adults who have had habitual constipation from their earliest recollection, and these cases, that aggregate so large a number, might, there is little reason to doubt, have been prevented for the most part during childhood, when the habit was being formed.

In long-continued constipation, in which there is a large fecal accumulation, not only is the diameter of the colon increased, as stated above, but this part of the intestine becomes elongated. This may lead to change in its position, the curves of the sigmoid flexure extending further to the right, and the central part of the transverse colon by its weight curving downward. This abnormal lengthening and the consequent curvatures have a tendency to increase the constipation, as has been stated above in our remarks relating to the etiology.

In these cases of extreme constipation, which, fortunately, are rare in children, as they are also in adults, the distention of the colon at the ileo-cecal orifice has a tendency to widen this orifice, so that the valve which, in the ordinary state, prevents the return of any substance which has once passed by it, is apt to become insufficient. The adjacent folds which constitute the valve become separated, so that, if vomiting and anti-peristaltic movements occur, fecal matter may pass from the colon towards the stomach. In aggravated cases, in which there is retention of a large amount of fecal matter, distention, muscular paralysis, etc., similar to those which we have seen produced in the colon, are apt to occur, though to a less extent, in the small intestines, especially in the ileum.

Retained excrementitious matter accumulating in large masses evidently becomes an irritant, so that, by its pressure, it excites muscular contractions, which, if ineffectual in propelling the mass, cause colicky pains. The retained fecal matter also undergoes more or less decomposition, producing gases which, by increasing the distention, also increase the pain.

Any irritating substance applied to a mucous surface is apt to excite increased secretion from the mucous follicles or from the glands whose orifices connect with the mucous membrane at the point of irritation. Many familiar examples will at once be recalled to mind, as the defluxion from the nostrils from the use of snuffs, and increased mucous secretion and salivation from objects held in the mouth. In the same way, retained excrement, forming hard masses which press upon the intestinal surface, excite a secretion, and not infrequently produce thereby a diarrhea which is conservative, and which may for the time unload the bowels, or it may remove a part of the scybalæ, while the rest remain. Hence we sometimes hear

patients speak of having irregular evacuations, constipation alternating with diarrhea. In aggravated cases, the pressure of impacted feces sometimes produces inflammation of the surface, when, in addition to abdominal pain, there are tenderness on pressure and some, usually quite moderate, febrile movement. In cases which have terminated fatally, after a longer or shorter time, destruction of the mucous surface has been found in places, in consequence of the pressure and inflammation. Thus, in the history of the French officer related above, it is stated that the inner surface of the distended intestine "presented gangrenous and ulcerated patches." We can readily believe that, as in cases of typhoid ulcerations, if the ulcers reach a certain depth, they may also give rise to localized peritonitis, and that occasionally perforation may result at the ulcerated or gangrenous point. The expulsion of hardened masses which have collected in the rectum is slow and painful, and accompanied by more or less tenesmus, which not infrequently causes a portion of the mucous membrane at the anal orifice to descend below the sphincter ani and protrude, by which hemorrhoids are produced. Occasionally, as I have observed in certain cases, the entire circumference of the rectal mucous membrane, to the distance of half an inch or more above the anus, becomes so loosened from its attachment to the connective tissue that it descends below the sphincter ani, and protrudes during each defecation. But this displacement, known as prolapsus recti, more commonly results, in children, from protracted intestinal catarrh, attended by diarrhea, loss of flesh, and by diminished tonicity of the tissues.

A beautiful and conservative provision in the system is that by which vicarious functions are established to relieve organs which imperfectly perform their part. While the intestinal surface is to a great degree eliminative, so that noxious and effete products are largely expelled from the system in the stools, it possesses also, in high degree, an absorbent function, as all who employ rectal alimentation are aware. Now, if the intestine fail to perform its function of defecation, and feculent matter collect within it, and begin to exert pressure upon the intestinal surface, more or less of the liquid portion is taken up by the vessels, and, entering the general circulation, finds a mode of escape through other emunctories. The general ill-

health or languor, the furred tongue, headache, and foul breath which characterize these cases are, no doubt, due to the absorption into the blood, or retention in it of noxious products contained in, and which in part constitute, the feculent matter. The fact that patients may live for years with tolerable appetite, and with only one dejection every second or third week, receives explanation in the fact that other organs, as the lungs, kidneys, skin, etc., act as depurants for such excrementitious matter as can be taken up in a liquid or gaseous form by the intestinal surface.

In infants, constipation, even when slight and temporary, often causes fretfulness, which is indicated by the character of their cries and the movement of the thighs over the abdomen. Continuing for a time, it causes more or less fever, and, in those young children who are liable to eclampsia, it predisposes to an attack, and it may be the chief cause.

Treatment.—If there is reason to suspect the presence of a mechanical obstacle which prevents normal defecation, a careful examination should be made, in order to discover, if possible, its nature and location. Often it is of such a nature that it cannot be removed, but its constipating effects may sometimes be in a measure obviated. In the case related above, in which constipation continued from early childhood to adult life, and finally proved fatal, its cause was ascertained to be a septum in the rectum, which probably might have been relieved by surgical measures. In all cases of constipation, which the history shows may be produced by mechanical causes, whether the obstruction is complete and the colicky pains and other symptoms severe, or there are occasional scanty evacuations, with but slight or moderate suffering, the history of the patient should be obtained, in order to ascertain if there had been at any previous time symptoms of peritonitis or other pathological state which might throw light on the etiology. The abdomen and the usual sites of hernia should be carefully explored by palpation, and the rectum by the finger, large-size catheter, or rectal tube. A thorough examination thus instituted, painless to the patient, will usually enable the practitioner to determine either the exact or probable obstacle, if any be present.

The proper treatment of symptomatic constipation obviously

requires the removal, so far as possible, of the primary disease, or the cause, whether it be obstructive or otherwise, and we need not stop to consider the special measures which are required, and will pass to the consideration of the treatment of idiopathic constipation.

Hygienic Measures.—We have already alluded to the fact that habit has a powerful control over the action of the intestines, so that it is important to obtain a daily alvine evacuation at a certain hour, and, by establishing the habit, the need will usually be experienced when that hour arrives each day. Many cases which become troublesome and obstinate might, no doubt, have been prevented, had this physiological law been heeded, and a daily evacuation obtained at a certain hour. The constipated habit, mild and not yet fully established, is more apt to be overlooked when it occurs in childhood than in infancy, for the infant is closely and constantly under observation, and it soon presents symptoms, as fever and fretfulness, if it do not have the regular evacuation, while children over the age of four to five years tolerate better a sluggish state of the bowels, and are likely to be constipated for a considerable time before it is ascertained. They therefore require more attention, in this regard, than is usually bestowed by parents.

The nature of the diet is obviously important, as certain kinds of food are more laxative than others. Chicken-tea and, to a certain extent, beef and mutton tea are laxative, and, made plainly, are, therefore, useful in connection with other articles. The various kinds of berries and fruits have also a decidedly stimulating effect on the intestinal surface, and aid in removing constipation. The apple, scraped or baked, or applesauce, may be given to quite young children; and for those that are older, currants, cherries, and, among dried fruits, prunes and figs are laxative. Unfermented cider, in its season, which has been found so useful for adults, may also be given to children in moderate quantity, at least to those who have reached the age of two or three years.

By the digestive process, starch, which is unassimilable, is changed into glucose, which can be absorbed and assimilated, and, from the small size of the salivary glands in the first months of infancy, it is believed that the salivary and pancreatic fluids are insufficient to convert starch into glucose, except in

very inadequate quantity. It appears, however, highly probable that there is an epithelial ferment, which converts starch into sugar (see *Chemical Phenomena of Digestion*, by Charles Richet, *Rev. des Sci. Méd.*, Oct., 1878), so that young infants can digest starchy food. Nevertheless, the theory that the infantile digestion, up to a certain age, is inadequate to effect the change, led to the preparation of food for infants, in which the change of starch into glucose was accomplished by a chemical process. Now glucose, given in considerable quantity, is laxative, and I have found it necessary to give the glucose preparation sparingly, or not at all, during the hot months, when infants are so prone to diarrhea. But this laxative effect renders the glucose preparations of the shops very useful in the treatment of habitual constipation of infants, whether we employ the "maltose" or "granulated sugar of malt," or the preparations of Liebig's food. Of four constipated infants in the New York Infant Asylum, to whom Horlick's "sugar of malt" was given, three were relieved. Any of the glucose preparations can be given quite freely to a constipated infant, without impairing the digestive function, or producing other ill-effect, so long as no more than the normal evacuations are produced; and I consider them among the best and safest of the foods for the relief of constipation in infants, but glucose or grape sugar is only feebly laxative, probably not more than cane sugar.

Oatmeal is more laxative than most other kinds of amylaceous food. Made into a gruel and strained, it may be given to the nursing infant, and unstrained to those who are older. Bread or pudding from coarsely-ground or unbolted flour or meal, and vegetables which contain saline and fibrous substances, have a stimulating and laxative effect on the surface of the intestines, and, therefore, are useful for constipated children of the age of two or three years and upward.

There can be no doubt that the free use of water in the ingesta materially aids in relieving costiveness. In one of the numbers of the London *Lancet*, a physician asks the profession how to cure obstinate constipation in adults. Among the replies, one physician suggests drinking a tumblerful of cold water on retiring to bed, and another tumblerful in the morning, and there can, I think, be little doubt that the laxative effect

of the broths, gruels, fruits, and mineral waters is partly due to the amount of water which they contain. One of the chief causes of constipation we have seen is too great firmness or consistence of the stools, due to absorption of the water, and if a larger quantity of water is swallowed during or after the meals than is removed by absorption, so that the stools have their normal or less than normal consistence, this cause of constipation is removed. An excess of water introduced into the system is to a great extent eliminated by the kidneys, and, in hot weather, by the skin, and, to a certain extent, exhaled from the lungs; but experience shows that, if the amount of liquid received is so great that the vessels in the coats of the intestines continue in a state of repletion, only a certain part of it is absorbed, while the rest descends and mixes with the excrementitious matter.

This simple expedient of allowing a liberal use of water, so useful in adult cases, doubtless also has a laxative effect in children, and its judicious use is proper for them. Another important aid in overcoming habitual constipation is frequent kneading of the abdomen. My attention was first particularly directed to this in the treatment of the case related above, in which obstinate constipation, occurring in a child of three years from peritoneal bands and adhesions, was to a great extent corrected by friction over the abdomen for three or four minutes at a time with cod-liver oil, and three or four times daily. The manipulation probably did the good, and not the oil, but the use of one of the oils for inunction renders the kneading less painful, and insures its more thorough performance by the nurse. All obstetricians in certain emergencies stimulate the uterine muscular fibres to contraction by kneading the abdomen, and it is probable that the muscular fibres of the intestines are stimulated in a similar manner, so that the intestinal movements are increased by which feculent matter is carried forward.

The external application of cold, so effectual in contracting the uterine muscular fibres, also stimulates the contractile power of the muscular fibres of the intestines. Cold-water bathing, the sudden application of a cloth wrung out of cold water to the abdomen, and in certain obstinate cases even the douche may be used to stimulate the muscular coat of the

intestines, and the abdominal muscles, to greater activity Trousseau says: "Before leaving the subject of the treatment of constipation, let me refer to the application of cold to the abdomen—a minor method which I have seen recommended, and have myself prescribed with astonishing success. On rising in the morning, let there be placed on the abdomen a compress of several folds soaked in cold water, and let it be separated from the clothes by a sheet of gutta percha or caoutchouc. This compress ought to remain on for three or four hours." This recommendation by Trousseau is for adults, who are much less susceptible to the influence of cold than children. So prolonged an application of cold and wet to a child, even the most robust, would involve danger, while its application during the brief period occupied in an ordinary bath, with proper exercise afterwards, or with other measures to prevent chilling, could have no ill-effect.

Therapeutic Measures.—For temporary constipation and many cases that are habitual, enemata should be employed, since they promptly unload that part of the intestines in which feculent matter is ordinarily retained, while they do not impair the appetite or produce the prostration which so often results from purgatives. For temporary constipation, a warm clyster may be given, and it commonly is more agreeable to the patient than one of lower temperature than the body. Among the enemata which have been found useful are castile soap with molasses and water, salt and water, the various oils, as sweet oil, with or without castor oil, linseed oil, alone or with molasses, and the gruels, as that of oat-meal or corn-meal made thin. The belief that the frequent use of warm clysters produces a relaxing effect is probably correct, so that, if it is necessary to employ clysters often, in consequence of the torpid state of the intestines, cool water, the effect of which is tonic and stimulating, should be used.

For infants, a clyster of one or two ounces usually suffices, administered by a gutta percha or glass syringe, while for older patients a proportionately larger quantity is required, administered by preference through a Davidson India-rubber or a fountain syringe. In certain long-continued, aggravated cases, the frequent injection of a large quantity of tepid water is indispensable, in order to wash away the accumulation of fecal

matter. Thus, in 1854, Mr. Gay exhibited to the London Pathological Society a boy of seven years, who at the age of three years had had typhus fever with dysenteric stools. After convalescence, he had habitual obstinate constipation, so that, when Mr. Gay began treatment, there had been no fecal evacuation for nearly four months, and the girth of the body over the abdomen was forty-nine inches, and yet the appetite and general health were not seriously impaired. The shape of the abdomen and the examination showed great distention of the rectal ampulla and the descending colon. Mr. Gay first distended the sphincter ani, so that it admitted a speculum, and through a rectal tube, well introduced into the colon, the excrement was repeatedly washed away, so that at the time of the exhibition of the boy to the Society, the measurement in girth gave only twenty-four inches. Evidently in cases like the above, no other treatment except repeatedly washing out the intestines with warm water would have answered, and the dilatation of the sphincter ani and the introduction of the speculum to facilitate the escape of fecal matter are noteworthy.

Suppositories may sometimes be usefully employed in place of enemata; cocoanut butter, molasses candy, or soap cut in shape of a pencil may be used for this purpose. In the adult, long-continued constipation is not very rare, in which the rectal ampulla becomes so impacted that it is necessary to use the anal curette, the handle of a spoon, or the finger introduced, in order to break up the masses, and allow them to pass. In children, necessity for such treatment is much more rare, but there are occasionally cases like that above described by Mr. Gay, in which it may be needed. Dr. Nagel states that the evil may be removed by the introduction of a suppository of brown gelatine. This is steeped in water for twelve hours, and having been thus softened, is introduced into the rectum, and an evacuation obtained. The doctor attributes the laxative effect to the hygrometric action of the gelatine.

The known effect of the galvanic current in producing contraction of the uterine muscular fibre suggests its employment to relieve constipation, by stimulating the muscles of the abdomen and the muscular coats of the intestines, and those who have employed it speak favorably of its use. Habershon says: "A galvanic current, transmitted through the abdominal

walls, induces a very speedy action, or rather emptying of the colon. . . . A case of partial paraplegia, in which injections did not act satisfactorily, and drastic purgatives were undesirable, was treated by a galvanic current passed through the abdomen every morning. In a few hours a free evacuation was produced without any discomfort." But the constipation of children very seldom requires the use of galvanism.

The ordinary purgatives should not be given habitually to relieve a constipated habit. They are apt to irritate the intestines, causing a catarrh, or else the intestines become accustomed to their action, and a large dose is needed to effect purgation. Given habitually, they cannot fail, also, to disturb the digestive and nutritive processes. One or two doses for present relief, both in habitual or temporary constipation, is sometimes required, provided that an injection is for any reason not preferred. For this purpose, castor oil or a few grains of calomel mixed with syrup of rhubarb, the syrup of senna, or the compound liquorice-powder of the German Pharm. may be administered with advantage. But for habitual constipation I strongly advise to discard the ordinary purgative medicines, and if the measures of a dietetic or hygienic character, recommended above, are not sufficient, to employ such remedial agents as promote, or at least do not impair nutrition.

Belladonna, so highly recommended by Trousseau and others, I have often administered to children, especially in pertussis, in large doses during several consecutive days, and it has not seemed to me to have any decided purgative effect. Though it may be useful in certain mixtures for adults, our experiences in this country, with reliable preparations, certainly have not been such as to justify its employment as the sole or main remedy for constipation. It diminishes reflex irritability, and may render the action of purgatives less painful, but from its known physiological effects we cannot believe that it increases the intestinal secretions or the action of the muscular fibres, one or the other of which results, we expect, from the use of an agent which is really laxative. Why the effects of belladonna, in this country, differ so widely from those observed abroad, needs explanation. On the other hand, nux vomica and its active principle, strychnia, are doubtless valuable adjuncts

to purgative mixtures from their effect in increasing the action of muscular fibres.

Physicians are not infrequently at a loss what to prescribe for the habitual constipation of nursing infants, which is by no means infrequent. But recollecting that the colostrum is more laxative than ordinary milk, and that it differs from it in containing more sugar, salts (largely phosphates), and butter, we have a hint, as stated above, as to what is probably lacking in the milk, and what, therefore, should be supplied. I am in the habit of giving the oil, sugar, and salts in the following formula, and usually with the desired laxative effect.

℞ Ol. morrhuæ.....2 parts.
 Aq. calcis,
 Syr. calcis lactophos.....āā. 1 part.

One-quarter, one-third, or one-half teaspoonful may be given with each nursing, or a larger quantity, as a teaspoonful or more, three times daily. Breast-milk with this addition becomes more nearly like colostrum in its laxative properties, while it does not possess those properties of colostrum which disturb the digestive process. I know no agent of a medicinal nature which meets the indication so well as this for infantile constipation. But in my practice I have found it necessary, in not a few instances, to rely mainly on simple enemata for the relief of the constipated habit, till the infants reached the age when a mixed diet was proper.

The habitual constipation of older children may ordinarily be relieved by the remedies recommended above, but occasionally a more active purgative effect may be needed. Since the portion of intestine which is chiefly implicated in ordinary forms of constipation is the colon, it is evident that, if it is necessary to employ frequently any of the active purgatives of the pharmacopeia, such should be selected as produce little or no irritation of the long tract of the small intestines, while they stimulate the function of the colon. The aloetic preparations are preferable for this purpose, as the tincture of aloes and myrrh, or the simple tincture of aloes, which may be given in dose of part of a teaspoonful in a convenient syrup, as the elixir adjuvans of Caswell & Hazard, or in coffee or milk.