after this is done, and it should be done under illumination, for it is easy to sever the nerve with the chisel as it makes its exit; if the nerve is severed no harm is done, but it is more satisfactory to remove it intact.

After the overhanging shelf has been chiseled off, a wire 1 mm. in diameter, having a certain amount of spring and barbed so that the barbs are directed towards the handle, is introduced into the canal and pushed upward until the point can be felt at the upper opening on the inner surface of the ascending ramus of the jaw as the nerve is given off from the inferior maxillary nerve; the handle is then slowly turned around its own axis, care being exercised that the instrument is not twisted, otherwise the wire will be so twisted as to break off in the canal; it is important that the instrument be turned slowly so that the barbed end will engage the nerve. After the instrument has been rotated eight or ten times very slowly upon its own axis, the sensation of the nerve tearing away is readily felt when the whole nerve is withdrawn from the canal more or less intact. The nerve canal can then be felt empty of its contents when the probe is introduced.

A point of importance also is to avulse the incisor branch of the nerve which is a continuation of the inferior dental nerve that passes to the two incisor teeth; this should also be withdrawn by a barbed-pointed instrument, the same as the one just described. Alcohol may be injected into the canal, but the results are practically the same if the nerve has been thoroughly removed.

Note: It was Dr. M. H. Woolsey who first called my attention to the method of removing the nerve from the canal by means of the barbed wire.

Discussion.

Dr. Hyman: Do I understand that with ordinary resection the pain does not cease?

Dr. Levison: It does but it recurs after a year or so practically as after alcohol injections. I operated in one case and despite the fact that the inferior dental nerve had been removed, the pain did not disappear until the filaments of the nerve in the lip were avulsed.

In answer to Dr. Wilbur I want to say that the first operation of this kind that I performed was prior to the time when alcohol injections had been introduced; at that time the usual procedure in tic douloureaux was to trephine at the angle of the jaw and extract the nerve from its canal. As far as immediate effect was concerned, this was satisfactory and the patient remained well for a time. I have had several experiences of this kind. I advocate operation in a certain class of cases, for example:

The woman whose nerve I am here demonstrating was treated by numerous alcoholic injections given by competent people. She had reached the point where she felt that something else had to be done; her attitude was characteristic of those suffering from inveterate neuralgia of the inferior dental nerve; she could not open her mouth, neither could she speak nor eat on account of the severe pain that these motions produced. The area on the chin opposite the exit of the mental nerve was red and she held her handkerchief to this point constantly. She was ready to submit to anything but further alcohol injections. It is for these patients that operation is advocated; it is not associated with any mutilation and is really much easier to perform than to describe.

SOME FACTORS IN HABITUAL CONSTIPATION.*

By RAYMOND RUSS, M. D., San Francisco.

The center of surgical discussion shifts from time to time. The brain, the neck, the thorax, occupy in turn the circle of the spotlight, which may be switched at any moment to some other portion of the stage of endeavor. Surgery, constantly trying to increase its scope, has fads and fancies. The opening of a new field is always followed by a stage of over-enthusiasm and sometimes reckless and ill-considered operating. Concomitant causes are lost sight of in the presence of what is thought to be a newly evolved principle, so desirous are we of reducing our asset of painful experience to the proportions of absolute, scientific fact.

Until recent years our conception of the large intestine was that of a receptacle in which waste products were stored before their evacuation. The experiments of Cannon and Barclay Smith established a definite function for the first portion of this tube; with this focusing of attention came a discussion of habitual constipation which primarily concerns it. The work of Wilms, Lane, Jackson, Fischler and others is so well known that we will not comment on it; suffice to say that besides ptosis, various adhesions and membranes have been found throughout the length of this large tube and that the view is growing with many men to regard certain forms of habitual constipation as purely mechanical, and this class believe that in many instances direct interference offers the only remedy.

Bismuth meals and X-ray pictures of the large intestines are becoming common but many and most serious errors have resulted from their interpretation. While the surgeon may profit by his mistakes, the patient does not. Too frequently he pays the penalty of ill-timed enthusiasm. The X-ray is teaching us that we must abandon our mental picture of the large bowel in health; that there is a difference in location between the standing and the lying positions; that the colon may be entirely within the pelvis of a woman in normal health; that the length of the ascending colon varies within wide limits and that the cecum is most variable in size and position. These are some of the things that a careful study of X-ray plates is showing but the strange part of it is that we already possessed this anatomical knowledge.

The wonderful strides that surgery has made are so impressive that we are prone to forget its shortcomings. We have long believed that the most serious blow the subject ever received was when it was divorced from anatomy. Few surgeons of

* Read before the San Francisco Polyclinic Society.

the present have the anatomic equipment for their work possessed by those of yesterday. The result is apparent in the surgery of the large bowel as it is in other fields. A better anatomic knowledge would have saved many a blunder which has already been committed in the operating room.

This is our excuse for considering to-night some anatomical facts concerning the large bowel and their bearing on habitual constipation. The subject is so extensive that it will be impossible to consider it from all its standpoints and, as these various phases are closely correlated in the etiology, our remarks will not possess sufficient breadth to make them satisfactory. Anatomical textbooks have in general poor accounts of the large intestine and it will be necessary to revert to original articles in order to gain the necessary knowledge for surgical interference.

The cecum may be defined as that portion of the colon which is situated below the entrance of the ileum. Its average length in the adult is given by Berry, Treves and Lardennois as 6 to 7 cm., its average width is 7.5 to 8 cm. and its capacity is from 200 to 300 cc. The various shapes to be found in the human cecum are well shown in textbooks and do not concern us here, but differences in size and position are questions of moment. That the apparently normal cecum is capable of great variation in size is known to every active operator. Byron Robinson in 435 autopsies states that congenital absence of the cecum and appendix was met with in but one case and that he found excessively large cecums in a little less than one-third of all autopsies. The latter statement must be taken with some reservations for the autopsy should be made immediately after death; ballooning of the cecum will sometimes occur soon after rigor mortis has set in. Very small cecums are frequently encountered and this no doubt results from diminution of the blood supply during axial rotation and cecal descent.

The size of the cecum bears no relation to the height or weight of the adult. In the first few months of fetal life the development of the small intestines, as would be expected, is out of all proportion to that of the large bowel. There is little or no growth in the colon for the first four months of extra-uterine life. According to Legueu cecums of 7 to 8 cm. in length and longer are not uncommon in infants, but in general it may be stated that the length of the cecum augments with the age of the individual until full development is reached. Tarenetzky believes that the cecum continues to increase in length with age, but this statement does not conform with the observed facts.

Most commonly the cecum is found lying upon the psoas muscle with its apex, or lowest point, projecting but slightly beyond its border. Less frequently the cecum lies upon the iliacus muscle. In many instances the cecum is found not upon either of these muscles but quite clear of them and hanging down into the pelvis. This fact is well known to all surgeons. In 18 examinations out of 100 Treves found the cecum in the pelvis. Lardennois, in 80 subjects examined, found the cecum more or less inside the pelvis in 9 and Alglave in 100 subjects found the cecum 17 times resting on the pelvic floor. According to Byron Robinson the cecum is twice as often in the pelvis in women as in men, 20% in the former and 10% in the latter. Properly speaking there is no such thing as a mesocecum. Cecums of normal or large size float freely and enjoy a considerable amount of movement. Small ones are usually fixed, while those of considerable size are frequently found in the pelvic cavity or in the middle of the abdomen. Stierlin states that mobility of the cecum was observed in from 10% to 23% of a series of cadavers in which all evidence of intestinal trouble was lacking. In 11 bodies out of 100 free from abdominal disease, Treves met with cecums that could be made to touch the under surface of the liver and any part of the left side of the pelvis. Dreyer in a large number of autopsies found a movable cecum in 67%; the frequency with which the cecum may be raised to the height of an upper abdominal wound is well known.

The normal or large cecum floats clear of attachments ready to take any position to which a fluid content may depress it or a gaseous content buoy it. Its upper limit is marked by an incomplete groove and angulation is apt to occur at this point. In 94% of cases the cecum is fully covered with peritoneum as is also the first portion of the ascending colon. From the tip of the cecum to the beginning of the mesocolon, there is, in the greater number of instances, a space of 10 to 11 cm., thus affording an organ, frequently out of all proportion to the size of its container, the opportunity of adapting itself to the position of the other viscera. In addition, the mesocolon is sometimes found to be stretched, thus affording a still greater excursion.

We find then that the normal cecum varies greatly in size, that it is freely movable and that its contents, whether liquid or gaseous, will determine to a great extent its abdominal position; that it rests generally on the psoas muscle, although it often lies on the iliacus, and very frequently it is clear of these and is found in the pelvis. These positions, varying as they do to such a great extent, are, nevertheless, found without evidences of abdominal disease. Moreover, it must be borne in mind that the walls of the cecum are thinner than those of any other portion of the large intestine. These variations are present at birth or take place shortly after and therefore a good proportion of our patients are predisposed to serious affections which errors in diet or daily habit may at any time precipitate.

Sometimes the axial rotation of the intestinal tract is arrested and the cecum fails to descend or only descends part way. The ascending colon therefore is capable of great variation in length. This variation is given by Cohan as from 10 to 29

cm. with an average length according to Treves of 20 cm. Occasionally it is out of all proportion to the size of the abdominal cavity.

The descending colon is the portion which is least liable to variation. It and the duodenum are the only parts of the intestinal tract that retain their original positions in the great primary vertical loop. On the other hand, the transverse colon varies much not only in its length but in its position as well. In the adult it has on the average a length of 50 cm. with a variation from 30 to 82 cm. It arches from the hepatic to the splenic flexure, which occupies not only a higher but a deeper position as well. With the patient lying down it is more frequently to be found above a line drawn from the highest point on one iliac crest to a corresponding point upon the opposite side. Possibly the transverse colon is below this line in one-fourth of all cases.

But great bends downward in the transverse colon in the forms of U's or V's are very common and these great deviations, which were first pointed out by Bright, are especially interesting to us. Generally in these conditions the transverse colon will be found bound down by adhesions, and they are potent causes of intestinal statis. Decided kinks at the flexures have to be reckoned with occasionally and what is known as the "double-barreled stenosis" may exist at either flexure. Many of these bends are no doubt congenital and may be observed in the fetus or in a young child, but the greater part we believe are due to fecal stasis with concomitant causes such as tight lacing, faulty positions in standing, lax belly walls following confinement, and a passive lengthening of the mesentery from a sudden loss of fat.

Notwithstanding these anatomical considerations, which have long been studied in detail for the whole length of the intestine, a number of writers have lately advanced the thought that enteroptosis has a congenital basis as quite an original proposition. While radiograms taken after a bismuth meal are showing us that marked prolapse of the stomach and intestine is very common, especially in women, it does not necessarily follow that these deviations from the normal are accompanied by symptoms. We have seen several patients who exhibited enteroptosis to a marked degree, the greater part of the stomach and transverse colon being in the pelvis, but in whom abdominal symptoms were lacking.

Our conception of diseased conditions can only be founded on a careful and complete study of the parts affected in health. It is therefore evident that the surgeon who opens the abdomen with the determination of doing some general plumbing and of making the large bowel conform with some textbook illustration which he has in mind, is capable of much damage. He reaches the superlative degree of meddlesome surgery.

Constipation is such a common complaint that it becomes most necessary to examine this symptom carefully, both from the standpoint of cause and effect, before linking it to any anatomic condition which may be found to be present. It must be remembered that in some instances the widest departures from the normal are unattended by habitual constipation. This is just as true as the fact that some people of a most constipated habit are apparently in normal health and do not suffer from autointoxication. We recall a brassworker who had not had a bowel movement for sixteen days and complained only of abdominal discomfort resulting from carrying such a heavy load.

The time at our disposal does not allow a consideration of the indications for operation in such conditions as have been described. This is an engrossing but a lengthy chapter for the differential diagnosis, guided by physical signs and X-ray findings, is difficult and the surgeon must revert continually to his past experience in such conditions. It is hardly necessary to state that operation is only to be resorted to after all medical means have failed.

Having obtained a fair mental picture of the position of the viscera, and the condition of the large intestine in particular, we must carefully weigh the bearing which faulty position has on the symptomatology of the case in hand. If the transverse colon exhibits dilatation and a large bend downward, what will be the effect of straightening it? Possibly there will be no beneficent result if we have overlooked other conditions which may be present from the cecum to the rectum. The finding of all causes through five feet of large bowel is no easy matter and when one has operated on a few cases he will be very careful to collect all the information that is possible before subjecting his patient to such an ordeal.

Our own experience makes us feel that the first and most important operative feature that the surgeon must learn is a quick and easy manner of separating the dense adhesions which he meets in these conditions. They will be found binding down the large bowel tightly and forming kinks and angulations past which it is difficult for the fecal matter to force a passage. The bowel will generally expand at once when these are cut. Occasionally the adhesions are so dense that it is impossible to free the bowel and one must resort to anastomosis in order to make a proper passage for the fecal content, a method which while sometimes necessary, we consider in general poor practice. The raw edges left by cutting adhesions should be covered in wherever possible with No. 00 catgut on a fine needle. An intestinal stasis, severe and continued, will result sooner or later in a pericolitis and the formation of these adhesions. The surgical treatment of general ptosis is far beyond the limits of these remarks.

The thin veil-like adhesions which Jackson has excellently described and classified as membranous pericolitis are of a very different type. They are fairly common and Jackson's article must have recalled to the minds of many that they had dealt in the past with this condition, classifying it generally as light adhesions about the ascending colon with no further thought of their possible bearing upon the case in hand. A large number of observers, among them Gerster, Pilcher, Charles Mayo, Connell, Rubitshek, Lane, Crossen, and

Duval, have testified to this condition; Virchow mentions it, and Binnie gave a good description of it in 1905. Concerning the etiology, however, there are divergent views. Lane believes that the membrane is the result of the tendency of the cecum and ascending colon to fall, due to the upright position; that these lines of strain are crystallized into adhesions which forming bands tend to maintain the positions of these structures by fixing them to the abdominal wall. Charles Mayo is of the opinion that this membrane is due to the late rotation of the bowel and descent of the cecum, the cecum burrowing its way through the peritoneum. It is difficult to see how such a view is tenable. The membrane does not cover the ascending colon as do the layers of a hernial sac, and what is more, if Mayo's explanation is true, the cecum would be covered by this thin membrane, and this is not always the case. As Connell says, "Such an explanation attributes to the cecum in its descent from the liver the rather unusual choice of the route of the greatest, instead of the least, resistance, and prompts the question, Why burrow behind an already formed posterior parietal peritoneum, when it would be much easier to descend in front of this structure in the usual manner?"

We have regarded this condition as the result of a chronic colitis. These films are found primarily on the cecum and ascending colon; they have been reported on the descending colon as well.* Gerster is of the opinion that whether these veils are divided or excised they invariably return if the colitis persists. Many a surgical patient's enforced rest in bed and dietary regulation has brought a chronic colitis far on toward recovery. It must be remembered that the cecum is the widest and thinnest portion of the intestinal canal, that it is the seat of a most variegated bacterial flora and that the other conditions which have been enumerated make it splendid soil for the implantation of a catarrhal inflammation. In these respects the ascending colon is only second to the cecum. In one instance we have seen these thin, veil-like adhesions well marked on the ascending colon but becoming thicker and tougher as the region of the cecum was approached. The literature of pericolic abscesses, etc., in this region is growing rapidly and tends but to increase the role which a beginning mucus colitis plays in these affections.

Discussion.

Dr. Ryfkogel: I think that everyone will agree with Dr. Russ that in the vast majority of cases, constipation is a purely medical problem, but surgery can undoubtedly help many cases a great deal. Constipation is frequently caused by adhesions between the ascending colon and the transverse colon. I would like to disagree with Dr. Russ' statement that the so-called Jackson's membrane is purely an inflammatory one. The impression is certainly given one that Lane is correct and that there is an effort on the part of nature to form a new mesentery. The Jackson membranes that I have seen were present in cases in which the ascending colon had more or less of a tendency to prolapse, and the appearance was always as if nature was making an additional effort to support the ascending colon. This curious membrane does not spread over on to the transverse colon, but is usually confined to the anterior portion of the colon and runs to the abdominal wall. The dissection off of this membrane has relieved symptoms, not only of constipation, but formation of large amounts of gas, and I always felt that this relief was due to the fact that the ascending colon was caused to adhere to the abdominal wall. Dr. Russ did not take up the matter of the Lane operation, which, of course, is very frequently done now—too frequently. I have opened the abdomen with the idea of doing this, but nearly always found something else that seemed to be at fault, either adhesions between the transverse and ascending colon, or some very marked prolapse with kinking, or strictures from old ulcerations, the correction of which put the patients in such shape that the subsequent medical treatment carried them on very nicely.

Dr. Levison: I was very much pleased with Dr. Russ' scholarly presentation of this subject. Here are two concrete examples of treating these forms of constipation—one I operated to-day. The diagnosis was made as preliminary to operation, and operation was carried out as expected. Patient had suffered for 20 years from habitual constipation. By means of the X-ray we could locate the apparent point of obstruction. His abdomen was opened to-day, and a kink attaching the colon to the thin edge of the liver was discovered, a number of adhesions were severed and tied off. The point of importance is the introduction of a long rectal tube high up in the intestine, which facilitates the evacuation of the bowels. Second—the same condition in splenic flexure, located by the X-ray. There were very firm adhesions, producing decided kinking. These were separated, and the man who had had almost complete bowel obstruction, was relieved and condition is satisfactory.

Dr. Lartigau: I would like to say a few words on constipation from the standpoint of the gynecologist. The subject is one of lively interest because women are frequent victims of this complaint. From this standpoint we will have to consider the obstinate cases of constipation from sagging of the whole large gut, in other words, ptosis. I would like to emphasize the point that while ptosis is a matter of importance, one has to be guarded in dwelling too much upon the mechanical factors of this subject. While operations have been advised for this condition, it has been my experience in watching such patients that 6 months or a year or two years after the operation they are as bad as at first. I have had two operated by Lane, the latter with marked improvement immediately following the operation, before which she had only one movement a week, accomplished by the use of different strong cathartics. After the operation the patient had normal bowel movements. But the condition gradually returned, and at the end of six months she was as badly off as at first. I would like to mention the psychological factor, which is not to be neglected. These patients have been treated from the psychical standpoint and cured. Some think that these cases must be studied with reference to perineal tears and to the sagging uterus. If the tear is bad, and there is marked sagging of the uterus, you will have to begin by repairing the peritoneum so that the sagging cannot occur.

Dr. Freytag: I think the X-ray is of extreme importance in diagnosing intestinal conditions. In cases of ptosis the great masses of bismuth meal

* Since the above was written Flint has published (Johns Hopkins Hospital Bulletin, Oct., '12) the fact that he has found these membranes in embryos and infants at term. He believes them to be normal structures and not inflammatory in origin. He acknowledges, however, that these veils may become somewhat thickened as the result of a chronic colitis. Flint states that his argument must be admitted "unless we accept the unproven theory of foetal peritonitis." It is interesting to know that this possibility has been advanced by Virchow, Treves, Simpson and Shober. It seems to us that many bands and adhesions have their beginnings in utero and are in character inflammatory.

fill the large intestine going down, although going up it will be nearly empty. As soon as the splenic flexure has been overcome, you see the big mass going down to the rectum. It has been said that ptosis sometimes causes no trouble, but if there is no trouble they have no reason to go to a doctor for examination. I think I can say that in the examination of the intestine we are very proud of our accomplishments.

FEEDING IN LATER INFANCY.*

By H. H. YERINGTON, M. D., San Francisco.

During the past six or eight years, probably no subject in medicine has received more attention than infant feeding, and with numerous schools advocating so many various methods, the family physician, if he tries to keep up with the literature, finds himself in a hopeless tangle.

Owing to the mildness of our climate here, the mortality of infants during the first year of life is not great, and even the artificially fed, are brought through this period with few upsets and begin their second year in fairly good condition.

The majority of people have the idea nowadays that a child if watched carefully during the first year, having its formula increased by the family physician, say, once a month, needs no further attention. Thus, the physician sees no more of the baby after the 12th month and the feeding is left to the mother, grand-mother and numerous friends, who have had great experience in bringing up their own children. This is party the fault of the physician, for how many men can sit down and write out a dietary for a mother with proper intervals of feeding, for a child during the second and third year of life? It is a common opinion that if a child goes through its first year without any signs of rickets, the danger of this disease is past, but this, unfortunately, is not true, because often owing to careless methods of feeding, beginning with weaning and lasting through the second year, marked rickets may be the result.

In the Children's Clinic of the Medical Department of Stanford University, it is our custom to begin adding substitutes for milk at about the 11th and 12th months, and either a small feeding book or a carefully written dietary is given the mother, with directions as to the intervals of feeding and amount of food to be taken. At this period, when a change of food is begun, it is important to watch carefully the ability of the child to digest its new food, and this necessitates an examination of the stools at various times, which is a simple procedure, and can easily be done by any one.

*Read before the Medical Section of the San Francisco County Medical Society, June 4th, 1912.

Briefly, the examination includes three parts:

1. Macroscopic, including size, color, consistency, odor, mucus, pus, blood, food masses, parasites, etc.
2. Reaction to litmus.
3. Microscopic examination, including—
   a. meat and vegetable fibres.
   b. a Lugal stain for starch.
   c. Soudan red and acetic acid stain for fats, fatty acids and soaps.
   d. stains for bacteria, such as tubercle, colon bacillus, etc.
   e. parasites and ova.

Such an examination can easily be done in fifteen minutes, and in any intestinal condition should never be omitted.

During childhood milk should be the basis of diet, and the rule of giving not more than 24 oz. in 24 hours is a good one. Small children getting a quart or a quart and a half of milk a day, often suffer with flatulence, colic, and constipation and, as a rule, refuse other food. A normal baby, age 12 months, weighing, say 21 lbs., should have not more than five, and better, four feedings a day. An ounce of orange juice diluted with water should be given on waking in the morning, at least a half hour before milk is given. The subsequent feeds should be given at 7:30 a. m., noon, 3:30 p. m., and 6:30 p. m. At first a ten o'clock bottle may be given, but this can soon be eliminated because with a liberal meal at 6:30, the child will sleep until the next morning. Varieties such as well-cooked cereals, zweiback or toast, scraped beef, or beef juice, some well-cooked vegetables in the form of purees, part of a baked potato, baked apple, apple sauce along with five or six oz. of milk at a feeding, should be the dietary from the 12th to the 18th month.

Many mothers come to you during the child's second year, saying that their child will not take milk, and this is due to the fact that after the 12th month, so much fresh bread, sweets of all kinds, etc., are given and the children are fed so often between meals that their desire for milk is lost, and they prefer substitutes instead.

During the latter part of the second year, and through the third year, children should take not more than a pint and a half of milk during the day, and the mother should arrange the time of meals at intervals to suit the household, the point being that the feeding periods be regular and the time betwen meals increased. If this rule be adhered to, the child will have an appetite at meal time, and the so-called "intestinal indigestion" will be warded off. Such foods as finely cut meat,—beef, mutton, steaks or chops,—can be added, with soft boiled or poached eggs, custards, gelatine jellies, etc.

I would say that the two most common causes of intestinal disturbances in young children, are the over-feeding with fats and starch. Owing to the richness of our certified milk, we find children with flatulence, constipation, loss of appetite, eczema, and restlessness, whose condition clears up