of polymorph cells mixed with the lymphocytes, which will at once distinguish this lesion from that of syphilis and lethargic encephalitis.

Whenever the inflammatory lesion reaches the surface of the nervous system and the meninges there will be outpouring of cells into the cerebro-spinal fluid and a recognizable change in this fluid, immensely important in diagnosis, together with signs of meningitis. Now as meningitic symptoms, such as headache, head retraction, diplopia, nystagmus, vomiting, and pains in the back and limbs with pyrexia, are among the commonest of symptoms of all cases of poliomyelitis, especially when this disease is epidemic, it will interest you to know that from the first symptom of the disease the cerebro-spinal fluid of poliomyelitis is highly characteristic, and that a lumbar puncture will not only relieve the headache and pains and possibly lessen the severity of the disease, but it will help you to a diagnosis in at least 98 per cent. of the cases. There is an increase in the protein content, and often a fine spider-web clot forms on standing for a few moments. The chlorides are normal: this will at once distinguish it from tuberculous meningitis, in which the chlorides are characteristically subnormal. The sugar is normal: this will at once distinguish it from all forms of bacterial meningitis, for in every one of these the sugar is below normal. There is an increase in the cells, which may be lymphocytes or polymorphs or both. The culture is sterile.

There is only one other acute pyrexial disease which gives a fluid sometimes like this, and that is lethargic encephalitis, but I wish you especially to remember that the polymorph cells are never found in the cerebro-spinal fluid of lethargic encephalitis, and when these are present the diagnosis must be that of poliomyelitis.

CONGENITAL IDIOPATHIC DILATATION OF THE COLON TREATED BY STRETCHING OF THE PELVI-RECTAL SPHINCTER.

BY

ANDREW FULLERTON, C.B., C.M.G.,

PRESIDENT, ROYAL COLLEGE OF SURGEONS IN IRELAND; PROFESSOR OF SURGERY, QUEEN'S UNIVERSITY, BELFAST.

CONGENITAL idiopathic dilatation of the colon (Hirschsprung's disease or megalocolon) is described in textbooks as an enormous dilatation of the colon with hypertrophy of its walls, affecting all or part of the large intestine. The parts most frequently affected are the descending, iliac, and pelvic colons.

The object of the present note is to advocate the trial of a method of treatment which aims at dealing with the cause. L. E. Barrington-Ward¹ in 1914 gave a full account of the disease and supplied a list of thirteen different views as to its causation, under the headings of "Mechanical," "Neuropathic," "Inflammatory," and "Congenital." He referred to *post-mortem* examinations made at Great Ormond Street Children's Hospital on nineteen undoubted cases, in all of which the sigmoid colon was hypertrophied. In ten of these cases the hypertrophy also involved the rectum as far down as the anal canal. In no case was any mechanical obstruction to be found, though in one the bowel was said to be kinked as it turned into the pelvis. After discussing the various theories he states:

"The theory that best explains this series of cases is as follows: There is a congenital abnormality in the lower end of the hind gut which takes the form of a muscular hyperplasia. It usually involves the rectum and extends for a varying distance up the pelvic and iliac colon. . . . In some cases there is definite localization of the change (as in three cases described) where the hyperplasia has affected a segment of the intestine chiefly. . . . The physiological functions of the intestine are in abeyance, a block is produced, and the bowel behind, for a varying distance . . . dilates and hypertrophies."

A. F. Hurst² believes that this affection is due to achalasia, or absence of the normal relaxation of the circular muscular fibres found at the pelvi-rectal flexure, or of the anal sphincter. He holds that there is a close similarity between what is known as cardiospasm (or, as he terms it, achalasia of the cardia) and megalocolon.

A. J. Walton,³ in discussing the surgical treatment of cardiospasm, describes fourteen cases in which he adopted the method suggested by Mikulicz—that is, opening the stomach and digitally stretching the lower constricted portion of the oesophagus. The result in these fourteen cases was entirely satisfactory.

THE PELVI-RECTAL SPHINCTER.

The lower part of the large bowel consists functionally of two parts, a colic part and a rectal part, and between these there is a functional junction. In the dead body, hardened with carbolic acid and formalin, the functional tract shows considerable variety in form and appearance. As a rule, however, it is a definitely contracted region of the bowel, always empty, and in strong contrast with the part above, and, to a less degree, with the part below.

Under normal conditions the faeces do not at once pass through this tract, but collect in the movable pelvic colon above until just before defaecation, when they are discharged into the fixed rectum below. Between the two parts there is an angulation, especially in the erect position. W. J. Mayo⁴ has shown that the mucous membrane of the last two inches of the colon is disposed in longitudinal folds, contrasting with the circular arrangement in the rest of the colon. This favours the suggestion that the segment referred to is normally obliterated by a sphincteric action of its circular muscular fibres. A similar arrangement is seen in the abdominal portion of the oesophagus, and in the pyloric end of the stomach.

It has not yet been shown that there is developed in the pelvi-rectal tract a sphincter comparable with that found at the pylorus, but over its whole length, which varies from half an inch to two inches, it is believed that there is a sphincteric action of the circular muscular fibres sufficient to obliterate the lumen and to withstand the weight of the contents above. The lumen becomes patent when the circular muscular fibres of this tract relax. Interest is being taken in this matter at Queen's University, and Professor Walmsley believes it is possible to demonstrate a more definite sphincter in the foetus.

Recently I had the opportunity of examining the rectum of a woman, aged 28, in whom I had, six months previously, excised the entire colon with a few inches of the terminal ileum, for multiple papillomata of the former. The junction of the ileum with the lower bowel was made about eight inches from the anus—that is, well above the pelvi-rectal tract. I expected in this patient that the rectum would be full of liquid faeces, but it was empty, and it was only on passing a sigmoidoscope some distance up that semifluid faeces began to escape. The presence of an efficient pelvi-rectal sphincter may be assumed in this case. The patient can retain faeces for many hours at a time, the bowels acting from two to five times in the twenty-four hours.

TREATMENT OF MEGALOCOLON.

Medical.

By means of enemata, massage of the colon, liquid paraffin, and aperients, a certain proportion of cases may be benefited, but the mortality is very large, some authors placing it as high as 74 per cent.

Surgical.

Barrington-Ward, in the paper referred to, thinks that a fair estimate of the surgical mortality would be about 36 per cent. He considers that the ideal form of treatment is the removal of the whole of the affected bowel down to the anus. He advocates, in young children, operation in two stages. At the first operation the ileum is divided and implanted as low down in the rectum as possible. Some months later, when the child's strength has increased, the large bowel above the anastomosis is excised. Treatment on these lines has been carried out by Arbuthnot Lane and others with success.

An operation of the magnitude of colectomy in a debilitated child, even if performed in two stages, is a terribly severe measure, and would undoubtedly, if universally adopted, be attended with a high rate of mortality. Moreover, it seems unscientific and incorrect to remove a hypertrophied organ striving to overcome an obstruction, instead of seeking out and dealing, if possible, with the cause.

If Hurst is correct in his assumption that the block in this disease is due to pelvi-rectal or anal achalasia, stretching of the pelvi-rectal sphincter, and, less obviously, of the anal sphincter, ought to relieve the obstruction, just as stretching of the cardiac sphincter has relieved the obstruction in so-called idiopathic dilatation of the oesophagus, or cardiospasm. The following case seems to support this contention.

A boy, aged 2 years and 4 months, was admitted to the wards of the Belfast Hospital for Sick Children, under the care of my colleague Dr. Leatham, on November 11th, 1926, with the following history. He had been breast-fed, but from birth had been constipated, and from the age of 9 months the constipation had become more troublesome. Enemata, paraffin, and other measures were required to secure an action of the bowels. Gradually the abdomen became more and more distended, and the child had recently begun to lose colour and weight. For two days before admission he had complained of abdominal pain, which was attended with persistent vomiting.

Condition on Admission.

The child was pale and drowsy, and vomited dark coffee-ground material at short intervals. The abdomen was much distended, and measured $32\frac{1}{2}$ inches in circumference at the level of the umbilicus. Peristaltic waves were visible, and a "ladder pattern" could be produced by abdominal palpation. Pain came on in spasms, and was associated with a desire to vomit. The distension involved the whole area of the abdomen, which was tympanitic on percussion. I saw the child on November 15th, at the request of Dr. Leatham, who was very much opposed to the adoption of any heroic surgical measures. Examination by the finger of the anus, the anal canal, and the lower part of the rectum disclosed no abnormality, but about the level of the sacral promontory the examining finger encountered an encircling band, apparently about a quarter of an inch in breadth, constricting the bowel.

Operation.

The child was immediately anaesthetized, and, as a preliminary, the sphincter ani was gradually and carefully stretched. When this had been accomplished the index finger was inserted into the narrowed area just mentioned, and pushed up so as to dilate the constriction. The

middle finger was then also introduced, and further stretching was effected. Finally, both index fingers were inserted until the last phalanx of each rested above the band, and by pulling upon the latter the upper bowel was partially invaginated into the lower. It was now possible to separate the fingers and dilate more widely still. Great care was taken during these manipulations to avoid rupture of muscle or damage to mucous membrane.

After-History.

The child was put back to bed, and during the next twenty-four hours large quantities of faecal matter were brought away by enemata. Vomiting ceased at once, and the child became quite comfortable. The enemata were continued with success, and the child was again examined under an anaesthetic on November 27th, twelve days after the first examination. It was now possible to pass a sigmoidoscope right up into the pelvic colon, where it could be felt on abdominal palpation. The mucous membrane of the bowel was red and inflamed, but no accumulation of faeces was seen.

Introduction of Dilating Bag.

To maintain the dilatation already effected a pear-shaped rubber bag, with a diameter of one and a half inches at its broadest part, was inserted and passed beyond the band, which was still palpable. The bag was then distended with water, and the tube leading from its narrow end was wound spirally round a glass rod laid

FIG. 1.—Drawing to show position of rubber bag in bowel and situation of pelvi-rectal sphincter.

across the child's buttocks, and fixed in position. (See Fig. 1.) The nurse was instructed to rotate the glass rod at intervals so as to increase the tension of the rubber tube, and thus maintain steady pressure on the constricted portion of bowel. When the bag was in position a finger was introduced into the rectum, and it was found that a slight degree of invagination of the upper bowel into the lower was being produced by the drag on the rubber bag. This is shown in Fig. 1. Later, the water in the bag was replaced by sodium iodide solution, and an x-ray photograph was taken. The skiagraph (Fig. 2) shows the position of the bag in the pelvis, the site of the constriction being indicated by an indentation below the broad end. The drawing in Fig. 1 is intended to be a reconstruction of the parts, from the x-ray photograph. The bag is represented as lying in the bowel, and the position of the constriction is shown. The bag was passed spontaneously twenty-four hours after its insertion. An opaque enema was given on December 16th—that is, about a month after operation—and the x-ray photograph shows the enormous dilatation of the colon, the anal canal, and what appears to be the site of the pelvi-rectal sphincter. (Fig. 3.) A further stretching was carried out on January 22nd, 1927, as a precautionary measure.

The subsequent progress of the case has been extremely gratifying. The circumference of the abdomen has been reduced from $32\frac{1}{2}$ in. to $18\frac{1}{2}$ in., though it varies a little from time to time. The bowels respond well to aperients and enemata, and frequently act without assistance. The abdomen appears normal on inspection. The thickened colon can, however, be palpated along its entire length, and can be felt to contract, especially after massage. The patient's condition is excellent. He has put on weight, his appetite is good, and his colour is that of a healthy boy. He was discharged from hospital on February 5th, not quite three months after admission, having been detained longer than was necessary, in order that his progress might be followed. He is now (April 16th) in perfect health, and his bowels act daily without aperients.

SUMMARY.

This case concerns a boy, aged 2 years and 4 months, with typical Hirschsprung's disease.

Treatment was carried out on the hypothesis that there was achalasia of the pelvi-rectal sphincter. The treatment consisted in stretching the sphincter ani and the pelvi-rectal sphincter.

The result up to date has been satisfactory. It is suggested that this line of treatment might be tried before resorting to grave surgical procedures. Should it be impossible to reach the sphincter

from the anus an attempt might be made after laparotomy to stretch or divide the contracted muscular fibres from the abdomen.

My thanks are due to Professor Walmsley for the description of the pelvi-rectal sphincter, to Miss Rea for the drawing, to Dr. M. Robinson, house-surgeon at the hospital, for his notes of the case, and to the x-ray department of the Royal Victoria Hospital for its help and interest in the case.

REFERENCES.

- ¹ Brit. Journ. Surg., vol. 1, No. 3, 1914. ² Arch. des Mal. d'App. digestive, Tome xv, No. 1, January, 1925. ³ Brit. Journ. Surg., vol. xii, No. 48, 1925. ⁴ Surg., Gynecol. and Obstet., xxy, 616, 1917.

FIG. 2.—X-ray photograph of dilating bag in position.

FIG. 3.—X-ray photograph after an opaque enema (taken a month after operating).