most desperate cases it is permissible only to make enterostomy, under local anaesthesia. In such cases I think that one opening should be made in the bowel by incision above the umbilicus and another well below it. The upper opening will combat the proteose toxæmia, the lower will combat the septic toxæmia.

It is sometimes difficult to decide when to perform enterostomy. I believe that if strong colicky pains have persisted right up to the time of operation and if, at the actual operation, the bowel responds to local stimulation, such as pinching, it will likely recover without enterostomy. If, however, the colicky pains have become feebler, if general distension of the abdomen is present, and if, at operation, the coils are found to be in any degree flaccid and floppy and do not respond definitely to local stimulus, enterostomy is compulsory. In cases of doubt, rather make an enterostomy than not. Vomiting will not get rid of the toxin, nor will a parietic bowel pass it downwards. As Wilkie of Edinburgh pointed out, paresis of the bowel is an important contributory factor to toxic absorption. The bowel will not recover unless the toxic contents are removed. If the obstruction has been in the large intestine I like to make a caecostomy as well as an enterostomy. In cases of this degree of severity I should also administer 20 per cent. hypertonic saline intravenously.

Sir William Taylor of Dublin has given indications as to the likelihood of having to perform enterostomy in cases of obstruction. Roughly speaking, according to him, the necessity corresponds to the stage of the illness, and he defines three stages. In the early stage it is only necessary to treat the cause. In the second stage, when distension of the bowel has occurred, the obstruction should be relieved and jejunostomy performed. Drainage may be required for only twenty-four to forty-eight hours. In the third stage the condition of the patient is so bad that it will not permit exploration, therefore jejunostomy only should be done, and later on, if the patient recovers, the obstruction may be dealt with. In my opinion that "if" is a big one; I prefer to ascertain what the pathological condition inside is. There is practically no hope for a patient who has to deal with, for example, a gangrenous loop of bowel in his interior. Enterostomy alone will not save him. Before giving up all thought of exploration, I like to see the effect of stimulation by drugs, intravenous infusions of saline solution, and blood transfusion.

In making an enterostomy, I think a Pezzier's catheter is a suitable tube to use, and of a medium size, but an ordinary large catheter serves the purpose equally well and is easier to remove. The latter has to be fixed by suture. Only exceptionally are there solid particles in the small intestine, so that the contents drain through comparatively small tubes.

I prefer to make the enterostomy, when the condition of the patient permits, after drawing the selected loop of bowel through a hole made in the omentum. When practicable, the tube is inserted in the bowel in a manner similar to the Witzel method employed in gastro-enterostomy, but in many cases one has to dispense with this refinement and simply insert the tube through a straight puncture, surrounding it by a purse-string suture. One of the fine chromic catgut sutures is left long and is used to moor the bowel to the abdominal wall. The loop of bowel is pushed back through the hole in the omentum, which is then made to lie snugly around the tube. If the enterostomy has been made from the exploratory incision, I draw the tube, before inserting it into the bowel, through a new small incision in the abdominal wall; this is usually most suitably made somewhere to the left of and slightly above the umbilicus. By this precaution contamination of the main wound is avoided. For suturing such easily torn bowel as is met with in this condition the so-called "atraumatic needle" advertised by the London Hospital appeals to me. The traumatizing "catch" of the thread at the eye of the needle experienced when ordinary needles are used may tear and cause a leak.

After multiple enterostomy I like to remove one tube at a time, the upper before the lower. The upper part of the small intestine seems to recover tone more quickly than the lower; the character of the toxin producing the paresis of the bowel may account for this as well as the fact that

the paresis has usually been present in the lower bowel for a longer time. I have an impression that the higher the enterostomy the longer it takes to heal. The tubes may be removed and the stomata allowed to close as soon as the patient is established in convalescence—that is, really, when vomiting has stopped and the bowels have "moved" satisfactorily. Evacuation of toxic contents is one important factor, but restoration of peristalsis is also essential to recovery.

A simple application for preventing excoriation of the skin round an enterostomy is ethereal rubber cement solution (1 in 4) applied several times a day. The ether evaporates and leaves a thin film of rubber over the skin.

It is sometimes almost impossible to tell, from the appearance of the bowel, whether the colour and the swelling are due to intense congestion and subperitoneal or interstitial hæmorrhage alone or whether gangrene has actually occurred. The presence of the hæmorrhagic effusion constitutes the difficulty. The purple colour of mere congestion soon gives way to a more normal appearance when strangulation is relieved, but effused dark blood does not dissipate and there may be no change of colour or only in patches. Of course, the discoloured, flaccid, inert, and often brittle state of the really gangrenous bowel is easy to distinguish—but there are all gradations. It must be remembered also that interstitial extravasation of blood has probably taken place before gangrene has occurred. I have never found the following test to fail, though I have used it for many years. I incise, with a sharp knife, the peritoneum and very superficial fibres of the muscular coat of the suspected part of the intestine. If the circulation is intact, definite bleeding, although possibly in small amount, will occur. It is found, then, that each time a clean piece of gauze is pressed lightly on the incised part it will be stained with fresh blood. Viability of the bowel is still more certain if the blood can be seen oozing steadily from the cut. If gangrene has occurred, the first or second piece of gauze may be definitely stained, but not more. There is practically never any doubt in actual experience. If the gut is viable the small incision is closed by a mattress suture of fine linen or catgut.

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PYELITIS FROM INFECTION WITH MORGAN'S NO. I BACILLUS.

BY

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As I have been unable to find any reference to urinary infection with Morgan's No. I bacillus, I think that the following two cases are worth recording. The association of this bacillus with infantile diarrhoea, and as a concomitant organism in bacillary dysentery due to the bacillus of Shiga and Flexner, is generally recognized. Recently I have found this organism in the faeces of many patients suffering with symptoms of bacillary dysentery, when repeated attempts have failed to isolate any other dysenteric organism. While believing it to be pathogenic, I had no positive proof of this until I isolated it from two cases of very definite pyelitis.

CASE I.

Private L., aged 24, a British soldier at Khartoum, stated that while in India (Agra) he had the first symptoms of his present condition. In February, 1923, he had a sudden sharp pain in the left side, which remained localized, was worse when he was in bed, was not propagated, and had no relation to micturition. For several days he had frequency of micturition and noticed that his urine was thick. The acute symptoms passed off in a fortnight on the exhibition of urotropine. Two months later (in April, 1923) he had a similar attack; pus was found in the urine, but no blood or casts were seen.

No further symptoms occurred until November, 1925, when he had to be relieved on guard duty because of a sudden onset of acute pain in the left lumbar region. The symptoms again passed off in ten days, but a further attack occurred only one month after. A radiogram then taken showed no detectable pathological condition.

The present attack, when the patient first came under my notice, was on March 15th, 1926. While on police duty he was

seized with pain in the left lumbar region; it was unaccompanied by any nausea, or alimentary or urinary disorder, although he admitted having a slight headache. There was some tenderness over the left kidney, but none over the left ureter or bladder.

While in hospital the patient had slight pyrexia in the evenings of the first three days—98.8°, 99°, and 99.2°—and again on the seventh, eighth, and ninth days of 100.8°, 99.2°, and 98.8°; the rise in temperature was associated each time with an exacerbation of pain. The urine was alkaline and contained a trace of albumin and a heavy deposit of pus cells, with a few red blood corpuscles and epithelial cells; but no casts or crystals or other abnormal constituents, nor tubercle bacilli were found.

An organism giving the bacteriological characters of Morgan's No. 1 bacillus was grown in pure culture. This organism was again isolated on March 25th, April 15th, and April 18th, each time in pure culture. A blood culture made on April 8th remained sterile. The results of agglutination tests of the patient's serum against the bacillus isolated proved interesting. Using Professor Dreyer's macroscopic technique, the following results were obtained: On April 2nd, agglutination in a dilution of 1 in 125 in an hour; on April 20th, agglutination in a dilution of 1 in 500 in an hour. In each case a normal human serum was put up as a control. The patient had the first three doses of an autogenous vaccine in the interval between the two agglutination tests.

CASE II.

The second case occurred in a British subject who was in the Khartoum Civil Hospital in February, 1926. He had a typical attack of pyelitis with pyrexia which lasted about three weeks. The urine was alkaline and contained a heavy deposit of pus cells and many coliform bacilli. I isolated Morgan's No. 1 bacillus from the urine, but in this case there were a few *B. coli* colonies present also.

The organism in each case gave the following cultural characteristics, etc.: On agar slopes a thin yellowish-white film was formed, having a sticky feel when touched with the platinum wire, while small colonies closely resembling *B. dysenteriae* were grown on MacConkey's medium. In broth a diffuse turbidity was produced. The bacillus was motile and Gram-negative.

The usual sugar reactions were tested. The result was alkaline with litmus milk; acid and gas with glucose and with galactose; acid on the fourth day with glycerol, and slight with indol. In tests with all the other substances there was no reaction.

Conclusions.

While the findings are very definite in Case I, they are more doubtful in Case II.

Both patients are receiving vaccine treatment, an autogenous vaccine having been prepared in each case.

EXTENSIVE DIVERTICULOSIS WITHOUT SYMPTOMS.

BY

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THE following case is notable as indicating the existence of extensive diverticulosis for at least fourteen years without giving rise to symptoms. Other pathological conditions were also present within the abdomen, including congenital abnormality of the small intestine.

A married woman, aged 51, who had borne six children and had a tendency to obesity, was admitted to the David Lewis Northern Hospital, Liverpool, on May 3rd, 1926, under Mr. G. C. E. Simpson. She complained of "wind" since an operation in 1912, and stated that for the last year she had suffered from occasional attacks of pain in the epigastrium, occasionally going through to the right shoulder-blade; they had no relation to food, and occurred irregularly either by night or by day, were sometimes accompanied by jaundice, and invariably by vomiting. The vomit was frothy, yellowish, and tasted sour. She said she had had typhoid fever when 6 years of age. On February 21st, 1912, she was operated on for gall stones, and five months later a hydatid cyst of the left hepatic lobe was removed. Both operations were performed by Mr. Murray at this institution. She brought to hospital with her a copy, which she herself had made at the time, of her old case-sheets, and also the two summary sheets dealing with the operations. On the back of the first summary sheet was found a pencil drawing of a portion of large intestine showing diverticulosis of the mesenteric attachment. This, she said, was drawn by Mr. Murray in the out-patient department to illustrate her condition. Mr. Simpson, who was then assistant honorary surgeon, remembers the occasion well.

Condition on Admission.—She was slightly jaundiced, the tongue was coated, and the breath foul. She was not constipated. Nothing abnormal could be discovered in the abdomen, and Murphy's sign was not elicited. Faeces and urine contained no abnormal constituents. A fractional test meal showed the presence of blood and bile in the stomach, with 0.03 free hydrochloric acid and 0.07 active.

Operation.

Mr. G. C. E. Simpson opened the abdomen on May 10th, when slight hepatoptosis became evident. The gall bladder, which was adherent to omentum, was full of small faceted stones. The pancreas and the appendix were in a state of marked chronic inflammation. From the caecum to the beginning of the rectum were hundreds of diverticula containing beads of faeces, and varying in size from that of a pea to that of a cherry. They were of the acquired type¹—that is to say, they were hernial protrusions of mucosa. The vast majority were in the concavity of the mesenteric attachment and the appendices, but there were also numerous small protrusions through the taeniae and peritoneum-covered muscular wall. The contents of all those in which it was attempted could be emptied easily into the bowel. There was no evidence of inflammatory reaction round these diverticula, and Mr. Simpson was able to say, having seen the case in 1912, that the only notable progress was an increase in size.

Another interesting condition present was an arrested rotation of the small intestine. The duodenum, with the superior mesenteric artery on its inner side, turned back on the head of the pancreas in the shape of a double S. The duodeno-jejunal flexure was at McBurney's point, the mesentery running thence upwards to the left. The mesenterized caecum, which was entered by the ileum from the right, was slightly left of the mid-line in the upper umbilical region. This arrest had apparently occurred at the eleventh week after the caecum had entered the abdomen through the narrowing umbilical orifice.² The gall bladder and the appendix were removed; the colon, with its diverticula, being symptomless, were left.

The patient made an uneventful recovery, leaving hospital in very satisfactory health.

I am indebted to Mr. G. C. E. Simpson for permission to publish this case.

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ULTRA-VIOLET LIGHT FROM OPEN ARC WITH TITANIUM ELECTRODES.

BY

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It is now established that ultra-violet light has important biological effects. Many diseased conditions have been treated with it and much enthusiasm has been evoked over its possible therapeutic value. It has been pointed out that if a list of the diseases said to have been benefited was made it would probably begin with acne and go through the whole official nomenclature to zona, including house-maid's knee and the minor psychoses. But the fact that its value is in many cases overstated and its mode of action is at present rather mysterious is no reason why its effects should not be thoroughly explored.

GENERAL.

The rather widespread impression that these rays are dangerous is illusory. They cause nothing comparable to the injuries that may follow the imprudent use of x rays. Their penetration is very slight and confined at the most to the lower layers of the epidermis. Even at this slight depth we begin to recognize two kinds of action, depending upon the degree of exposure and the precise wave-length of the light employed. It is at present difficult in medical practice to restrict the wave-length to any narrow degree of the ultra-violet spectrum. Where this has been done experimentally we have evidence that rays beyond the visible spectrum down to 290 $\mu\mu$, which have been spoken of as "biologic," are of such a nature as to stimulate biological processes, particularly as the lower limit is approached, whilst beyond this the still shorter rays, called "abiotic," exhibit a lethal action, though on account of their restricted penetration this is of little importance unless the exposure is prolonged. Even these shorter rays, if used with brief exposures, may perhaps act biologically. Taking the germicidal effect as a test, Browning and Russ got a maximum effect between 280 and