7. Marston resected 112 cm. (44 in.) for sarcoma of mesentery. Death five months afterwards from perforation due to Murphy's button.
8. Billroth: Female, 52 years, 113 cm. (45 in.) small intestine, on account of fixation by the extirpation of a fibroma size of child's head. Death from collapse.
9. Troje: 115 cm. (46 in.), female, 25 years, for four ring-like tuberculous strictures. Result, fistula.
10. Elliot (*Annals of Surgery*, January, 1895) resected 124 cm. (4 ft. 3 in.) in a man aged 25, for infarction due to thrombosis of the superior mesenteric veins. Patient was in good health two years after.
11. Roux (*Semaine Médicale*, 1892) resected 124 cm. (4 ft. 3 in.) of intestines for a lipoma. Recovery.
12. Budberg-Boeninghausen and Koch, 125 cm. (4 ft. 1 in.) flexure. Death from already existing peritonitis on the same day.
13. Do., 125 cm. (4 ft. 1 in.) ileum; death on day of operation from already existing peritonitis.
14. Obalinski: 126 cm. (4 ft. 2 in.), ileum, for gangrene. Death in twenty-four hours.
15. Studsgård: 128 cm. (4 ft. 3 in.) jejunum for invagination. Death five days after from peritonitis.
16. Schlange: 135 cm. (4 ft. 6 in.) ileum, gangrene. Recovery without disturbance.
17. Braun: 137 cm. (4 ft. 7 in.). Small intestine, on account of circumscribed peritonitis. The woman recovered in the beginning, but soon the appetite began to fail and the wasting continued to increase; oedema of the lower extremities set in, and four months after the operation death took place. *Post-mortem* report: shrinking of kidney, but otherwise nothing abnormal.
18. Kosinski: 143 cm. (4 ft. 9 in.) ileum, gangrene from hernia, death from collapse.
19. Müller: 12 years old boy, 150 cm. (5 ft.) ileum, caecum, and colon for invagination; for 7 days normal, then rise of temperature and pulse-rate, vomiting, diarrhoea, death. Cause of death, according to Professor Ziegler's view, filling of the intestine with air and fluid.
20. Kocher: 160 cm. (5 ft. 4 in.) ileum, gangrene. Recovery without disturbance.
21. Budberg-Boeninghausen and Koch: 175 cm. (5 ft. 10 in.) ileum, caecum with appendix and ascending colon; artificial anus formed; closed 2½ months after operation. Recovery without disturbance.
22. Wallstein: 175 cm. (5 ft. 10 in.) ileum for strangulation, recovery without disturbance.
23. Schwalbach: 183 cm. (6 ft. 1 in.) ileum, recovery.
24. Hinterstößer: 186 cm. (6 ft. 2 in.) ileum and part of jejunum for incarceration, recovery without disturbance.
25. Schlatter resected 292 cm. (6 ft. 4 in.) of ileum for gangrene due to the intestine protruded through an abdominal wound being grasped tightly by the skin. Recovery from the operation was uneventful save for an attack of urticaria which appeared on the fifth day, disappearing on the tenth. This was probably owing to the interference with the assimilatory area due to the operation. His weight increased in the second month after the operation from 140 to 165 pounds. He was then (two months after the operation) feeling perfectly well there being no tendency to diarrhoea. An examination of his ingesta and ejecta for ten consecutive days showed, however, that his appetite was abnormally great, that whereas the amount of undigested albuminous material in the faeces was slightly above the normal percentage, the amount of fat similarly lost was very much more than normal. The subsequent history showed that the man was not fit for heavy work, and that he required much more nutritious food than the working people of his own class doing their full work. Other food caused abdominal pains.
26. Koeberlé: 205 cm. (6 ft. 10 in.) small intestine for four strictures, artificial anus closed after six weeks. Recovery without disturbance.
27. Kocher: 208 cm. (6 ft. 11 in.) for tearing of small intestine. Recovery, but subject to diarrhoea if not very careful of diet.
28. Dreesmann: 215 cm. (7 ft. 2 in.) ileum for gangrene. Recovery, but slight diarrhoea.
29. Shepherd: 224 cm. (8 ft. 2 in.) ileum. After operation thin stools, but increased 40 lbs.
30. Hayes resected 255 cm. (8 ft. 4½ in.) ileum for laceration of mesentery with crush of intestine in a boy, aged 10. During recovery there was a great tendency to diarrhoea which lasted for eight weeks. At a later period a tendency to diarrhoea recurred. There was also occasional vomiting, and the patient suffered from chorea.
31. Fantino: In a woman, aged 60, 310 cm. (10 ft. 4 in.) ileum, for gangrene from incarceration, healing by first intention. The further study of the nutrition in the intestinal canal showed that the same was not complete. Substances introduced appeared rapidly in the stools which were also frequent and rich in nitrogen, fats and water. Nevertheless, in the beginning increase of weight, also after a year no wasting since the loss was compensated for by increase of nutritive materials.
32. Ruggi: Boy, aged 8, 330 cm. (11 ft.) small intestine for circumscribed peritonitis. Recovery and good health one year after.
33. Obalinski: 365 cm. (12 ft. 2 in.) practically the whole. Death in 22 hours.

In analysing these cases we find that death quickly followed the operation in 9 cases. Three survived the operation for about four months. As regards the site of intestine removed in the 21 cases which recovered in two it consisted partly of colon, so that it is not to be wondered at that ill-effects were absent in these subsequent to the operation. In one ileum with a portion of jejunum (how much is not stated) was removed, the total amount being 186 cm. In this case no ill-effects followed. In the remaining cases it is, as a rule, expressly stated that it was ileum which was removed, so that, generally speaking, in analysing these results we should remember that it is resections of the ileum with which we are principally dealing.

One of the most striking features in the subsequent history

of those who survived is that whereas some showed symptoms of intestinal disturbance chiefly in the form of a tendency to diarrhoea, these have been absent in Ruggi's case in which the greatest length of intestine (330 cm.=11 ft.) has been successfully removed. Leaving for a moment this case aside we find with regard to the others that if we take a length of 200 cm. (6 ft. 6½ in.) as a dividing line they pretty nearly fall into two classes. Thus, in the 7 cases which showed subsequent disturbance the length of the intestine removed was over 200 cm. with two exceptions. In one of these (Braun) the length of intestine removed was only 137 cm. (4 ft. 6 in.) but here there was the complication of contracted kidney so that much weight cannot be laid on it. In the other (Schlatter) the amount removed fell short of 200 by only 8 cm. (3 in.) and in that case, too, it is distinctly stated, that the intestine was measured after it had considerably shrunk. The 14 cases which showed no untoward symptoms had lost less than 200 cm. with one exception, and in this case (Koeberlé) the amount removed exceeded the standard by only 5 cm. (2 in.). The teaching of clinical experience in adults would thus seem in cases uncomplicated by other lesions to point towards 200 cm. as being the limit about which the danger line fluctuates. In adults when the intestine removed is less than this intestinal disturbance will probably be absent and when greater present. Children must apparently be placed in a different category, for in a child, aged 8, 330 cm. (11 ft.) have been removed without interference with nutrition or intestinal disturbance. The explanation seems to lie in the circumstance pointed out by Monari that in those animals which showed no intestinal trouble after operation a marked hypertrophy of the intestine was found to have taken place. It is easy to understand that such a hypertrophy will occur much more readily in a child than in an adult, and in this probably lies the key to the mystery that in the most extensive resection ever successfully done no disturbance of digestion followed, or possibly Ruggi's case had an abnormally long intestine. Another very remarkable fact is also brought to light, namely, that even in those cases where diarrhoea occurred nutrition could still be kept up to a good level by giving an abundance of nutritious food. If, now, we accept Treves's measurement of 22 ft. 5 in. (683 cm.) for the small intestine as approximately accurate, and take 200 cm. (6 ft. 6½ in.) as the limit beyond which we cannot safely go in the removal of portions of the intestine, we see that the latter is considerably less than one-third of the total length. Thus Senn is the most accurate of the experimenters as regards his deduction in reference to man, for he it was who asserted that resections of over one-third of the small intestine are likely to be accompanied by grave digestive disturbance probably terminating in death.

In conclusion, I would point out that although the interest of the subject is considerable the question of exactly how much intestine may be removed without damage to nutrition concerns more the physiologist than the surgeon. The latter in these cases is confronted with a problem which admits of but one answer. His patient is in imminent danger of death and the surgeon's first duty is to save his life. If he is dealing with gangrenous intestines, as is most commonly the case, he must remove the whole of it; whether it measures a few inches more or less than 200 cm. he will not stop to inquire; the leaving behind of the smallest portion of gangrenous gut means death, its complete removal may mean life. When he has got his patient safely back to bed after the operation he may in his leisure moments measure the intestine removed and assist his prognosis as to the ultimate result by remembering the points which I have here endeavoured to bring forward.

A CASE OF INTUSSUSCEPTION IN A PATIENT AGED 72: LAPAROTOMY: RECOVERY.

By C. CLEMENT STEAD, M.B., B.C. CANTAB.,
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IN the BRITISH MEDICAL JOURNAL of September 7th, there is in Mr. Bernard Pitts's paper a list given of all cases of intussusception treated at St. Thomas's Hospital from 1875 to 1900 inclusive. Amongst these 115 cases in the list there is

no record of any case in which the patient had attained the age of 50 years. The following notes may, therefore, be of interest:

The patient, a rather feeble lady, aged 72, had suffered from chronic constipation and had had several attacks of extreme flatulence, during which she suffered a considerable amount of colicky pain, and the distension was such that the abdomen—abnormally flaccid as a rule—became so distended that the skin was shiny and the percussion note very hyper-resonant, and one might almost describe her at such times as a "living drum." In three attacks of this kind which I saw, an ordinary soft stomach tube was passed *per rectum*, with the result that enormous quantities of flatus escaped, all pain vanished, and the abdomen again became supple.

On the evening of March 29th she took a cascara tabloid, which failed to act until 9.15 P.M. on the following night. She then went to stool, having felt perfectly well all day, and after some minutes, although she did not strain in the least (on this she was emphatic), she felt that "something wrong" was happening, and found a lump protruding from the anus. The condition on examination was as follows: A mass some 8 inches long and about the same in circumference was protruding *per anum*; its long axis was curved, and between it and the sphincter the finger could be passed its full length without reaching the top of the *cul de sac*. The external surface of the mass was obviously everted mucous membrane of the large bowel. The pulse was of good quality, but rapid. There was no pain, but the patient wore an anxious expression.

I tried to reduce the mass by means of moderate taxis, in the hope that if it could be returned within the anal sphincter, injection might be sufficient to complete reduction of the intussusception. As taxis failed, I gave a hypodermic injection of morphine with atropine, and made arrangements for the performance of coliotomy.

The operation was begun 6½ hours after the appearance of the intussusception, and lasted about an hour. A lipoma about 4 inches in diameter being situate in the middle line between the umbilicus and pubes, the left semilunar line was chosen for the site of the incision, which was 6 inches in length. Directly the peritoneum was opened several distended coils of both large and small intestine shot out, and could not be kept back; they were kept in towels wrung out of a hot solution of lysol. The right hand was introduced, and with the uterus as guide, the position of the intussusception—which was composed entirely of large bowel—was ascertained.

Moderate traction on the bowel above the neck of the intussusception proved that the greatest obstacle to reduction was at the sphincter ani, which was accordingly divided. With the left hand externally, taxis was applied to the bowel simultaneously with traction on the neck by the right hand internally. This manœuvre took time, as great care had to be exercised so that the intussusception should be as little damaged as possible. Bit by bit, however, the mass was gradually passed back into the abdomen, an inch or so returning at a time with a little jerk. This want of smoothness in the return of the bowel I attributed to the unequal thickness of its substance in various parts.

As soon as the external mass had been reduced, the reduction of the last few inches was quite easy. The peritoneal surface of the now disinvaginated bowel was found to be shiny and of good colour, though congested. The coils, which had been kept in lysol towels, were returned into the abdomen, and the wound was closed with a row of 7 deep fishing-gut sutures, through all the layers of the parietes, and a superficial continuous suture of horse hair. Immediately before drawing together the deep sutures, a "tell-tale sponge" was passed down to the bottom of the pelvis. It returned practically unstained. It may be well to state that the word "sponge" is misleading, as during the whole operation nothing was used to do the work of swabs or sponges except a roll of sterile gauze about 4 inches wide, which was kept under the edge of one of the enveloping towels. The end of the gauze roll was used for "sponging" the wound, and also for keeping back the intestines. When any portion became soiled it was cut off and immediately thrown away. By this method, suggested first, I believe, by Dr. Peter Horrocks, all danger of leaving swabs or sponges in the abdominal cavity is avoided.

Convalescence was slow but uninterrupted, except for a small stitch abscess. The temperature, which for five days was subnormal, rose to 100.2° F. only on one occasion, and this was clearly attributable to the stitch abscess. The patient made a good recovery, and continues in her usual health.

It is a great pleasure to acknowledge the kindly help of Dr. Joyce (of Cranbrook), who saw the patient with me in consultation before and helped at the operation, and that of Dr. Colls, of Benenden, and Miss Fendick, who also rendered valuable assistance.

AFTER-CARE OF CASES WHICH HAVE BEEN OPERATED UPON FOR PERFORATION OF THE STOMACH.

By HASTINGS GILFORD, F.R.C.S. Eng.

Reading.

ON glancing through the records of those cases of gastric ulcer which have undergone treatment by operation during the last ten years one is struck with the fact that while every detail of the operation is entered into again and again with almost painful minuteness, very little is said on the important subjects of feeding and general treatment. It has, therefore, come to pass that while every step of the operation is carried out systematically and intelligently the same can hardly be said of the after-treatment. This is too often apparently based on mere routine, and has but little regard to the requirements of physiology. Perforations of the stomach should rank with strangulated herniæ and with bleeding as cases which any surgeon may at any time be called upon to undertake. It is, therefore, of importance that the principles of treatment should be clear in his mind, especially if he have had no experience of these accidents. It is not now necessary to say anything about those details of treatment which are applicable to abdominal injuries in general. All that we are concerned with are those special points which apply to the after-care of the particular cases with which we are now dealing. These are, in the main, questions of food, of the position occupied by the patient, and of aperients.

Food.

In regard to the nature of that which is to be put into the stomach it must be, almost of necessity, liquid; and either previously digested, or of such a character as to require no gastric digestion. We have to remember that in the normal condition the stomach serves both as a reservoir and as a digestive organ; and it must therefore be our object to supply such material as will pass straight through it, without bringing either of these functions into play. If the indications are favourable, nothing but water, or water containing some substance which is not food, should be given during the first 24 hours. If the operation has been severe, or if there is reason to suppose that the stomach will not tolerate liquids, it is best to inject a pint of warm water into the rectum to begin with. This may be done so soon as the patient has become conscious and may, if desirable, be repeated every four hours. The quantity must vary according to the tolerance shown by the patient and the degree of thirst. In the great majority of cases hot water may first be given by the mouth about four hours after the operation. To begin with only a teaspoonful at a time should be allowed, and care should be taken that it is really hot. Sometimes a little chloroform water is of use in allaying nausea, and now and again I have found dill water or peppermint water most acceptable. They tend to allay the irritability of the stomach and are also, of course, of some slight value as antiseptics. Nothing, perhaps, is more grateful to the patient at this time than a little t.e.a. This should contain neither sugar nor milk, and should be made by pouring water on tea leaves and immediately pouring it off again. It is, in reality, little more than sterilised water, flavoured and coloured with tea. It need hardly be said that, at first, fluids should be given in the smallest quantities and with the greatest caution. They should be stopped as soon as nausea is felt, and should not be given again until after the lapse of an hour or more, according to circumstances. When