But while the substance of the catgut is thus not only aseptic but powerfully antiseptic, its dry surface is liable to contamination by contact with septic material, and it is essential that, before being used, it be washed with some trustworthy germicidal liquid.

My practice has been to put the catgut, like the instruments, in 1 to 20 solution of carbolic acid about a quarter of an hour before the operation is begun. Any of the catgut that remains unused upon the reel may be afterwards kept in a similar solution for any length of time without disadvantage.

The essential precaution of purifying the surface of the catgut is, I fear, sometimes overlooked, the result being occasional suppuration attributed to defect in the ligature, while it is really the fault of the surgeon.

Remarks

ON

THE RESULTS OF THE OPERATIVE TREATMENT OF CHRONIC CONSTIPATION.

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WHILE the term "chronic constipation" is in the large majority of cases quite correct, yet in a certain number a very advanced condition of autointoxication may be associated with a daily evacuation of the bowel, and also in some of the complications of chronic constipation, such as mucous, membranous, or ulcerative colitis, the motions are usually fluid and frequent.

Again, in a certain proportion of cases of autointoxication the patient may have several fluid motions during the day. I indicate these facts as some apology for the term "chronic constipation" which I have employed, not because it is completely comprehensive, but for the reason that it gives the most general idea of what I wish to call attention to.

In the earliest cases in which I removed the greater part of the large bowel the symptom demanding it was pain, usually in the caecum, splenic flexure, or sigmoid. Though I was aware of the associated symptoms of autointoxication I did not operate for their removal, nor was I aware that the excision of the large bowel would result in their complete disappearance. I only became conscious of this result after the removal of the large bowel. And the comparatively abrupt change which ensued during the few days following the operation was almost startling.

The recognition of the immense advantages which these miserable people obtained from the removal of the large bowel then induced me to operate also in cases where pain was not necessarily such a marked feature, but where life was becoming a burden through the misery and distress induced by the autointoxication and its results. As time went on I found that the condition of chronic intestinal stasis had a very extensive and far-reaching pathology, part of which was due merely to mechanical causes and part to the influence exerted by the poison absorbed. A greater experience of these cases served to increase the range of the knowledge of these effects and to associate with this condition in a causal relationship changes which at first sight would appear to have no connexion whatever with it. Metchnikoff's work has naturally been of the greatest interest and help in the study of these changes. The most important factors in determining the fatality were that one felt justified in exposing to what appeared to be such a severe operation only such patients as were practically dying, and in consequence were not in a condition to bear a surgical operation of even very moderate severity, and that the time spent in performing the earlier operations was naturally longer than that required after some experience. This class of case is about the worst possible from the point of view of the surgeon; while the operation is one of moderate severity the resisting power of the patient is at the lowest ebb. The sufferer has not only one trouble, but many others, some of which are too advanced to be relieved by one

operation alone. I might allude to the dilatation of the stomach, the presence of ulceration of that organ, the acquired adhesions about the gall bladder, the mobility of the kidneys, the degenerative changes in the breasts, the fixation and probable degenerative changes in the left ovary, etc.

The removal of the large bowel alone cannot cure all these conditions; many of them may demand subsequent surgical interference. For this reason, though in a large number complete relief is obtained by operation, in a smaller proportion of very advanced cases the patient has still much left to complain of. It is quite obvious, therefore, that the earlier the patient is deprived of the cause of all these troubles the better is the result.

At first I was satisfied in most cases to remove the large bowel as far as the splenic flexure, as I believed that the risk of the operation was reduced by leaving the descending colon and sigmoid, for these structures being vertically placed I did not expect that material would accumulate in them above the junction of the ileum and rectum. I found, however, that many of those in whom this portion of the large bowel was left complained, after a lapse of time, of symptoms which I was able to attribute to distension of the descending colon and sigmoid with gas. Therefore I excised the residual bowel in many such cases of incomplete resection and took away the entire large bowel with the exception of the rectum in all primary operations.

Constant and prolonged vomiting frequently was a very distressing feature after these operations, and in some cases it was so serious as to imperil the life of the patient. We found by putting the patient on constant and abundant subcutaneous saline injection all vomiting was done away with, the beneficial result to the patient of the subcutaneous injection being most striking. Instead of these patients vomiting for days, the large majority do not vomit once after the operation. I am under the impression that abundant subcutaneous infusion also obviates what I have found to be an occasional objectionable complication in very advanced cases, namely, the fixation of the dilated small intestine by adhesions. These occasionally produce obstruction of the anchored bowel and may call for surgical interference for their liberation. In this way the risks of the operation have been greatly reduced. One might say that if the patient is in a condition to bear any surgical operation of moderate severity the removal of the large bowel may be undertaken with the same sense of security.

I do not propose to attempt to prove anything by statistics, as personally I have very little confidence in them, but I will relate briefly the notes of several cases.

CASE I.

F. M. M., aged 36, a nurse, was admitted into Guy's Hospital, under my care, on March 25th, 1907, suffering from an extreme condition of autointoxication which rendered her quite unfit to continue her occupation. On April 25th the large bowel was removed up to the splenic flexure and the ileum was united to the sigmoid.

The improvement which ensued was very rapid. She left the hospital on May 28th, having lost all her symptoms and putting on flesh rapidly. She was delighted with her condition.

CASE II.

S. K., male, aged 19. Operated on in Guy's Hospital in November, 1906. He had been troubled with his bowels from infancy. The reason he was admitted under my care was that for the last six months the pain from which he suffered in the late afternoon in his abdomen had become so severe that he was unable to follow his occupation. The pain was referred to the sigmoid, which was telescoped, hard, and tender, and fixed in the iliac fossa. His skin had a most offensive smell, and, although his underclothes were changed frequently, it was distinctly perceptible to others. He was very thin and wasted, and his skin was of a dirty-brown colour. His lips were opaque, and he had no reddish tint whatever. Within three days of the operation, which consisted in the removal of the large bowel to the splenic flexure, the offensive smell had disappeared completely, and much of the general pigmentation had gone also. He had also lost his pain.

In November, 1907, his health was excellent, his appetite was good, his dirty colour had quite gone, and his face

was rosy and looked perfectly healthy; he has had no return of his pain, and enjoys life thoroughly.

CASE III.

K. B., aged 23. She had suffered for years from constipation, and since 1905 this had been complicated by the presence of large quantities of mucus. She complained of great abdominal pain. Her appetite, health, weight, and colour had failed, and recently she had become much worse. In April, 1907, the small intestine was divided and united to the rectum.

In July, 1907, she was enjoying good health, and was free from pain. She was very pleased indeed with the result of the operation.

CASE IV.

L. B., aged 51. She had been constipated for years, and had got much worse recently. Purgatives caused great pain and vomiting. Persistent headache and incapacity; great dislike of food; wasting rapidly; yellowish-brown complexion; very feeble. Her abdomen was opened on June 24th, 1907. The pylorus was hung up to the liver and gall bladder. Then adhesions were divided freely. The stomach was dilated and the small intestines were very thin. Owing to her feeble condition the large bowel was not removed, but the ileum was divided and put into the junction of the sigmoid and rectum.

A month after the operation her colour was good, and she had lost her headache. She does not vomit. Her tongue is clean, and she enjoys and looks forward to her meals. She says she feels quite a new woman.

CASE V.

E. B., female, aged 34. Admitted into Guy's Hospital suffering from chronic constipation, abdominal pain at frequent intervals, and marked symptoms of autointoxication. Colectomy performed in December, 1905.

In July, 1907, her condition is very satisfactory, she has gained considerably in weight, she has lost almost all her brown colour, and is quite free from abdominal pain.

CASE VI.

M. C., female. Appendix removed in 1900. She suffered severely from chronic intestinal stasis and its effects. In 1904 the ileum was divided and connected to the sigmoid. She improved very greatly after the operation. Owing to a feeling of occasional discomfort in the caecum her large bowel was removed up to the splenic flexure in 1906. She improved still more, putting on 2 st. in weight.

In March, 1907, she had a sharp attack of abdominal pain followed by vomiting; gastric ulcer and general peritonitis were diagnosed. The abdomen was opened and about an ounce of fluid was found. No gastric ulcer was seen. She made an uninterrupted recovery. In November she was admitted under my care with an abscess in the abdominal wall in the scar of the last operation. She is still under treatment.

CASE VII.

P. S., aged 20, female. Extreme constipation and auto-intoxication. She was never without a headache. She suffered from severe abdominal pains. She used to be sick every other day. In spite of purges and enema her bowels would remain confined for ten days. She has been unable to work for two years, being practically an invalid. Ileum divided and connected with rectum in September, 1906. Large bowel removed to splenic flexure in February, 1907. She was going rapidly downhill before the first operation, having lost 2 st. in the eighteen months preceding it. For twelve months before the operation she was treated with massage and drugs.

May, 1907. She is now much stronger, and is fatter. She has no pain in the abdomen, has not been sick since the colectomy was performed; her bowels are kept regular with some cascara, and she is able to do housework. On July, 1907, she developed some pain above the umbilicus, and there is a fullness suggesting some anchoring and distension of a loop of small bowel. On opening the abdomen a loop of small intestine was found to be pinned down at one point in such a way as to produce partial obstruction. This operation gave her relief from this pain.

CASE VIII.

B. N., aged 43 in 1904, nurse. In 1900 both ovaries

were removed in the Cancer Hospital for cystic degeneration.

She was operated on in St. Mary's, 1901, for adhesions, and in the Cancer Hospital, December, 1901, for adhesions. In May, 1902, her appendix was removed. In June, 1903, she was operated on for adhesions, and in January, 1904, a piece of omentum was removed.

She was admitted to Guy's, July, 1904, suffering from chronic intestinal stasis. The ileum was divided and connected with the rectum or sigmoid. She improved considerably, but returned complaining of pain and tenderness in the caecum, where a hard nodule of faecal matter could be felt. In November, 1904, the colon was removed up to the splenic flexure. In February, 1905, as she still suffered discomfort from a very mobile right kidney, it was fixed by operation.

On August 8th, 1907, a friend of hers wrote as follows: "Miss N. has derived very great benefit from your most successful operation. I have known her for some considerable time before your operation, and I must say I never saw her looking so well for years as she is now. She certainly is a living wonder." She was seen on August 12th, 1907. Is now a big heavy woman. She used to weigh 9 st. 9 lb.; she now weighs 11 st. 2 lb.

CASE IX.

A. W., female, aged 53. Chronic intestinal stasis of almost a lifetime's duration. She was exceedingly feeble and wasted. Her skin was deeply stained, and she was unfit to do anything but lie about. She also suffered greatly from abdominal pain. She felt her life unendurable. She was quite aware of the great risk that must necessarily be associated with any operation in her condition, but she was most anxious to obtain some relief if possible. In April, 1907, the ileum was divided and connected with the upper limit of the rectum. Her behaviour under the anaesthetic caused the greatest anxiety, so that a colectomy could not be considered.

Unfortunately the abdominal wound suppurated, and a portion of the intestine exposed by its gaping perforated, and she died three weeks after the operation. Except for the infection of the wound she would have done excellently.

CASE X.

A. W., aged 32. She suffered from gastric ulcer eight years ago. Extreme constipation for years. Had all sorts of abdominal treatment without effect. She suffered much pain, chiefly in the right iliac region. Made worse by eating, so that she had to limit her food. She was admitted May 25th, 1907, and was sent home after a time for further treatment. She was readmitted in August, 1907, as her condition was worse. She complained of pain and vomiting, and was sick of purgatives and enemata, which caused her great distress. She was quite unable to do any work, and felt her life a burden to her. On August 15th the pyloric adhesions were divided and the large bowel removed as far as the rectum, to which the ileum was united by a lateral anastomosis.

She recovered with great rapidity after the operation, and her condition continues to improve steadily, much to her satisfaction.

CASE XI.

A. B., aged 39, spinster. Suffered from extreme constipation and its results. Her right kidney was sewn up in 1902 and her left in 1904. Later in 1904 her ileum was divided and connected with the upper part of the rectum. In 1905 her large bowel was removed as far as the splenic flexure; she improved in health and weight, and felt perfectly well and was able to do her work.

Except for some pain and tenderness in the fixed right kidney, she is quite free from pain and has very little trouble with her bowels.

CASE XII.

E. A., female, aged 29 in 1905. Severe constipation and its consequences. Had her right kidney sewn up in 1904. In October, 1904, had her ileum divided. In September, 1905, had her large bowel removed up to the splenic flexure.

When seen in June, 1907, her condition was most satisfactory.

CASE XIII.

L. R., female, aged 39. Completely broken down in health by the results of chronic constipation. In 1905 an opera-

tion was considered and finally advised, the patient being fully informed as to the risk her condition exposed her to in the circumstances. She was most anxious to be operated on as her misery was great.

Though the operation of dividing the ileum and uniting it to the sigmoid was performed as rapidly as possible, she suffered severely from shock. Vomiting commenced when she came round from the anaesthetic, and continued till her death three days after. At the *post mortem* examination nothing was found to account for her death, which appeared to be due to the constant vomiting.

CASE XIV.

E. F., 20 years old. Her appendix was removed early in 1900 for pain in and about the caecum. Severe constipation; generally ill in consequence. Remained constantly under treatment. Readmitted for constant pain in right iliac fossa in 1902. Had adhesions in the intestines broken down. Admitted under my care in 1903 with extreme constipation, progressive evidences of auto-intoxication, and great pain and tenderness in and about the caecum. An extensive operation was performed, and the caecum and hepatic flexure freed from adhesions as far as possible. Attempts were made by immediate purgation to prevent their re-formation. She improved for a short time, but her condition soon became serious. The right kidney was fixed in 1904. In 1905 the large bowel was removed at the splenic flexure, and the small intestine was connected with it at the point of section.

In May, 1907, she was very much fatter and stronger than she was. Her colour is very good, and all her deep coppery tint has disappeared. Her capacity to do work is fair, and she has had to earn her living ever since the operation. She has now worked continuously without a rest for twenty months, whereas she was unable to do any work for any time previous to her last operation. She was very pleased with her condition. Her bowels acted with a mild laxative. Owing to the development of some pain to the left of the umbilicus the abdomen was opened in November, 1907, and an adhesion which had bound down the large bowel was divided. She has a nice healthy colour, and has put on a good deal of flesh.

CASE XV.

A. E. H. M. suffered from dysentery at intervals from March, 1899, for which he was treated, but without other than temporary benefit. For instance, he went to Plombières for a three weeks' course in August, 1906, but soon after his return home he was seized with haemorrhage and pain, and was again laid up. In January, 1907, after consultation with an Indian medical officer of great experience in dysentery, I divided the ileum and put it into the rectum. This was very difficult, because of the contracted and anchored condition of the rectum. Unfortunately the fixation of the left half of the large bowel deterred me from attempting its removal. Its continued presence is responsible for the incomplete nature of his recovery.

He writes on August 23rd, 1907: "I have since gradually regained strength, and now weigh 10 st. 7 lb., rather in excess of my normal weight. I am fully able to work, and my general health is fair, though I suffer a good deal from indigestion and giddiness, and am unable to take more than very moderate exercise."

CASE XVI.

F. N., nurse, aged 50. In 1884 she had an appendical abscess, which was opened. In 1899 the appendix was removed. In July, 1906, she came under my care absolutely unfit to continue her work because of pain and auto-intoxication. She was treated for some time in the hopes of improving her condition, but without much benefit. She was urged not to incur the risk of the operation, which in her toxic condition was a very serious one. She said that if it were not done she would terminate her existence. In these circumstances the abdomen was opened, and arrangements were made to remove the large bowel. She behaved so badly under the anaesthetic that it became necessary to close the wound. She was treated for a long time by purgatives, massage, position, etc., and was sent away to the seaside. She returned and insisted on the operation being done. It was done in November, 1906, the large bowel being removed to the splenic flexure.

At first she did very well, but on the third day her circulation gave serious trouble, and she died four days after the operation.

CASE XVII.

M. S., female, aged 41. Admitted in 1905. Had suffered pain, constipation, and its results for twenty years. She had evidence of dilatation of the stomach and all the other changes associated with intestinal stasis. She was very feeble, wasted, and deeply stained. The colon was removed up to the splenic flexure and the ileum joined to the rectum. The stomach was dilated and attached posteriorly. Her condition became so critical during the operation that it had to be completed hurriedly.

Two days after the operation she developed symptoms of general peritonitis, but she was too feeble to permit of any operative interference. She died on the fourth day. At the *post-mortem* examination a small ulcer in the posterior wall had perforated by a small hole, apparently in consequence of the manipulation. Except for this unforeseen accident, the results of operative interference were found perfect in every particular.

CASE XVIII.

M. B., female, aged 39. Acute appendicitis, April, 1892. Between 1892 and 1900 had repeated attacks of severe abdominal pain, sickness, and constipation. November, 1900, appendix was removed. 1901-5. Repeated attacks of abdominal pain, sickness, and obstinate constipation. Attacks of membranous colitis. 1905. Right kidney stitched up. 1906. Abdominal pain increased after food or exercise. October, 1906, to May, 1907. Attacks of abdominal pain more frequent and severe. Great tenderness, sickness, and constipation. Rapid wasting and loss of strength. Became so ill that it was feared impossible to remove her to the hospital. May, 1907. Ileum cut through and connected with rectum. Large bowel excised to splenic flexure.

General health greatly improved. Mild aperient quite sufficient. Appetite good. Has now a good colour. Very pleased with result of operation.

CASE XIX.

E. F. She was in hospital for gastric ulcer for periods of four, seven, and nine weeks during 1902-3. In May, 1903, gastro-jejunostomy was performed. She was relieved of many of her symptoms for six months. She then suffered from abdominal pain and constipation. During 1904 and 1905 she underwent courses of massage. Her feebleness and exhaustion became extreme, and her life thoroughly miserable. In May, 1905, the ileum was divided and joined to the sigmoid. This relieved her for a time, but as the caecal pain returned the large bowel was removed up to the sigmoid flexure in December, 1905.

This afforded her much benefit, as she lost her pain and sickness for a good time. She then gradually slipped back into her old condition of anorexia, dyspepsia, vomiting, haematemesis, and obstinate constipation, and died from exhaustion in December, 1906, aged 25½ years.

CASE XX.

A. C., nurse. Suffered for many years from extreme constipation, with the mechanical and toxic disabilities associated with it. In 1901 her appendix was removed, as she had symptoms of trouble in that organ. This afforded her some relief of that pain for a short time. On February 12th, 1906, the adhesions about the pylorus and large bowel were divided as freely as possible with only very temporary benefit. Her pain rapidly recurred. On March 23rd, 1906, her colon was removed as far as the splenic flexure.

She did very well for a time, but later she developed what was considered to be bronchitis. This became more troublesome in spite of treatment, and she finally succumbed on April 10th. At the *post-mortem* examination the small tubes were blocked with very tough diphtheritic membrane, which extended up to the larynx. No membrane had been coughed up during lifetime, and the presence of diphtheria was not suspected by the physician who had attended her for the supposed bronchitis. The condition of the intestines was perfect.

CASE XXI.

E. B., male. Suffered for years from constipation and excruciating abdominal pains, with frequent attacks of vomiting. December, 1904. Ileum divided, and put into the rectum

with the best possible result. The distension of the large bowel became a feature in August, 1906, so in November it was removed. The stomach was found dilated, and the pylorus was fixed to the liver and gall bladder in the manner I described. These adhesions were divided very thoroughly.

He went on exceedingly well till April, 1907, when the dilatation of the stomach caused him some distress. In May, 1907, a gastro-enterostomy was performed, with complete relief of the gastric symptoms. He is now in excellent health.

CASE XXII.

H. C., aged 22, male. In December, 1904, he was suffering very severely from acute ulcerative colitis following on chronic constipation from which he had suffered all his life. The ileum was exposed at its junction with the caecum and drained. The very acute symptoms subsided. When he came under my care the condition was chronic. All the contents of the small intestine escaped through the opening made in the right groin, while frequent discharges of bloody stinking mucus ran involuntarily from the anus.

In January, 1905, I opened the abdomen in the middle line, and divided the ileum proximally to the fistulous opening. I then introduced it into the rectum. This was done with the greatest difficulty, cleft-palate needles having to be employed. The reason was that while the whole large intestine was reduced to the size of the little finger, the only place in which the rectum was sufficiently dilated to allow of a junction being effected was the middle of the rectum. I found it impossible to get the large bowel away except at a risk which I did not feel justified in taking. This difficulty was due to its very inflamed condition.

The patient is now perfectly strong and well.

CASE XXIII.

Mrs. J., 35 years old. Suffered miserably for years from chronic constipation and its results. In February, 1906, large bowel removed to splenic flexure.

She is now in excellent health. Her bowels act regularly and comfortably, the appetite is good, and her dirty colour has gone except about the eyelids, where it is still perceptible.

CASE XXIV.

L. W., aged 20. Chronic constipation and its results have rendered her an invalid and quite unable to perform her duties as a nurse. In June, 1904, the right kidney was sewn up, with relief to the renal symptoms. In October, 1904, she was relieved of all her toxic symptoms by the division of the ileum and its connexion with the rectum. Her behaviour under the anaesthetic was such that the large bowel was not excised.

In August, 1907, when last seen, her bowels were regular, the presence of the large bowel caused her no discomfort, and her general condition was excellent. She is following her occupation.

CASE XXV.

Mrs. P., widow, aged 44. Saw her with a distinguished obstetric physician, who agreed with me as to the advisability of the removal of the large bowel because of the distress and depreciation consequent on chronic constipation. In December, 1905, the large bowel was removed to the splenic flexure, with relief of all her symptoms.

She is now enjoying her life thoroughly, has got back her good looks, and can walk two miles without feeling tired. She is very well nourished. She occasionally requires an aperient.

CASE XXVI.

A. T., 36 years old; worn, aged woman of a mahogany colour. Suffered for many years from obstinate constipation, nausea, vomiting, pain, and the disability of loss of flesh and happiness consequent on toxæmia. Was unable to do any work, and found life unendurable. In June, 1907, large bowel removed to splenic flexure.

She is delighted with the result, and now enjoys her life thoroughly. Her colour is good, her weight is rapidly increasing, and her appetite is excellent.

CASE XXVII.

Miss M., aged 28. Had suffered for many years from very severe constipation and its results. She steadily got worse, and obtained no relief from medical treatment, although she was most favourably placed in that respect.

In October, 1904, the ileum was divided and joined to the sigmoid. Her health improved. After a time the distension of the large bowel became an annoying factor. In September, 1905, the large bowel was removed as far as the splenic flexure.

She is steadily but slowly improving, whereas originally she was going rapidly downwards.

CASE XXVIII.

W. M., born 1867. Suffered all her life from constipation, vomiting, etc. In November, 1902, appendix removed without advantage. In November, 1903, had several attacks of acute obstruction. On one occasion the adhesions obstructing the large bowel were divided with temporary benefit. In July, 1904, ileum divided and put into rectum, with relief of toxic symptoms. In November, 1905, large bowel removed.

At present her condition is enormously improved. She has put on flesh, her bowels are regular and she only wants medicine very occasionally, and she is able to earn her living. Her only trouble is due to some dilatation of the stomach.

CASE XXIX.

G. R., born 1871. Extreme constipation and its consequences. Right kidney fixed in January, 1903. January, 1905: Small intestine divided and put into rectum. Conditions did not justify the removal of the large bowel. Toxic symptoms removed. Subsequently the distension of the large bowel with gas caused much annoyance. December, 1907: Colon removed.

Several days after this operation acute peritonitis set in, and she died. This had resulted from the rupture of a small, deep stitch abscess into the general peritoneal cavity.

CASE XXX.

Miss D., aged 29. Had always suffered from chronic constipation, and for several years from a very troublesome mucous colitis, with pain, loss of flesh and vitality. This had rendered her thoroughly unfit to enjoy life. In February, 1905, the ileum was divided and fixed into the lower part of the sigmoid. The difficulties of this operation were so great, on account of the extreme thinness of the large bowel, that I did not delay to remove it as I had intended.

Her improvement was slow but steady, and when she was last seen, in the summer of last year, she was able to enjoy her life, and her general condition was good. Her somewhat slow recovery was due to the occasional discharge of mucus from the bowel, which depressed her. If the large bowel had been removed this delay would not have occurred. She is most pleased with the result of this operation.

CASE XXXI.

Miss A., aged 49. Had become a perfect wreck in consequence of a most obstinate constipation. She was unable to get about because of the pain in her abdomen.

In November, 1906, the large bowel was removed.

She was last seen in August, 1907, when she looked years younger, her colour was very good, and she had become stouter.

CASE XXXII.

Miss K., born 1853. Constipation a cause of trouble since she was 12. She had been continually under treatment for it and for its results. Her condition was very distressing, and was becoming rapidly worse. In November, 1904, her large bowel was removed.

In July, 1907, in spite of the existence of phthisis, which became apparent in 1906, her condition had improved decidedly since the operation. She had much less discomfort. Her condition at the time of the operation was so advanced that she could only expect a moderate improvement from it.

CASE XXXIII.

Miss G., 30 years old. Since 1894 she had suffered from very obstinate constipation, the results of which became so marked that she was totally unable to lead an active life. In March, 1905, the ileum was divided and joined to the sigmoid flexure.

Since the operation the patient has improved uninterruptedly, she has a good colour, has not much difficulty with her bowels, and she has been able to resume her work, which had been given up in 1903. On one occasion scybala were formed in the caecum. She was conscious of their presence, but in two days they had disappeared.

CASE XXXIV.

F. H., aged 55. He had suffered from constipation for many years, and recently the pain and debility consequent on it had become distressing. In July, 1904, the ileum was divided and united to the sigmoid.

He improved greatly after the operation. Unfortunately he had acute obstruction, and died in January, 1905. No *post-mortem* examination was made.

CASE XXXV.

A. G., aged 40. For many years she suffered much misery from chronic constipation, pains in the abdomen and vomiting. Had been continually under medical treatment.

In July, 1907, the large bowel was removed as far as the rectum, with which an end-to-end anastomosis was effected. The pylorus, which was also fixed to the liver and gall bladder in the usual manner, was liberated. Her recovery was uninterrupted, and the result was excellent in every way.

CASE XXXVI.

M. L., aged 24. Had suffered all her life from severe constipation, producing violent attacks of abdominal pain and loss of flesh. She was perhaps the worst case that ever came under my observation from the point of view of pain. Between November, 1901, when she had her appendix removed, and October, 1903, she had had several operations for the liberation of adhesions, each giving only temporary relief. In October, 1903, the large bowel was removed to the splenic flexure, and the pylorus was freed from the liver and gall bladder. In October, 1905, the stomach having again become dilated, these adhesions having re-formed, they were divided, the pylorus was dropped, and gold leaf inserted to prevent the parts adhering again to one another. In July, 1907, the distension of the descending colon and sigmoid causing distress, these portions of the bowel were removed.

The patient improved greatly after this. Her general condition is now fairly satisfactory. She is able to get about, and only suffers from discomfort at intervals of three or four weeks.

CASE XXXVII.

Miss B. had for some time been under the care of a very experienced physician for chronic constipation. He felt that unless her condition was benefited in some way her unhappy life could not be prolonged materially by further medical treatment. In September, 1905, the large bowel was removed to the splenic flexure. She gained in weight, being 8 st. before the operation and reaching 9 st. 4 lb. some months after it. After a time the dilatation of the stomach, which had not previously been apparent, gave trouble, and in December, 1906, the pylorus was freed from the under surface of the liver. She improved for a time, but the dilatation of the stomach was soon as bad as ever. In March, 1907, gastro-enterostomy was performed, with complete relief of the stomach symptoms. After a time the descending colon and sigmoid gave trouble, and were removed in October, 1907.

She is now progressing very comfortably.

CASE XXXVIII.

E. C., aged 21. She was admitted on October 18th, 1907, in an extreme degree of exhaustion consequent on chronic constipation. Her condition was so critical that I hesitated to adopt operative measures. She was treated actively with drugs for nearly three weeks in the hope of improving her condition, but with little benefit. It was apparent that if anything was to be done it could not be delayed. The big bowel was removed to the lower limit of the sigmoid, where very great difficulties were experienced in effecting an end-to-end junction between the ileum and rectum, due in part to the degree of fixation of the large bowel and in part to the extreme thinness of the wall of the ileum.

Some days later the symptoms of obstruction developed, and the patient died six days after the operation. A *post-mortem* examination was not permitted, so I am unable to define the seat of obstruction. I may say it is the only case of this sort on which I have operated which proved fatal in this way. In the same difficult circumstances I would not again perform an end-to-end junction, but would try to obtain a larger aperture by means of a lateral anastomosis, an arrangement which is usually preferable.

CASE XXXIX.

Miss C., aged 28. Health deteriorating for eleven years. February, 1905: Extreme constipation with mechanical and toxic results of a very serious nature. Early in 1906 gastro-enterostomy was performed to relieve the frequent vomiting, without benefit. Her condition became progressively worse and her emaciation very great. In May, 1907, I removed the large bowel as far as the splenic flexure, and put the ileum into the rectum.

Since the operation she has gained weight steadily, and her complexion is clear and healthy instead of dirty brown as before. She eats heartily of ordinary food and has no indigestion. The result of the operation has been most satisfactory in this case. Her doctor, writing on November 15th, 1907, says she is marvellously improved, and reports that the patient declares she has not felt so well for ten years as she does now.

Lectures

ON

THE PASSAGE OF FOOD THROUGH THE HUMAN ALIMENTARY CANAL.

DELIVERED AT GUY'S HOSPITAL FOR LONDON UNIVERSITY
ADVANCED STUDENTS DURING OCTOBER, 1907.

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UNTIL recently almost all our ideas on the subject of the passage of food along the human alimentary canal were derived from experiments performed under more or less abnormal conditions in animals. But the discovery of the x rays in 1895 was soon followed by their employment in the study of the physiology of digestion. In the next ten years our knowledge of the movements of the stomach and intestines was greatly extended, mainly as a result of the work done on cats by Cannon and subsequently on man by Rieder and Holzknecht.

In 1905 Cannon made some observations on himself which suggested that auscultation, which had previously been used in the investigation of swallowing, might give some assistance in the study of the movements of the stomach and intestines.

The original investigations,* to which I shall refer in these lectures, were carried out by means of skiagraphy, auscultation, percussion, and palpation in normal individuals. They were done in the Guy's Hospital Physiological Laboratory, with the co-operation of Messrs. F. Cook, A. N. Cox, H. Gardiner, E. G. Schlesinger, and A. N. Todd, students of Guy's Hospital, with the exception of those in which skiagraphy was employed, these having been carried out in the Skiagraphic Department of Guy's Hospital, with the additional help of a number of other gentlemen. But the actual management of the x rays was entirely in the hands of Dr. C. J. Morton, Radiographer to Guy's Hospital, and on a few occasions of Mr. C. E. Iredell and Mr. E. W. H. Shenton, without whose aid the work could never have been accomplished.†

I.—SWALLOWING.

The reflex process of swallowing begins when a bolus of food has been brought by a voluntary effort on to the back of the tongue. Before it can be propelled into the upper end of the oesophagus it is necessary for all the other passages which open into the pharynx to be closed. The mouth is closed by the approximation of the dorsum of the tongue to the palate by the palato-glossal muscles. In order to shut off the naso-pharynx the soft palate is raised by the levator palati and the palato-pharyngeal muscles, which also render the posterior pillars of the fauces more prominent, and the uvula is lifted by the azygos uvulae so as to touch the posterior pharyngeal wall, which bulges forward owing to the contraction of the constrictors of the pharynx. The importance of the contraction of these muscles is well seen when they are paralysed in diphtheritic neuritis; if an attempt is made

*Towards the expenses of this research a grant was made by the British Medical Association on the recommendation of the Science Committee of the Association.

†For fuller details of the original investigations see a paper in the *Guy's Hospital Reports* for 1907.