the toxin increases, the previously almost stationary bone corpuscles rejuvenate, enlarge, and multiply, and eventually form a highly cellular and active mass of cells. They form, as it were, a corps of pioneers with outlying sappers and miners who by their cellular activity absorb and remove the already decalcified bone matrix that lies in the path of the advancing army of epithelial cells, thus smoothing the way and removing all difficulties. The connective tissue cells have become the working slaves of the epithelial; and, carrying the analogy still further, in their degradation have deteriorated from their once higher development. The epithelial cells have possibly no power in themselves for thus absorbing bony tissue, but by their influence on the connective tissue cells of bone origin which have this power they stimulate them to such exertion. Thus, with skilful generalship, the victorious army of epithelial cells triumphantly advances.

Origin of the Epithelium.—The arrangements and characters of the epithelial cells are unlike those of sebaceous or sweat glands, of dentigerous tissues, or remains of the thyro-glossal duct. They could then only originate in the sublingual or submaxillary salivary glands; no other glandular epithelial structures exist in this region. In which of these two it had originated the extent of the growth would not permit me to say.

Professor Welsh, of the Sydney University, has kindly allowed me to make sections of a portion of a tumour of the jaw in his possession, in which a duct-like arrangement and the characters of the cell-masses resemble closely those in this case, though the appearance is not so beautifully regular as that seen in sections of my tumour, where it traverses adipose tissue. Unfortunately, the clinical history is not obtainable, but I understand that the origin of the growth was supposed to be in the submaxillary gland.

In conclusion, let me draw attention to the following points:

1. The rarity of the condition.
2. The good general health of the patient before the operation, and at least for a year afterwards with no recurrence up to that time.
3. The peculiar characteristic of elasticity in the part of the jaw affected. This could be bent considerably, and would spring back on removal of the pressure. It is best described by the term, "indiarubber jaw."
4. The absence of practically all degenerative processes even where the cells were aggregated into considerable masses. This probably accounted for the complete set and perfect character of the teeth, which, fixed merely in a dense fibrous matrix, doubtless received an excellent blood supply. The decalcification of the bone forming the tooth-sockets must have very appreciably preceded the invasion of the epithelium. This preservation of the teeth—though loose—is an exceedingly remarkable fact.
5. Where the growth was but little affected by its environment, the perfect way in which the invading neoplasm aped the tissue from which it had sprung. Rarely in a carcinomatous growth do we see large ducts, small ducts, and acini, and all the arrangements of the original gland tissue faithfully reproduced. A carcinoma usually consists of a multiplication and alteration of the cells of one particular part of the gland only—of the ducts or of the acini. It is generally accepted that the less they resemble the structure of the original tissue the more malignant they become, and vice versa. This may account for the undoubted mild malignancy of this tumour.
6. The method of invasion of bone.

I desire specially to thank Professor Welsh of the Pathological Department of the University of Sydney for his skilled advice and kind direction to me during the preparation of this paper.

ABDOMINO-PERINEAL EXCISION OF THE RECTUM BY A NEW METHOD.

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THE method of excision of the rectum which I am about to describe is one which in certain essentials I believe to be new. It gives free removal of the primary growth however high in the rectum it may be situated, permitting at the same time complete clearing out of the post-rectal fat and glands up to or beyond the bifurcation of the aorta. The continuity of the bowel is not interrupted until the abdominal stage of

the operation has been completed. The anus is retained in its normal position, the nerve supply of the sphincter is not interfered with, and the union of the divided bowel is placed at or close to the anus; the danger of soiling the peritoneum with faecal matter either at the operation or by leakage at the junction is thus minimized.

The patient for whom the operation was designed was admitted to the New Hospital for Women on February, 25th, 1903.

CASE I.—Mrs. W., aged 54, widow, came to the hospital complaining of passage of blood and slime, diarrhoea and pain in the rectum.

History.—Fifteen months before admission she passed a large quantity of blood, having been previously constipated for a week. Since that time she had constantly passed blood and slime, with much pain on defaecation. During the same period she had suffered much from diarrhoea. She had never suffered from piles, and the bowels were always regular until the present trouble.

State on Admission.—The patient looked thin and ill. Appetite poor, no nausea or vomiting, no distension of the abdomen, no faecal accumulation. Liver not enlarged. Per rectum, the anus was normal, but 3½ in. from the anus the finger reached the lower limit of a hard, irregular mass with an everted edge. This mass filled the lumen of the bowel, and appeared to grow from the whole circumference. The finger could not be passed into, and still less beyond, the stricture, so that examination for glands in the hollow of the sacrum was inconclusive. The cervix uteri could be plainly felt through the rectal wall quite below the level of the growth, and examination both by the rectum and vagina showed the uterus to be freely movable, and in no way attached to the growth. Bimanual examination showed the rectum with the contained growth to be fairly movable. The bowel below the stricture was markedly ballooned. The mucous membrane of this part was quite healthy.

As there was no distension, and no faecal accumulation could be made out, I did not think a colotomy needful in order to get the bowels cleared, and as in the operation I proposed the junction would be close to the anus, the danger of leaking at the line of union would be very small. If not really needed preliminary colotomy appears to me a disadvantage, as it wastes two or three weeks of time, complicates the subsequent abdominal section, and necessitates a third operation for its closure when the union of the rectum is firm. The bowels were cleared by castor oil and enemata, and the operation was done the following day, February 27th.

Operation.—The patient was anaesthetised with A.C.E. mixture and placed in the Trendelenburg position. The abdomen was opened by a median incision 5 in. long, edges held apart by a Kelly's self-retaining retractor, and the uterus, covered by a gauze veil, was held forward with a flat retractor

Fig. 1.—Condition before operation.

The rectal growth could then be plainly seen wrinkling the peritoneum over the anterior aspect of the rectum at the back of Douglas's pouch. The limits of the growth could be easily made out, and the rectum was found freely movable from side to side. A U-shaped incision in the peritoneum was made beginning on the left side of the sacral promontory going down the hollow of the sacrum just clear of the rectum, across Douglas's pouch well in front of the growth, and up on the right side to end on the promontory to the right of the rectum. With the finger and handle of scalpel the rectum and fatty tissue were completely freed from the hollow of the sacrum down to or a little beyond the tip of the coccyx. It also separated easily from the vagina in front. The

freed rectum was then held forwards and the fat and cellular tissue, which contained several enlarged glands, were followed up to the bifurcation of the aorta in one continuous mass till the upper limit of this tissue was apparently reached. The rectum was now held posteriorly only by the superior and two middle haemorrhoidal vessels, which were tied and then cut.

If the sigmoid mesocolon had admitted of it I had intended to bring the most dependent portion of that loop of bowel to the anus, removing the rectum and lower half of the sigmoid flexure. I found however that in this individual the sigmoid was unusually short, and I therefore determined to straighten out the lower part of the sigmoid and its junction with the rectum (B, Fig. 1).

The sigmoid was turned towards the mid-line, and the left end of the U-shaped incision in the peritoneum was continued up about $\frac{1}{4}$ in. outside the line of attachment of the bowel, care being taken not to go deep enough to injure vessels. A few careful snips in any portion of the sigmoid mesocolon, which seemed tight, freed the flexure sufficiently, when displaced towards the mid-line of the brim, to allow me to carry the lower part of the sigmoid to the tip of the coccyx without undue tension, and there was beyond this a healthy portion of rectum, which appeared to me perfectly well nourished, which would stretch from the coccyx to the position of the anus. A silk stitch was passed through the peritoneum of the anterior wall of the rectum at that spot to serve as a guide to the place of division selected, when the bowel should be brought out in the perineum.

The rectum, with the growth and attached fat and lymphatics, was pushed down into the lowest part of the pelvis (Fig. 2). The cut edge of the U-shaped incision in the pelvic peritoneum was united to the lateral and anterior aspects of the straightened sigmoid in its new position by fine silk sutures, the pouch of Douglas thus formed being a very shallow one (Fig. 2, D.P.).

Fig. 2.—Condition at the close of the abdominal stage of the operation.

The pelvic peritoneum and viscera were sponged over with warm saline solution, and the abdomen closed by suture in three layers, dressed, and bandaged. Patient was now put into the lithotomy position, the rectum washed out, and the surrounding skin again cleansed.

A scalpel was passed through the posterior wall of the rectum about $\frac{1}{2}$ in. up, dividing the anal margin and all the tissues in the mid-line back to the coccyx. The posterior part of the incision was deepened till the portion of rectum which had been separated from above was reached. The anus was held open and a circular incision made through the rectal wall about $\frac{1}{2}$ in. up; the rectum above this was caught in a clamp and drawn down, a finger passed in at the posterior median incision easily freed any attachments that had not been divided, and the rectum could then be drawn out through the anus until the guiding suture appeared, at which level it was cut through transversely, the upper end showing its vitality by bleeding quite freely.

The upper and lower ends of the divided bowel were now united by five silkworm gut sutures passing deeply into the internal sphincter and levator ani below, and taking a good hold on the rectal wall above. Between these several catgut sutures were used to approximate the edges more accurately. In order to obviate danger of leakage into the cellular tissue at this junction I made no attempt to unite the sphincters posteriorly, as that can be done at a subsequent operation. The hollow of the sacrum was packed with iodoform gauze, secured by a pad of wool and a T bandage.

Progress.—The patient made an uninterrupted recovery. She was kept on a very low diet, but no opium was given, and there was no appearance of faeces at the anus until March 5th, a week after the operation. After that the bowels acted several times a day; she often knew when an action was about to occur, but had no control. On

March 20th she began getting up and about the ward, and was discharged on April 24th, to return for an operation to close the sphincter, when the small cavity, which was all that remained of the wound between rectum and coccyx, should have healed entirely.

Fig. 3.—Condition at the end of the operation.

I have described the operation as I actually performed it on February 27th. By its means I removed $6\frac{1}{2}$ in. of the rectum, together with all the fatty tissue and glands, from the hollow of the sacrum as high as the bifurcation of the aorta. The growth almost completely encircles the bowel, its vertical measurement is about 2 in., and microscopically it shows the structure of a typical adenocarcinoma of the rectum. Some of the higher glands examined microscopically show no sign of growth.

M. Quénu¹ advocates abdomino-perineal excision of the rectum, but his method differs wholly from mine in that a permanent inguinal anus is made a fortnight beforehand, and the rectum is removed after ligation of both internal iliac arteries.

The idea of bringing the sigmoid flexure to the anus is by no means new. Kocher² mentions it as a possible procedure in his perineo-coccygeal excision, an advance which he attributes to Rehn; and it is strongly upheld as the proper method of completing an excision of the rectum by Schuchardt in a paper published in 1899,³ in which he states that he on one occasion freed 40 cm. and removed 30 cm. as measured from the anus by the perineo-coccygeal method.

With regard to the perineal portion of the operation the median posterior incision does not interfere with the blood or nerve supply and does the least possible injury to the muscles, while it gives greater freedom in separating the lower part of the rectum than would be obtained by merely dilating the sphincter.

In the case I have described the median posterior cut through the sphincters was not sutured, as the line of union was just above the internal sphincter, and I feared strain on that junction, which I thought would be obviated by leaving the sphincter open. It has since struck me that by adopting Moulouquet's proceeding⁴ of dissecting off the mucous membrane from the anal segment, after division of the rectum above the internal sphincter, and drawing the sigmoid or upper part of the rectum through the denuded sphincter, one could put the junction at the anal margin—that is, actually on the surface of the body, while still preserving the sphincter muscles. It might be possible to leave the sphincter intact, making the posterior median incision only from behind the anus to the coccyx, which in any case should be kept open for drainage, while if the freer access appeared desirable, the sphincters could be reunited immediately by silkworm-gut sutures. Within the last few weeks I have used this last method in an excision of the lower part of the rectum from the perineum for an early case of cancer low down. The sphincter and muco-cutaneous junction have healed by primary union, and the patient has had complete control throughout, the hollow of the sacrum being drained by a tube immediately in front of the coccyx.

I have ventured to bring forward this method of abdomino-perineal excision for cancer of the rectum, because it appears to me both simple and efficient. I have been further

encouraged by some statements in the last of the Erasmus Wilson lectures on Adenoma and Adeno-carcinoma of the Rectum, by Sir Charles Ball.

The third lecture, which dealt with treatment, was published in the *BRITISH MEDICAL JOURNAL* of March 7th, 1903, a little more than a week after the operation I have described was actually done.

In this lecture Sir Charles Ball strongly supports the "abdominal excision." He says this can be completed by bringing the sigmoid to the anus if the sigmoid mesocolon at its greatest length is 6 in. If decidedly less than this, he thinks the operation should be terminated by the formation of an inguinal anus.

His method differs from that I have described in this important particular—namely, that he divides the bowel after tying it above and, if possible, below the growth, from the abdomen, and only then turns to the perineum, which would seem to give greater risk of soiling the peritoneum, though doubtless this can be obviated to a large extent by careful use of gauze wraps and pads.

The fact that so great an authority on rectal disease states that "many cases which have been treated by trans-sacral excision would in his opinion have given a better result by this (abdominal) method" encourages me to hope that the operation I have described may prove a useful one.

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THREE CASES OF GASTRIC ULCER PERFORATING ACUTELY.

By C. W. SMEETON, M.R.C.S., C. C. SMITH, M.R.C.S.,
AND J. G. E. COLBY, F.R.C.S.

CASES of acute perforation of the stomach may not be common in general practice, still they occur, and when they are twenty miles from a hospital must be dealt with on the spot, in spite of difficulties in obtaining immediate help and of time lost in travelling. The chief object in publishing these notes is to encourage the general practitioner to undertake cases which would otherwise be almost certain to have a fatal issue, and to remember that there is some compensation in his patient not having been moved, and that he is not working in the air of a large hospital.

CASE I.—E. P., a married woman, aged 30, who had often been treated for anaemia and symptoms of gastric ulcer, was suddenly seized on the morning of September 11th, 1899, before breakfast, with vomiting and acute pain in the epigastrium. She was a strong-looking woman in good condition, and when first seen two hours later was in a state of collapse, with a small pulse of 120, temperature 99° F., and repeated vomiting. The liver dullness could be made out, but the respirations were shallow and there was no movement of the abdominal walls. She had been given a pint of arrowroot with brandy. Five hours from the onset the abdomen was tense and the liver dullness gone. The abdomen was opened by a median incision above the umbilicus, when gas and fluid immediately escaped, and the latter kept welling up in large quantities. The stomach was covered with flakes of recent lymph, and there were numerous old adhesions round the perforation, which was on the anterior surface close to the cardiac end and the greater curvature. The opening itself was large enough to admit the end of the thumb, and the edges were rounded and worn as if it had been there some time before the acute symptoms came on. Access was difficult, and the silk cut readily, but closure was ultimately thought to be effected by two rows of Lembert sutures. The remaining fluid was sponged out as well as possible and one gauze drain left in. The patient bore the operation well, but an increasing peritonitis proved fatal after forty-eight hours.

CASE II.—L. S., a general servant, had occasionally during some months been treated for pain in the stomach and vomiting after food. There was never any haematemesis or melaena. On January 24th, 1903, she had supper at 9 p.m., consisting of a poached egg, toast, and tea; at 1 a.m. on January 25th she awoke with acute pain to the left of the epigastrium, and vomited some greenish fluid. When first seen at 3.30 a.m. she was found in great pain, collapsed, with a pulse of 120, and great tenderness in the left hypochondrium. There was no dullness in the flanks, and the liver dullness was normal. She was given a hypodermic injection of morphine and atropine. At 9 a.m. the patient was free of pain, the abdominal movements were not much restricted, the pulse was 120, respirations 32, and the liver dullness could still be made out, but at noon it had gone, the respirations being 40 and the temperature 100° F. The abdominal walls still moved and there was no distension. For unavoidable reasons nothing could be done till 9 p.m., when the abdomen was opened by a median incision, afterwards supplemented by one at right angles to it. A little gas escaped at first, and subsequently

much fluid. There was lymph all along the lesser curvature and much more round the hole, which was the size of a slate pencil, near the cardiac end, and on the anterior surface. Though the actual hole was small—the ulcer could be felt the size of a florin, and so thickened and hard that it could not be infolded. The greater part was therefore removed by an elliptical incision, and then good approximation was obtained by interrupted silk sutures, and complete closure secured. The peritoneum was wiped dry, and the external wound closed without drainage. No food was given by the mouth for 14 days, only boiled water, the patient being fed entirely on nutrient enemata and suppositories. Recovery was absolutely uneventful, and most satisfactory.

CASE III.—E. G., 23, a waiting maid in a country house, who had been anaemic and had complained of ill-defined pain in the body, was suddenly seized, soon after rising on March 27th, 1903, with very severe pain in the epigastric region, but in spite of it went on with her work for an hour or so, till she was compelled to return to bed. She was first seen at 10 a.m., and was then lying on the left side, and complaining of agonizing pain to the left of the epigastrium and under the left shoulder. The pulse was good, the abdomen rigid, and the liver dullness easily made out. Two hours later this had gone, the pulse was rapid and small, and the facial expression quite altered. There was no vomiting, and the patient had had nothing by the mouth save a little milk since supper time the previous night. At 7 p.m. a median incision was made above the umbilicus, and gas and fluid escaped on opening the peritoneum. More fluid, with small curds, welled up from the left hypochondrium, and the perforation was found midway on the anterior surface and near the greater curvature. It would admit a lead pencil, and was surrounded by thin flakes of lymph. Closure with fine silk was easily effected in two rows of Lembert sutures, the abdominal cavity was wiped out, and the external wound closed without drainage. No opiate was used at all. The patient was fed by the rectum for a week, a little hot water only being allowed by the mouth on the third day, with the addition on the fourth of some grape-sugar. With the exception of an attack of influenza on the tenth day, the patient made an excellent recovery and left for her own home five weeks after the operation.

Case I was peculiar in the size of the opening, and though operated on in five hours was most difficult to deal with on account of its position and surroundings, while the large amount of food taken did not help matters. Case II, bad as it was, showed that the abdominal walls may continue to move freely in spite of the active mischief beneath, but the trouble with it lay not in the size of the opening, but in the extent and depth of the induration. Case III presented the symptoms which have been pointed out by Mr. D'Arcy Power as indicating operation—namely, acute localized pain with rigid muscles and a rapidly-increasing pulse-rate. It was very easily dealt with.

THREE CASES TREATED BY THE "X" RAYS.

By F. OSMUND STEDMAN, M.B., B.S. LOND.

Hong Kong.

THE following three cases seem to be sufficiently interesting to be worth recording, both because of the rapidity with which a cure was obtained, and because, in two of them at any rate, sufficient time has elapsed to make it appear probable that the cure is a permanent one.

CASE I.—Ulcer on the right side of the bridge of the nose. The trouble was first noticed two years ago as a small wart-like growth, of which the centre used to come out, leaving a small, excavated ulcer; the whole growth was then about the size of a pea. The case, that of a man of 68 years of age, was first seen by me in January, 1902. There was then a deep, excavated ulcer situate towards the right side of the bridge of the nose, at the level of the inner canthus; the ulcer is three-eighths of an inch in diameter, nearly round in shape, the edges are raised three-sixteenths of an inch above the surrounding skin, the edges are hard, and present the rolled-out appearance typical of a rodent ulcer; the patient complains that a good deal of smarting pain is felt from time to time. Various remedies had been tried to induce the sore to heal before he came under my care, but without any success. The growth has every appearance of being a rodent ulcer. Treatment by exposure to the x rays was commenced the same day, January 11th; in all fourteen exposures were given between this date and February 3rd, on an average about four a week; the duration of each exposure was ten minutes. The focus tube was placed about three inches from the patient, in fact as near as it was possible to keep it without sparks coming off from the tube on to the patient. The face was protected by a sheet of thin lead, such as is used to line tea boxes, a small hole being cut out slightly larger than the diseased part. The focus tube was rather a soft one, giving from three to four inches spark-gap, the coil one capable of giving a twelve-inch spark. The first effect of the treatment was to increase somewhat the area of ulceration, the surrounding thickened edges gradually breaking down. By February 3rd the raised edges had become level with the surrounding skin, and in consequence of the red irritable appearance of the skin round about from burning by the x rays it was not thought prudent to give any more exposures; from this time healing commenced, and within three weeks the ulcer had entirely closed. Now over fourteen months have elapsed,