

CANCER OF THE RECTUM.

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MALIGNANT NEOPLASMS OF THE RECTUM AND ANUS.

OF the various new growths which are found in the rectum, and which are clinically malignant, cylinder-celled epithelioma, or, as it is sometimes called, "malignant infiltrating adenoma," is unquestionably the most common.

Subsequently I purpose discussing, as far as is at present possible, the pathological differences between the various forms of rectal tumour exhibiting malignancy; but as it is sometimes quite impossible to differentiate these varieties *clinically*, it will be convenient to retain the term "cancer," using it in its broadest sense, as synonymous with all the forms of malignant tumour, whether histologically of epithelial or connective tissue origin. It is not necessary here to discuss the vague and speculative theories which have from time to time been put forward to explain the ætiology of cancer. Much has been written and said upon this subject, but nothing definite has been arrived at; and it still remains an inscrutable mystery why it is that tissue in all respects apparently identical with normal epithelial structure should overstep its natural limits of growth and development; extend widely into neighbouring regions; appear as metastatic growths in other situations; break down and suppurate as a result of excessive and exuberant growth; recur after wide removal; and, lastly, produce that constitutional disturbance and rapidly-progressing marasmus known as the cancerous cachexia.

In order to arrive at some idea as to the frequency of rectal cancer, both relatively to the examples of the same disease in other parts of the body, and more particularly in other parts of the intestinal tract, it becomes necessary to refer to considerable statistics. It is, however, quite useless to collect for this purpose a simple record of cases published in periodical literature, the returns of large hospitals alone affording reliable information. Leichtenstern^a has carefully collated the following figures from the returns of the K. K. Allgem. Krankenhaus at Vienna. Out of 34,523 deaths at the hospital between the years 1858 and 1870 were 1,874 cancers of different kinds, equal to 5·4 per cent.; and of 4,567 cancers at the same hospital, 143 were of the rectum, and 35 of other parts of the intestines; the former were therefore 3 per cent., the latter 0·76 per cent. of the whole, and the former 80 cent., and the latter 20 per cent. of all cancers of the intestines. Mr. W. R. Williams^b has collected a large series of equally reliable statistics from the Middlesex Hospital, St. Bartholomew's Hospital, St. Thomas's Hospital, and University College Hospital. Out of 5,556 cases, he gives the following table, showing the frequency in some of the more important organs:—

	Male	Female	Total
Breast - - - -	13	1,310	1,323
Uterus - - - -	—	1,160	1,160
Tongue - - - -	384	64	448
Rectum - - - -	130	127	257
Skin of face and neck, including rodent ulcer - - - -	161	89	250
External genitals - -	126	102	228
Lip - - - -	221	2	223
Intestines, &c. - - -	23	26	49

^a Ziemssen's *Cyclopædia of Medicine*. Vol. VII., p. 635.

^b *Lancet*. May 24, 1884.

It will be seen from this table that the results obtained at the London general hospitals are practically the same as those observed at Vienna. Referring to the records of the Brompton Cancer Hospital, as given by Jessett,^a we find that out of a total of 1,908 cases of cancer admitted, 58 were suffering from cancer of the rectum, or slightly more than 3 per cent. One would expect that a slightly smaller proportion of rectal cases would present themselves at this special hospital; because persons suffering from cancer of the rectum would be more likely to apply to a general hospital, under the impression that it was some other form of disease that they were suffering from; whereas, persons suffering from some of the other and more easily recognisable forms of cutaneous cancer would gravitate to the Brompton Hospital. It may, therefore, be taken as sufficiently accurate that in 3·5 per cent. of all cases of cancer the disease is situated in the rectum; and in 80 per cent. of cases of intestinal cancer the disease is located in the lower bowel. In the records of St. Mark's Hospital, as given by Allingham,^b out of 4,000 cases of rectal disease, 105 were examples of cancer.

The degree in which apparently similar forms of carcinoma exhibit the clinical features of malignancy varies notoriously with the situation in which the disease develops. Thus, for instance, epithelioma of the tongue is extremely malignant; whereas, the same disease situated upon the lip is, at any rate in the early stages, one of the most benign of the unequivocal epitheliomata; similarly, epithelioma on the scrotum is very much more satisfactory to deal with than the same disease when occurring on the penis. Compared with other regions of the body, it would appear that the rectum is one in which the average intensity of the malig-

^a *Cancer of the Alimentary Tract.* P. 238. London. 1886.

^b *Loc. cit.*

nancy is not very great, the disease for a long time not passing the limits of the intestinal wall. Allingham, whose experience on this subject is so extensive, puts the average duration down at two years, the most rapid terminating fatally within four months of the earliest symptom of its invasion; while the longest duration noticed by him was four years and a half. It is, however, quite impossible to estimate accurately the duration of this disease, as the symptoms during the early stages are so slight that they may be scarcely sufficient to attract the attention of the patient. This will be a matter of familiar observation to all surgeons. It not unfrequently happens that a patient comes to us complaining of some slight diarrhoea or other mild rectal trouble, and an examination unexpectedly reveals the fact that he is the victim of cancer so very extensive that it must have obviously existed for a very considerable period. And, again, the life of the patient is not unfrequently sacrificed by the accidental complications of the disease, such as intestinal obstruction, or involvement of the bladder, rather than by the progressive marasmus, which is the usual mode of termination of cancer of other regions.

Some authors state that as the result of their experience a greater number of males suffer from rectal carcinoma, while others assert that the opposite is the case. The large statistics of Williams, however, show that there is extremely little difference in the relative frequency. Out of 257 cases, there were 130 males and 127 females.

Although essentially a disease of middle life and old age, rectal cancer has been met with several times under the age of 20 years. The earliest age that I have seen recorded is that noticed by Allingham^a as having occurred in the practice of Mr. Gowlland at St. Mark's Hospital, in which a boy not 13 years of age suffered from cancer of the rectum;

^a *Loc. cit.* P. 270.

while Allingham gives a case of his own in which a boy of 17 years died of what is described as encephaloid of the rectum. Considering the vagueness of the term encephaloid and the frequency with which it is applied to rapidly growing tumours of the sarcoma type, it appears possible in the absence of detailed microscopic examination that this tumour was sarcomatous, and it is well known that tumours of that type are not very uncommon in early life. A case of cancer is recorded by Godin^a at 15 years, Quain one at 16 years, and Cripps one at 17 years. Schœning^b describes two cases as occurring at the Rostock clinic. In the first, a girl, aged 17, presented typical symptoms of rectal cancer. She was stated to have suffered from rectal prolapse at the age of 7, and the more severe symptoms began to manifest themselves at the age of 16 years. The tumour was excised, and presented the microscopic characters of undoubted carcinoma. The disease recurred and proved fatal in two months. The writer concludes that she suffered from adenoma at the age of 7 years, which subsequently began to infiltrate and become malignant. In the second case, a girl, of 17, presented herself with a tumour the size of a fist, very hard, and encroaching on the pelvic organs, and affecting the inguinal glands. As the tumour could not be removed, the constricting tissues were divided. A portion removed proved the tumour to be an alveolar, cylinder-celled carcinoma partly undergoing cystic degeneration.

THE PATHOLOGY OF MALIGNANT NEOPLASMS OF THE RECTUM AND ANUS.

The older method of classification of tumours into benign and malignant, although of great practical utility, was soon found to be insufficient; for although the difference between

^a Quoted by Mollière.

^b *Deutsch. Zeitschrift f. Chirurg.* Bd. 22, Hft. 1 and 2. 1885.

typical varieties was sufficiently obvious, cases were met with on the borderland between the two which it was impossible to refer to either with certainty, and for these the class of semi-malignant tumours was introduced. Since the clinical classification has given place to the histological, it does not appear that the exact limitation of the groups is thereby rendered, in some instances, more definite, and this is notably the case in cancer of the rectum. The clinical differences between the simple adenoma, or mucous polypus, of the rectum, and cancer of that organ, are sufficiently obvious: the simple adenoma generally occurring in young persons; being attached to a long pedicle; not tending to recur after removal; or to affect the constitution: the cancer, on the other hand, is sessile; tends to infiltrate deeper parts; to break down and ulcerate; to profoundly affect the constitution; to recur after removal, and produce metastatic growths of similar character at a distance from the original site. Now when these growths are examined under the microscope they both consist essentially of the same tissue—namely, the glandular structure of the mucous membrane, such as is normally found lining the Lieberkühn follicles of the intestine; the only difference being that in the benign form there is a tendency to project into the lumen of the bowel, and to draw down a pedicle of *normal* mucous membrane, while in the cancer the wall of the intestine is from the very first infiltrated with the new formation. First the muscularis mucosæ becomes perforated, then the submucosa invaded, and subsequently the muscular coat itself is infiltrated (*see* Plate I.), so that the only histological difference between these growths is really one of situation, and of relation to surrounding tissues, not of structure.

As might be expected, cases are occasionally seen in which it is impossible to say to which class, whether adenoma or adeno-carcinoma, the growth should be referred; so that

histologically as well as clinically the limits of classification are not very distinct. As the carcinomata originating in any structure are principally composed of the epithelial elements similar to those normally present in the immediate vicinity, it follows that those commencing in the intestinal mucous membrane should consist principally of adenoid tissue, and such has been found to be the case. Mr. Harrison Cripps, whose investigations of the histology of rectal cancer have been extremely extensive, embracing a careful investigation of sixty separate examples of the disease, says: "In the rectum I have failed to discover any growths or tumours which pathologists designate as scirrhus or medullary cancers, or as belonging to the different varieties of sarcoma. Considering the eminence of many careful observers who have applied such names to these growths, it would be quite unjustifiable to assume that such distinctive structures never form the entire bulk of the tumour; but I feel bound to state that, with perhaps a more than average opportunity of examining such growths from the rectum, I have been myself unable to discover tumours composed entirely of the distinctive features appertaining to these diseases." ^a Mr. Treves ^b expresses a somewhat similar opinion, that the form of cancer found throughout the entire intestinal tract is cylinder-celled epithelium, and he quotes from a monograph by M. Haussmann, ^c who says:—"We will give, then, cancer of the intestine the following definition: cancer of the intestine is cylindrical epithelioma of that organ." Putting aside for the present the question of sarcoma, the occurrence of which in the rectum is undoubted (and of which I have had an instance in my own practice), let us consider what is meant by the terms scirrhus and

^a Diseases of the Rectum and Anus. P. 317. 1884.

^b Intestinal Obstruction. P. 268.

^c Thèse de Paris. No. 228. 1832.

medullary cancers at the present day. If the former is taken only to indicate that in which, with the epithelial development, there is a very considerable hyperplasia of the connective tissue, forming firm and hard masses of tissue, the so-called stroma, which frequently manifest a tendency to contract and pucker the invaded tissue, then, without question, scirrhus cancer does occur in the rectum. Similarly, if medullary cancer or encephaloid is taken to mean that the tumour is of rapid growth, soft structure, and that the epithelial cells are more or less embryonic in character, and the connective tissue ill developed, then this form of tumour is also present in the rectum. But if, on the contrary, these terms are taken to represent distinct types of carcinoma, the epithelial elements of which essentially differ from those found in the organ or tissue in which the carcinoma originates, then not only are these forms not to be found in the intestine, but they cease to have an existence in any other part of the body. As, however, these terms have been used with much vagueness, it is better to dispense with them altogether. All observers appear to be agreed that at any rate by far the most common form of intestinal cancer is the columnar-celled epithelioma, or adeno-carcinoma, or infiltrating adenoma, as it is variously termed. The term cylindroma, which has been frequently used as a synonym for this disease, is misleading in the extreme, having been introduced by Billroth for a special form of tumour quite unconnected with this form of cancer.

When cancer primarily attacks the anus, as might be expected, the bulk of the tumour is composed of scaly epithelium, and the growth resembles that met with in the lip. Cripps has, however, stated that when a cancer, originating in the interior of the rectum, and of the adeno-carcinomatous variety, invades the anus, the character of the epithelial

cells varies, and comes to resemble the ordinary scaly type. This is remarkable, as the metastatic reproductions of intestinal cancer in other organs correspond very accurately to the original histological character of the growth; as, for instance, the multiple tubercles in the liver, which are such a common sequela to rectal cancer, when examined under the microscope present the same follicular structure so characteristic of adeno-carcinoma. My colleague, Dr. Purser, has given me a section of a tumour in the lung, secondary to a carcinoma of the sigmoid flexure, and in it the reproduction of the original character of the tumour was most marked, little masses of epithelial cells closely resembling Lieberkühn crypts being surrounded by normal lung tissue.

There is some considerable variation in the macroscopic characters presented by adeno-carcinoma when present in the rectum; these differences being chiefly influenced by the rate of growth, and the direction in which the tumour principally extends. These varieties have been distinguished by Cripps as the "tuberous," "laminar," and "annular."

The *tuberous adeno-carcinoma* presents itself as a considerable-sized mass projecting into the lumen of the bowel, obviously implicating the mucosa, which can be traced into it, but not moved freely over it. Associated with it may be other smaller masses. It is not necessarily very hard to the touch, and, in the early stages, does not extend beyond the limit of the rectal wall, as is demonstrated clinically by the free mobility of that organ in the pelvis. This form tends to ulcerate very rapidly; first the mucous membrane on the surface necroses; then the centre of the mass breaks down, exposing the muscular layer of the intestine, and leaving a crater-like cavity surrounded by the infiltrated mucosa and submucosa; at last the intestinal wall is perforated, and the pelvis becomes invaded, the bladder or urethra may be opened, the vagina ulcerated into, or the nerves of the sacral

plexus involved in the neoplasm, or even the bony wall of the pelvis may become implicated. This variety may be taken as the type of the more rapidly growing adeno-carcinomata. It is the form most frequently met with in younger subjects. It may produce obstruction by the bulk of the growth, but does not usually do so by producing contraction of the intestinal wall, as the other and more chronic forms do. This no doubt is the variety alluded to by most of the older writers under the head of medullary or encephaloid cancer; though in all probability the same term was applied to some of the sarcomata, which from rapid growth and large tumour formation resemble closely the tuberous adeno-carcinomata in their clinical aspects.

The Laminar Form.—This, according to the investigations of Mr. Harrison Cripps, is the commonest variety. It occurs as a layer of adenoid growth spreading laterally in the submucosa, of a thickness of about a quarter of an inch or less, while the area over which it extends may be considerable. It has a tendency rather to extend laterally than vertically, so that in time the entire circumference of the gut may be involved. Although principally situated in the submucosa, it is obvious that the mucous membrane is attached to, and incorporated with, the growth; and in the same way, the muscular tunic of the intestine is adherent to the tumour deeply. As the tumour advances in growth there is a considerable development of connective tissue in the outer walls of the intestinal tube, which subsequently undergo contraction, producing the puckering and cicatricial constrictions which have given origin to the use of the word scirrhus in connection with this disease. As in the former variety, ulceration of the mucosa soon occurs; which may be followed by perforation of the rectal wall into any portion of the genito-urinary system; or at other times the new formation will be more rapid than the ulcerative action, and the

result will be the spreading of a fungating mass into the rectum.

The annular form is that in which the neoplasm surrounds the rectal tube without extending vertically to any great degree. It would appear to be one of the most chronic forms, and naturally attended with much contraction, forming the true "malignant stricture."

Besides the infiltration of surrounding structures, rectal adeno-carcinoma tends to reproduce itself in other parts of the body; and like all the group of the carcinomata, the lymphatic glands become implicated with extreme frequency. When, as is usually the case, the disease is situated entirely within the rectum, leaving the anus free, the first to be involved will be the pelvic and lumbar glands; and sometimes these are seen to be of very large size, the glands along the iliac vessels being sometimes quite as large as hen's eggs, and capable of recognition during life by abdominal palpation. Next in order, the lumbar glands are enlarged; but the lymphatics of the groin only become implicated as a consequence of involvement of the external skin of the anus, or when in an advanced stage of the disease a very widespread lymphatic implication follows the primary enlargement of the pelvic glands in cases of adeno-carcinoma. Next in frequency to the lymphatic system, the new growths are liable to be found in the liver, probably the most frequent cause of disseminated hepatic cancer being the form of disease under consideration. As is usual with metastatic tumours, the secondary growths reproduce with singular exactness the histological characters of the original tumour. Involvement of the peritoneum also is not unfrequent, the metastatic growths appearing like grains of boiled sago over the surface, and matting together, when extensive, the coils of small intestine. Secondary deposits have also been found in the pancreas, lungs, &c.

The essential histological characteristic of adeno-carcinoma is the fact that in this disease the adenoid tissue perforates the muscularis mucosæ, and develops in the submucosa and muscular coat (Fig 1). It is this characteristic alone which serves to establish the accurate diagnosis between the

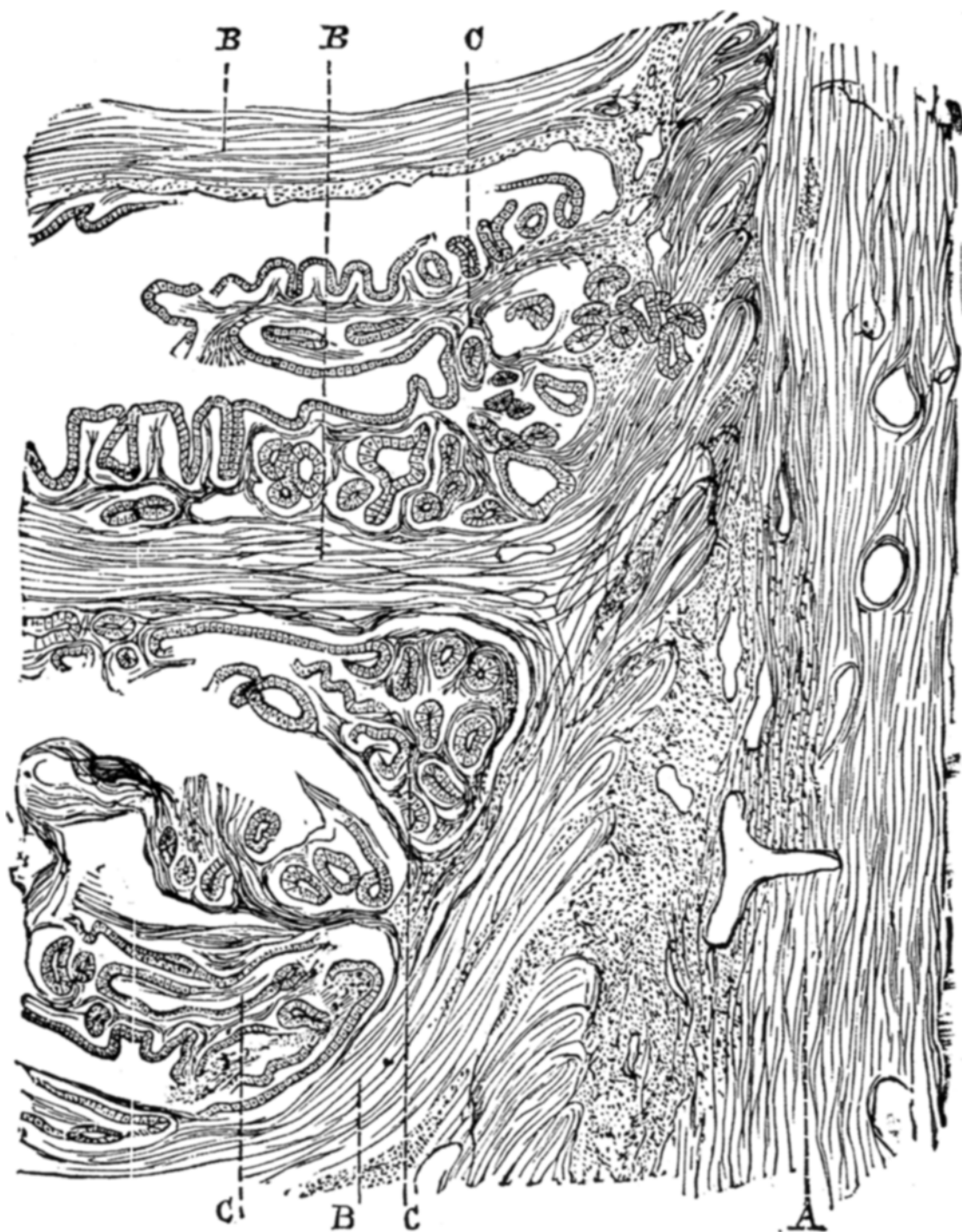


Fig. 1.—Cylinder-celled Epithelioma of Rectum ($\times 10$ diameters).
A, External muscular coat of bowel; B, internal muscular coat of bowel; C, masses of adenoid tissue separating the bundles of muscular fibre of the internal muscular coat.

malignant and non-malignant forms of adenoma, and in this respect the case is exactly analogous to difference between a wart and an epithelioma on the skin proper. In fact, the essential element in the production of a carcinoma is the development of epithelium beyond its natural superficial

limits. For fuller detail of the histology of rectal cancer the reader must be referred to the work of Mr. Cripps.^a It is, of course, seldom that the very earliest stage of rectal carcinoma can be investigated, as no important symptoms are usually produced until the disease has made considerable progress, so that it is impossible to state what the initial change is. Cohnheim has propounded a very ingenious theory, by which he attributes an embryonic origin to all tumours, and considers that an embryonic rudiment is left during development, and that at some later period this may undergo proliferation. He bases one of his arguments in support of this theory on the frequency with which cancer occurs at the places where, during development, diverse epithelial formations pass one into another, as the lips, rectum, stomach, cervix uteri. Certainly the fact that, in a large majority of cases, rectal cancer commences at a place corresponding closely to the site of junction of the proctodæum and mesenteron would appear to favour this view.

In order to investigate the method of growth, it is necessary to examine the spreading margin of the tumour; that which projects into the rectal lumen being the most suitable for demonstrating the mode of growth, the deeper parts being altered by the way in which the neoplasm is disseminated between the normal structures, and mixed with the débris of atrophic tissues. The central parts are also unsuited for minute examination, as fatty degeneration and breaking down of the tissues is usually taking place there. If the spreading margin be examined, it will be found that it is raised above the level of the adjacent membrane, and sometimes overhangs it to some extent, but it will always be found to be attached by a broad base, and incorporated with the structures forming the rectal wall; it is, however, never distinctly pedunculated as in the case of the simple adenoid

^a Loc. cit. P. 308.

growth. It is quite true that we sometimes find small pedunculated adenomata in the rectum in conjunction with adeno-carcinoma, but they usually appear as if they were due simply to the irritation of the discharge from the cancer. Figure 2 represents a section of a simple adenoma, which existed in conjunction with undoubted cancer (from a specimen kindly given me by Dr. Patteson). And although a few

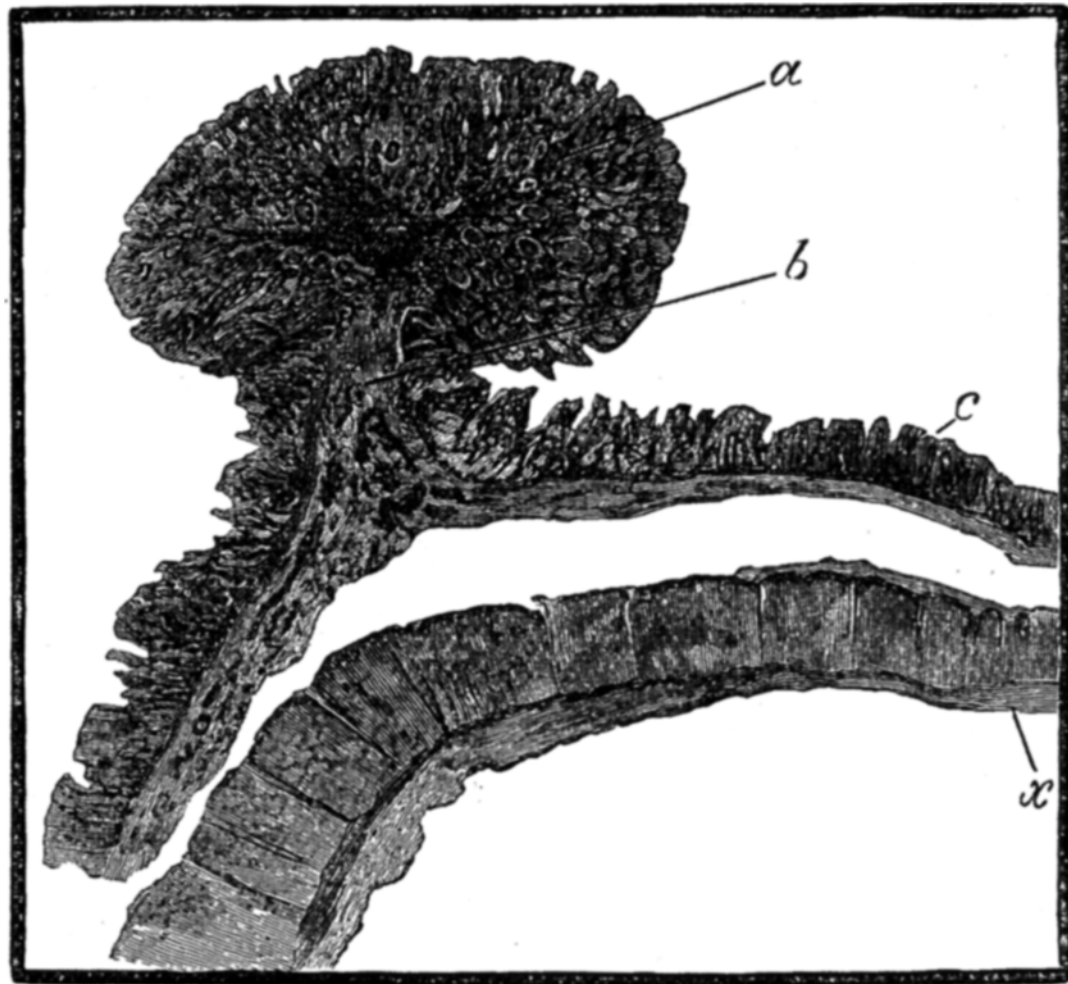


Fig. .2—Adenoma of Rectum from Case of Rectal Cancer ($\times 12$ diameters).
a, Glandular structure ; *b*, connective tissue and muscularis mucosæ ; *c*, healthy mucous membrane ; *x*, muscular coat of bowel.

cases are recorded in which a malignant form of disease has followed the removal of a simple adenoma, yet they are so rare that the rule may be adopted, that pedunculation is a very strong argument against malignancy. According to Cripps, if the surface of a growing margin be examined with a low microscopic power, it will appear like “an ant-hill thickly studded with fungi. Upon closer inspection these bodies are seen to be projections from the surface of the tumour.” Upon making sections, the Lieberkühn follicles are found much increased in size, being three or

four times longer than normal, while the individual cells are also much increased in length, sometimes being ten times longer—*i.e.*, one-hundredth of an inch. The follicles may be lined by a single layer of columnar epithelium, only leaving a central cavity. In other instances the central cavity is absent either by approximation of its walls, or by a growth of offshoots from the epithelial walls. These offshoots consist of a central stroma of retiform tissue, upon which a bipinniform arrangement of cylinder-cells is seen to fill up completely the cavity. The question arises whether these cavities are shut sacs, or only cross-sections of convoluted tubes of dilated Lieberkühn crypts. Cripps appears now to take the latter view. Where the sections are taken from very rapidly growing and soft tumours, it will be found that the typical cylinder cells will not be formed, the whole aspect being more embryonic in character; the cells being rounder and less defined, the way in which they are disposed, and the tendency to follicular formation, however, leave no doubt of their connection with the adeno-carcinomata.

Colloid or Gelatinous Cancer.—The writings of Cruveilhier^a have been frequently quoted as showing that this form is the most frequently met with in the intestinal tract. As Cripps, however, justly remarks, an examination of museum specimens does not tend to show that this disease was more common formerly than at present, and certainly an examination of recent specimens tends to indicate that colloid must be considered one of the rarer forms of intestinal cancer. In the reports of cases read before the various pathological societies formerly, the terms were used with much vagueness, and probably applied to very different forms of growth. In the rectum it may occur as a definite tumour or as a diffuse infiltration, and is characterised by the translucency of its substance. The stroma contains, instead of closely packed

^a *Traité d'Anatomie Pathologique Générale.* P. 64, et seq.

masses of epithelial cells, a more or less clear jelly. According to Ziegler,^a “the colloid or gelatinous texture of the tumour is due to mucoid or colloid change affecting the cancer cells. It begins with the formation of clear globules in their interior; the cells then perish, and the globules coalesce with each other and with the larger gelatinous lumps already formed. In this way a large homogeneous mass is ultimately built up. It is not uncommon for all the cells over a wide area to perish in this manner, so that the stroma is the only formed constituent remaining; in other spots cell groups may still be found encircled by colloid masses; in others there is no colloid substance at all.”

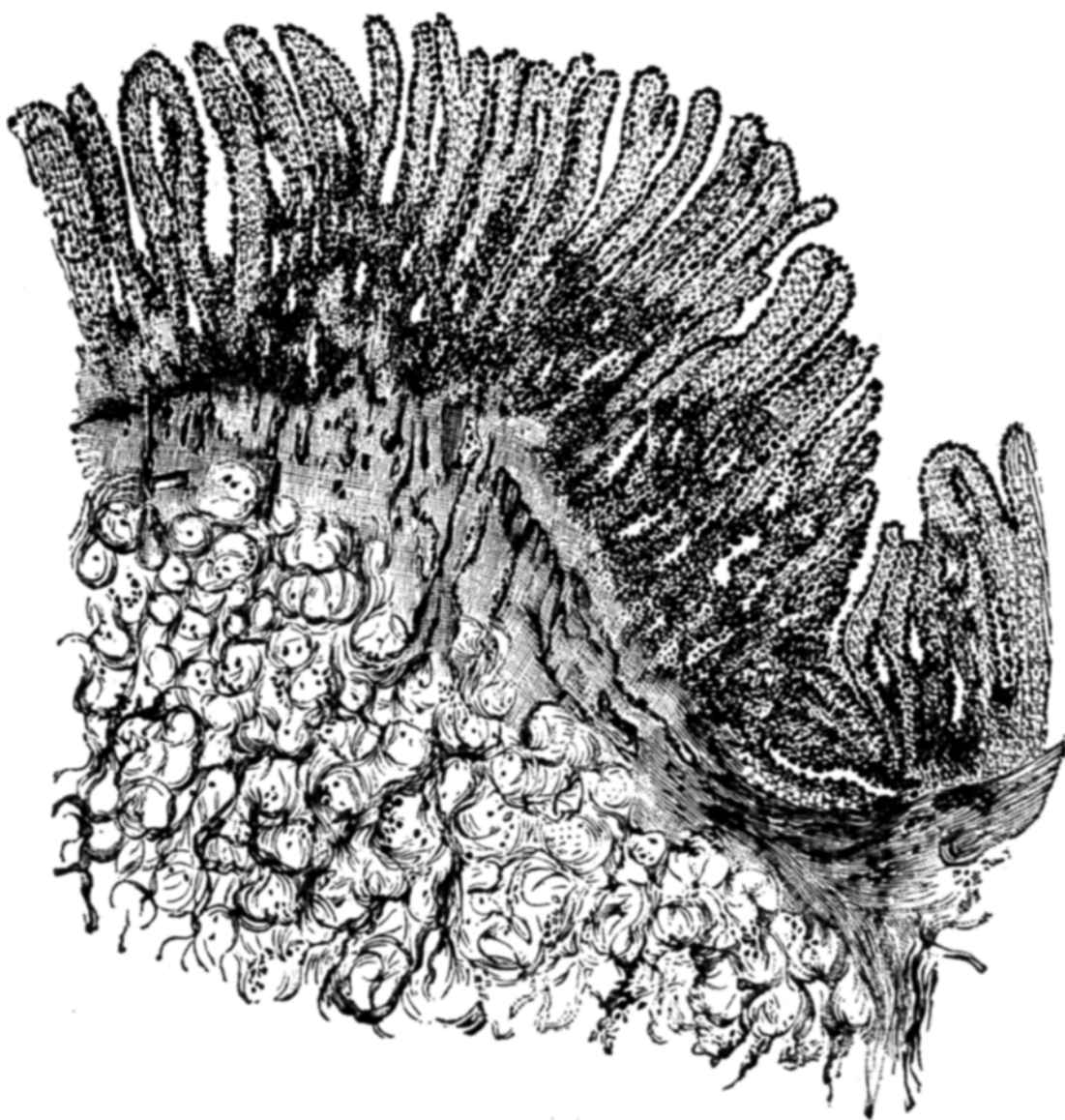


Fig. 3.—Colloid of Rectum ($\times 50$), showing perforation of muscularis mucosæ, by new growth.

Some, no doubt, of the gelatinous rectal cancers might be with greater precision designated as *carcinoma myxomatodes*. Professor Purser has kindly given me a very beautiful

^a Macalister. General Pathological Anatomy. P. 242. London, 1883.

microscopic section of a colloid cancer of the upper part of the rectum, which shows the new growth perforating the muscularis mucosæ, its development in the submucosa, and infiltration and separation of the bundles of the muscular coat. In the greater part of the section nothing but the stroma is left, while in a few places cells containing globules of colloid matter still remain (Fig. 3).

Of colloid cancer I have had two well-marked cases in my practice. The first formed a long tubular stricture about 4 inches long, commencing immediately inside the anus (Plate II.), and the lower portion was much ulcerated, and the intestine above considerably dilated. It was removed from a woman, aged thirty, by trans-sacral incision. She made an excellent recovery, and so far remains free from recurrence.

The second case was that of a man, aged sixty, in whom the disease appeared as a nodule at the upper extremity of a cicatrix, following a very extensive operation for rectal fistula. This was also successfully excised.

The second great class of malignant neoplasms, coming, in order of frequency, after the carcinomata, are those tumours the bulk of which is composed entirely of embryonic connective tissue, but *sarcomata* are rare in the intestinal tract. Mr. Cripps states^a that he has been unable to find, in his extended examinations of rectal growths, any of the characteristic structure belonging to the different varieties of sarcoma.

In the Museum of the Royal College of Surgeons of Ireland are two very remarkable examples of sarcomatous growths. In the first (Fig. 4) there is projecting from the anus an enormous mass which measures five inches by four; it is much lobulated on the surface, presenting somewhat the appearance of an ordinary papilloma of this region. It differs, however, in this, that the individual lobules are much

^a Loc. cit. P. 318.

larger, and the intervening depressions much shallower; a small group of secondary growths appears near the scrotum, in the skin of the thigh, and the disease extends up into the rectum for a distance of about two inches. There does not appear, however, to have been any obstruction, as the tube



Fig. 4.—Large Sarcomatous Tumour of Anus and lower part of Rectum, with Secondary Tumours on the inside of the Thigh.^a

was quite pervious behind the growth. There is, unfortunately, no very reliable history with this specimen. Dr. P. S. Abraham, the late curator of the museum, kindly undertook a detailed examination, and he made microscopic sections from the mass inside the rectum, from the external growth, and from the secondary formations. In all of them the appearances were practically identical: there was no trace of proliferating mucous membrane; almost the entire of the sections consisting of small spindle cells, with but little fully developed connective tissue.

The second specimen (Fig. 5) is one in which a long tubular rectal stricture exists, commencing about one inch inside the anus, and extending upwards for a distance of five inches. All the coats of the bowel appear to be lost in the growth which surrounds the intestine evenly, and which measures one inch in thickness at the middle portion. Above the neoplasm, the intestine is widely dilated, showing very clearly that during life the degree of obstruction must have been considerable.

^a Museum, Royal College of Surgeons in Ireland.

Dr. Abraham has made a careful examination of this specimen also, and the structure appears to be almost identical with the former, and undoubtedly is an example of spindle-celled sarcoma.

These two specimens illustrate remarkably the very different macroscopic appearances which may be produced by tumours of the connective tissue type.



Fig. 5.—Sarcomatous Infiltration of Rectum, producing long tubular stricture.^a

A well marked case of alveolar sarcoma of the rectum is reported by Billroth.^b The patient was aged fifty-six, and there was a three years' history of difficult defæcation, the growth prolapsing when the bowels moved; it increased so much in size that it could not be replaced. It extended into the rectum for a distance of 6 cm., and there was a well-marked constriction where it was embraced by the sphincter.

^a Museum of Royal College of Surgeons in Ireland.

^b Quoted by Esmarch. *Handbuch der allgemeinen und speciellen Chirurgie*.
Jil u. Billroth. Band III. P. 183. 1882.

There were no enlarged glands or evidence of secondary tumours. The growth was excised, and microscopic examination showed it to be a well-marked example of small-celled alveolar sarcoma.

In connection with Hodgkin's disease, several examples of *lympho-sarcoma* of the intestines have been recorded. In these instances it appears that the tumour originated in the adenoid tissue of the mucosa and in Peyer's patches, and they do not hitherto appear to have produced obstructions or other important symptoms. Dr. Carrington^a has detailed a case in which a tumour of this kind weighing one and a half pounds, occupied the cæcum without producing symptoms. I have had personal experience of one case in which a tumour, apparently of this nature, was situated lower down in the intestinal canal, and gave rise to rectal obstruction. The patient, an old man of sixty, came under my care in June, 1884, at Sir Patrick Dun's Hospital. He complained of piles and difficulty in getting the bowels to move. Upon making an examination a tumour was felt in the hollow of the sacrum, obstructing the rectum. The mucous membrane was freely movable over it, and the tumour itself was movable in the pelvis. As I thought, from the movability of the mucous membrane over it, that it was outside the intestine, I attempted its removal by linear proctotomy. When reached it was found to be very soft, and it broke down under the finger. As much as possible of it was removed. The patient, however, died of septic periproctitis. At the *post-mortem* it was found that the neoplasm infiltrated and thickened considerably the posterior portion of the muscular wall of the rectum, the new growth in parts above where it was removed being one and a half inches thick. The mucous coat was entirely unaffected, and freely movable over the growth, which appeared to have originated in the

^a British Medical Journal. Vol. XI., p. 773. 1883.

muscular coat of the bowel. The pelvic and lumbar glands were all very much enlarged, but with this exception there did not appear to be any general disease of the lymphatic system. Microscopic examination was kindly made by Dr. Abraham, who states that it was in all respects similar to the descriptions given of lympho-sarcoma.

Melanotic Sarcoma.—Primary melanotic cancer of the rectum is extremely rare; and according to Virchow this is the only portion of the intestinal tract in which it has been found. Mr. Treves, however, states that there is a specimen of apparently primary melanotic growth arising from the ileum at the London Hospital Museum; and there is an example of melanotic growth in the colon in the Museum of Trinity College, Dublin, but as there were apparently (from the history) similar growths in other parts of the body, it is improbable that the intestinal growth was the primary one. In November, 1884, I brought before the surgical section of the Academy of Medicine in Ireland the following typical case of melanotic sarcoma of the rectum.

The patient, who was sent to me by Dr. J. K. Barton, was admitted into Sir Patrick Dun's Hospital Sept. 16, 1884. She was a tolerably healthy-looking woman, aged sixty years. Eleven months before admission into hospital she first felt a lump coming down when she was at stool, and difficulty in obtaining an evacuation, with occasional hæmorrhage. A month later she was in a Dublin hospital, where, she stated, a pile which appeared externally was removed. From that time she remained free from bleeding and pain for six months. Towards the end of May, 1884, she suffered from flatulence and indigestion, and the bowels, which had for a long time been costive, became more so, relief being only obtained after the use of strong purgative medicines, and then with considerable straining and pain. There was some slight discharge of bloody mucus occasionally, but not to any great

extent. A month later she became conscious of a growth in the rectum, which partly protruded when the bowels moved; lately this had increased much in size. The pain during defæcation was considerable, and was referred to a point immediately above the symphysis pubis, and she was much troubled with pruritis ani.

Upon making an examination the anus appeared normal, and the sphincter was not unduly relaxed. About an inch from the anal verge, on the anterior aspect of the rectum, two distinct and tolerably hard tumours could be felt. By passing the finger well up, the superior limits of both could easily be made out, and below them a smaller mass was to be felt. With one finger in the rectum and the other in the vagina it was easily determined that there was no abnormal adhesion between the two canals. The rest of the rectum, as far as it could be examined with the finger, appeared normal; and no enlarged glands could be felt in the hollow of the sacrum; nor was any evidence to be found of engorgement of the liver or other abdominal viscera.

I removed the growth by the usual method, Clover's crutch being employed to keep the patient in the lithotomy position. The anus was first stretched, and an incision carried from its margin back to the coccyx, dividing the posterior wall of the bowel to the extent of about $1\frac{1}{2}$ inches. The angles of the incision were held asunder, and a good view obtained of the interior of the rectum and the origin of the tumours. An incision was next carried round the anterior two-thirds of the wall of the gut, about half an inch below the attachments of the growths, and well above the external sphincter. The wall of the intestine was now carefully dissected from the vagina, until it was evident that the healthy bowel could be felt between the finger and thumb above the highest limits of the disease. A curved incision was made with a scissors well free of the mass, and the whole

removed. Hæmorrhage was not as severe as might have been anticipated, only two ligatures being required. There was a little oozing from a point deep in the incision between the vagina and bowel, to which the benzoline cautery was applied, and, finally, a deep suture was passed to arrest it. No attempt was made to suture the divided portions completely. The wound was thoroughly well washed with a solution of corrosive sublimate, 1 in 2,000, and a sanitary towel wet in the same solution was applied.

The progress of the case was quite satisfactory. The temperature never reached 100°; indeed, for a few days it was subnormal, during which time she was much depressed. The bowels moved on the fourth day, and again on the eleventh; each time she had complete control of the motion, and has

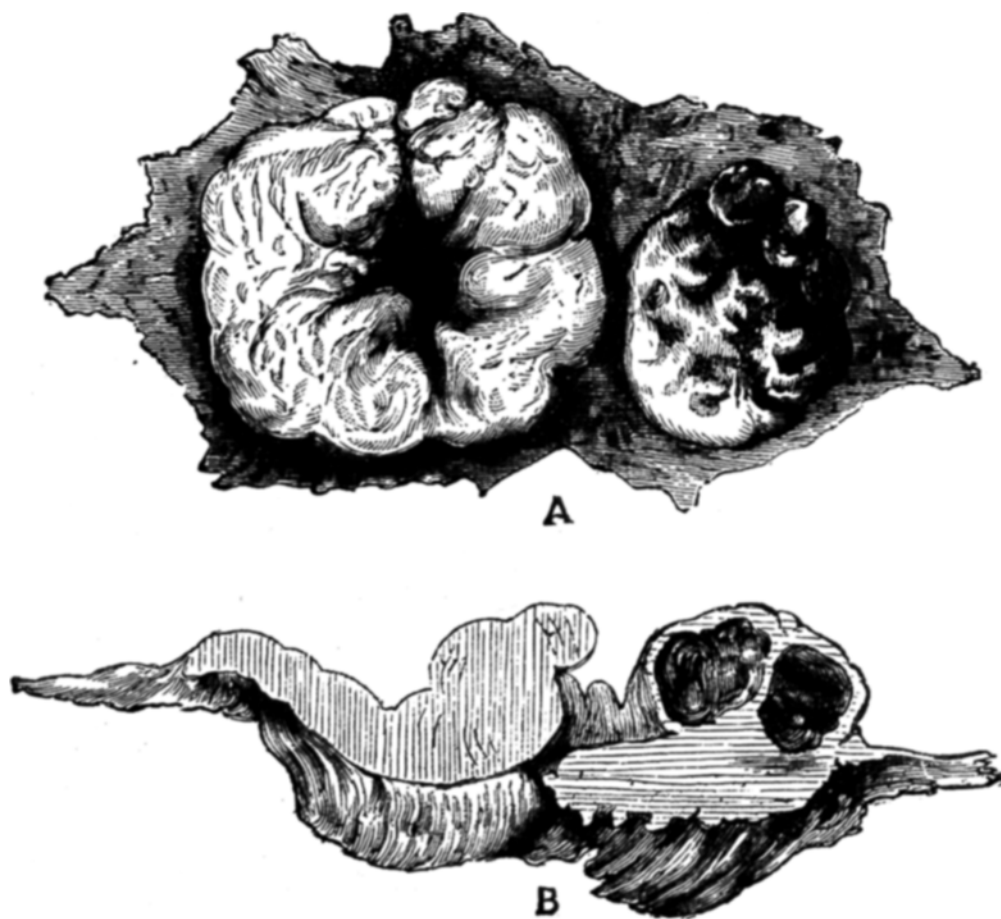


Fig. 6.—Melanotic Sarcoma of Rectum.
A, Surface view; B, section.

not since suffered from incontinence, except when she has diarrhœa. I have lately seen her (nine years after the operation): there is not the slightest evidence of recurrence; the bowels move naturally every day; and she is earning her living as a cook.

Upon examination of the structure removed it was found that a good margin of healthy tissue surrounded the disease. The piece measured about 3 inches in breadth and $2\frac{1}{2}$ inches in length, and consisted of the anterior two-thirds of the rectal tube (Fig. 6). A section carried through both of the principal growths shows that the greater portion of the smaller one is of a sooty black colour, while the larger one is quite white. The third and smallest one is also melanotic. Microscopic examination, kindly made by Dr. Abraham, shows that the growth is a typical sarcoma, much pigmented. In no part of it was there to be found any evidence of proliferation of the gland tissue of the mucosa, and, as far as could be made out, the disease originated in the submucosa.

At a meeting of the Société de Chirurgie, January 28,^a 1880, M. Nepveu delivered a lecture on the subject of rectal melanosis, and gave statistics of the cases which have previously been recorded, from which it appears that but ten instances had been noted. In only five of these was there any microscopic examination detailed, and all of these were instances of sarcoma. In two the position was immediately within the anus, once at the sigmoid flexure, and the rest were situate at the anus. In all the cases recorded the disease ran a rapidly malignant course; and in four which were submitted to operation recurrence was not long delayed.

Virchow has pointed out the remarkable fact^b that intestinal melanosis, which is such an extremely rare disease in the human subject, is met with frequently in the horse.

Ossifying Cancer of Rectum.—As far as I am aware, the case put on record by Mr. Wagstaffe of this form of neoplasm is unique.^c The following is a condensed summary of the case as recorded: The history pointed to disease of the

^a Mémoires de Chirurgie (quoted by Kelsey). Paris, 1880.

^b Pathologie des Tumeurs. Vol. ii., p. 281. Paris, 1867.

^c Transactions of the Pathological Society of London. Vol. xx., p. 176

rectum for about twenty years, when symptoms of obstruction came on. This was followed by pelvic suppuration and death. At no time could any tumour be distinguished by examination with the finger in the rectum, nor by manipulation above the pelvis, but the history pointed distinctly to obstruction of the bowel in this region. Upon examination of the pelvic viscera, *post-mortem*, a tumour was found in the back of the rectum, of about the size of a walnut. It occupied nearly the whole calibre of the rectum, but the disease involved more or less the entire circumference of the intestine, upon a level rather above the larger mass. A small opening large enough to admit a goose-quill was found in the sigmoid flexure, about twelve inches above the cancerous growth, and communicating with a circumscribed abscess cavity within the peritoneum, and this again communicated with the rectum below the obstruction. When first laid open the surface of the cancer presented a nodulated red appearance, but the larger or posterior mass was roughened in its lower half by numerous sharp spicules of bone which projected from its surface. Section showed the growth involving the thickened muscular coat, as a hard contracting mass; and from its base firm fibrous bands ramified into the neighbouring fat, just as from the base of an ordinary scirrhous tumour. That portion which projected into the cavity of the rectum was softer, and its lower part was occupied throughout by numerous spicules of true bone. On the surface, the softer structures having sloughed away, the bony constituents were exposed. The growth did not extend to involvement of the sacrum, which was perfectly healthy, and the other bones of the pelvis were also free from disease. The other viscera were examined and found healthy. The ulceration in the sigmoid flexure appeared simple in character. The solid portion of the growth was composed of cellular and nuclear structures embedded in granular matrix. Bands and

fibres, composed almost altogether of nuclei, ramified in the growth, and could be traced as continuous with the osseous portions. It appeared that the nuclei became darker, more granular, and harder in outline as the examination was carried towards the ossified parts; the intervening matrix became more fibrous, and the processes of bone branched out into this. The bony spicules contained numerous lacunæ, whose size was about that of the ordinary nuclei of the growth. They were of various forms, generally branching, and were arranged with no regularity, but in the manner usually found in adventitious bony deposits in tumours.

Cancer of the anus is not very commonly met with; if it originates at that aperture, it is of the usual squamous type of carcinoma, and does not present any characteristics to distinguish it from the same disease in other parts of the body.

Secondary cancer of the rectum, most commonly following cancer of the uterus, does not require here any separate consideration.

SYMPTOMS OF RECTAL CANCER.

As in cancer of other parts of the body, pain is a prominent symptom at a certain period of the disease; but in the early stages it is in many instances exceedingly slight; this is so as long as the disease is confined to the interior of the rectum, and before the anus or the pelvic contents have been encroached upon. So slight is the pain, that in some instances patients consult a surgeon on account of some slight discharge from the anus or sense of uneasiness in the rectum, and an examination reveals the fact that a very extensive neoplasm is present which must have existed for months previously. I recently was consulted by a gentleman who complained of slight œdema of left arm, pain down right leg, with some loss of sensation over the area supplied by the anterior crural nerve. He never had diarrhœa, bowels moved

every day without pain, but on one or two occasions he had passed a little blood. He had a hard mass in the right iliac fossa, enlarged inguinal glands on the same side, and enlarged glands in the left axilla. He ridiculed the idea that he had anything wrong with his rectum. Nevertheless, I found upon making a digital examination that the whole pelvis was filled with a mass of rectal cancer. This freedom from pain is no doubt due, as Hilton has pointed out, to the characteristics of the upper part of the normal rectum—*i.e.*, its great distensibility and little sensibility, conditions the physiological reason of which is obvious. In the immediate neighbourhood of the anus these conditions are reversed, and, as might be expected when this region is involved in the disease, the pain experienced is extreme. It will be within the experience of most surgeons to have met with cases of malignant disease of the rectum in which for months, or even years, trivial pain alone is complained of. Sooner or later, however, pain becomes a prominent symptom, and is frequently very intense. In no locality, not even excepting the tongue, is the suffering sometimes more severe. The pain may be due to four distinct causes; and the character of the suffering in each case is quite distinct: 1. The disease may involve the anus, where, owing to the abundance of cutaneous nerves and continued motion of the part, the pain will be severe. 2. As the cancer extends beyond the limits of the intestinal tube, the nerves of the sacral plexus may be encroached upon, which may result in violent neuralgia, or in painful cramps of the muscles of the lower extremity. It is well to bear this always in mind, as not unfrequently an attack of (so-called) “sciatica” has been the first indication of a cancerous rectum. 3. Obstruction, when situated in the rectum or lower part of the sigmoid flexure, is followed by a considerable amount of pain, which is always that of a paroxysmal character, and associated with frequent efforts to

defæcate. 4. Implication of the bladder will be, of course, associated with considerable suffering, especially if the disease has progressed so as to form a fistula, and permit the flow of fæces into the bladder, or of urine into the rectum.

Bleeding is a symptom which is seldom altogether absent; and on the other hand is not often severe. It commonly follows the passage of hardened fæces, and may be taken as an indication that ulceration has commenced. A certain amount of discharge also is a common result, frequently blood-stained and abominably foetid. At a later stage this discharge, mixed with thin fæces, comes away through the patulous anus, the relaxed sphincters having lost all power of control. The skin about the neighbourhood becomes excoriated, constituting by no means the least of the miseries to be endured by the sufferer.

Diarrhœa may alternate with constipation, or be continuously present, and is often the earliest symptom which attracts attention. Every case of diarrhœa, or so-called dysentery, which has become at all chronic, should be examined by the rectum, and in not a few the cause will be found to be a malignant growth. In some rare cases pieces of the cancerous growth may be separated and passed with the fæces, when they can be easily recognised. I have several times seen cases which had been treated for diarrhœa for considerable periods which owed their origin to this cause, and the importance of making an early examination in these cases cannot be over-estimated. Early diagnosis is of greater importance here probably than elsewhere, the great majority of cases not coming under the notice of the surgeon until the disease is so far advanced that the hope of successful operative interference is passed.

As has been before pointed out, narrowing of the intestinal tube, sufficient to retard the passage of fæces, may be due to two distinct causes in cancer: either the neoplasm may by

its exuberant growth obstruct the calibre of the bowel ; or in the more chronic form, the cicatricial contraction may form a true stricture of the gut. In either case, the symptoms will be similar. Stricture of the rectum produces symptoms in some respects differing from those met with in obstruction of the intestine higher up. The continuous straining and tenesmus which is so marked in the former is absent in the latter ; while vomiting of fæcal matter, which comes on tolerably soon when the small intestine is completely stenosed, may not appear for a very long time when the rectum is occluded. In some of the recorded cases complete obstruction was continuous for many weeks or even months before continuous and fæcal vomiting supervened.

Cancerous obstruction, which may have existed for some time, may eventually give way, and an exit be established for fæces through the rectum again, or by an alternative route. In the first instance, the neoplasm may slough to such an extent that the bowel will become pervious again, or, as in the case recorded by Wagstaffe, ulceration of the bowel above the obstruction may lead to perforation and the formation of stercoral abscess, which may again open into the bowel below the cancer, thus affording a new, though not very efficient, route for the fæces. In the case of the celebrated Talma, as recorded by Quain, this also appears to have been the case.

Where an opening of sufficient size forms into the vagina, the more urgent symptoms of obstruction may be relieved, but the patient is left in a truly miserable state ; but where the opening takes place into the bladder, no sufficient exit for fæces will be by this means provided, and the urgency of the obstruction will continue ; while at the same time the other symptoms will be much aggravated. Opening into some of the pelvic viscera by ulceration in this way may be due to breaking down of the neoplasm itself, or it may be due to the

distension and irritation of fæces above the obstruction ; the ulceration then being of a simple character. This form of stercoral ulceration may take place at a long distance above the seat of obstruction, several cases being recorded where the cæcum has given way and produced a fatal peritonitis, in consequence of the dilatation due to rectal cancer. At other times nature has attempted to overcome the obstruction by the formation of an artificial anus at some part of the cutaneous surface, but such cases are of extreme rarity, and likely only to give a very inefficient relief to the obstructed gut. Dieffenbach records a case^a in which it was necessary to evacuate, by means of free incision in the buttock, an enormous quantity of fæces extravasated from a cancerous rectum ; and Smith^b gives a case in which an extravasation in this way found its way into the hip joint.

As has been elsewhere stated, the glands first affected, if the disease does not implicate the anus, will be the pelvic and lumbar systems. The former may be felt through the walls of the rectum, and the latter occasionally by deep abdominal palpation.

When secondary tumours have formed in the liver, there may be indication of its increase in size ; and possibly, if the abdominal wall be thin, the surface may feel irregular and knobby.

Œdema of either leg is a symptom not uncommonly present in the later stages, and is usually of grave import as indicating an involvement of the iliac vein in the disease. In common with all forms of cancer, the peculiar cachexia soon becomes obvious, and if hæmorrhage has been at all abundant it comes on more rapidly. I think the sallow skin which is so characteristic is more marked in this form of cancer than in others. The onset of bladder implication is indicated by

^a Quoted by Leube. Ziemssen's Cyclopædia. Vol. vii., p. 437.

^b Surgery of the Rectum. 1872.

frequent and painful micturition; and fistula is of course soon rendered obvious after it has occurred.

In a case which I saw under the care of the late Mr. B. W. Richardson, the first symptom which aroused suspicion was turbid urine, from which a sediment settled. Upon examination by the microscope particles of striped muscular fibre and other fæcal débris were to be seen, and a digital examination demonstrated a rectal stricture high up. Leube^a notes a case in which the secondary involvement of the ureter in rectal cancer produced a large hydro-nephrosis.

The duration of symptoms may, in difficult cases, materially assist the diagnosis. If there is a history of rectal trouble slowly increasing for years, it is highly probable that the disease is not malignant.

Digital Examination.—Whenever the symptoms of rectal cancer exist at all, a complete digital examination should be made. In the majority of cases, within a short distance of the anus the surgeon will feel a hard nodular and irregular surface, which may surround the entire circumference of the bowel, or be more particularly confined to one side of it. When stricture exists, the tumour frequently is felt projecting into the lumen of the bowel, and conveying to the finger a sensation almost exactly resembling that of the os uteri. Should the finger not encounter anything abnormal, the patient should be made to stand up, and the digital examination should then be repeated, the patient at the same time being told to bear down. In this way a tumour which was not within reach by the ordinary method may occasionally be explored. Should nothing still be felt, and the symptoms clearly point to rectal disease, the patient should be etherised, and a careful bi-manual examination instituted, with the patient in the lithotomy position. This method is also of

^a Ziemssen's Cyclopædia. Vol. vii.

use in determining the height to which neoplasms, that are easily recognisable below, extend upwards. The existence of malignant disease having been determined, it is essential, with a view to treatment, to determine the following points—First, the distance to which the disease extends upwards; this may be done with the finger alone, by the bi-manual method, or by a ball-ended probang. Secondly, the movability of the rectum upon the other pelvic structures is of use in estimating whether or not the disease has spread past the limits of the intestinal tube. And, thirdly, a careful examination should be made to feel, if possible, any enlarged glands, which may sometimes be felt in the hollow of the sacrum through the rectal wall. In examining a case of this kind the greatest care should be employed, as in several recorded cases the attempt to pass a probang, or even a roughly made digital examination, has been followed by rupture into the peritonæal cavity.

In the female additional information may be gained by vaginal examination, the extent of the growth being sometimes easily determined through the recto-vaginal septum, while the fixity or freedom of the uterus is a point of great importance to make out.

Diagnosis.—There are but two conditions with which rectal cancer is likely to be confounded—viz., tumours external to the intestinal tube, and non-malignant stricture.

In the case of the former the diagnosis is easy if the disease is within reach of the finger. The fact that the mucous membrane is freely movable, and that the neoplasm is unquestionably outside the bowel, will render the matter clear. Hilton records a case^a in which the presence of enlarged glands, which could be felt through the rectum, in a case of chronic ulceration, had given rise to the opinion that the case was one of cancer; when the ulcers healed the

^aLectures on Rest and Pain. P. 294. Third edition, edited by Jacobson.

swelled glands disappeared, showing that they were simply due to irritation. In the same way uterine tumours, or even the fundus of a retroflexed uterus, by pressing on the rectum and causing obstruction, have given rise to an erroneous diagnosis of rectal cancer.

To distinguish between the malignant and non-malignant strictures is a matter of greater difficulty. In this, duration of symptoms will prove of much service, the onset and progress of the non-malignant being extremely slow. The sensation conveyed to the finger will also be different. The ordinary stricture is smoother, and more regular, and there is generally an absence of the nodular and protruding masses so characteristic of cancer. Cripps has also drawn attention to the fact that in the malignant form there is usually a portion of tolerably healthy mucous membrane between the cancer and the anus, whereas in the non-malignant stricture this portion is generally more or less infiltrated.

The diagnosis between squamous epithelioma of the anus and papillomata is sufficiently easy; as in the latter the skin surrounding the tumour is not involved, the neoplasm being in some instances even pedunculated, whereas in the epithelioma there will be considerable infiltration of the true skin.

TREATMENT OF RECTAL CANCER.

The medical treatment of cancer of the rectum presents two chief points which must be borne in mind by the surgeon: first, to ensure that the bowels are kept sufficiently free to obviate the occurrence of fæcal accumulation above the disease; and, secondly, to supervise the use of morphia and other narcotics. In order to relieve pain, morphia, either hypodermically in the form of suppositories, or internally, is frequently used somewhat recklessly, with the result that there is superadded to the miseries of the rectal cancer the

mental suffering and total inability to bear physical pain of the morphia habit, so that, unless used with a very sparing hand, opium, instead of rendering the remainder of life more comfortable, adds to its suffering.

The use of bougies, or any dilating instrument, is attended with extreme danger, several cases of fatal rupture having been induced by this means.

The operative treatment of cancer of the rectum may, with advantage, be classed under two heads—the one necessarily palliative, as directed only to the relief of the prominent symptoms of intestinal obstruction and pain; the other having for its object the complete removal of the disease.

Of the former, three operations are at present practised where extirpation is inadmissible, and of these colotomy must still be ranked in the first place, although there seems to be a tendency amongst operating surgeons to make use, as far as possible, of other plans of treatment, even where the symptoms of severe obstruction are manifest. Of these procedures the most important is linear proctotomy, or external rectisection, which has, chiefly owing to the writings of Verneuil,^a Panas,^b and Kelsey, obtained a recognised place in surgery as a treatment for malignant stricture, and at the Copenhagen Congress^c Verneuil speaks strongly in favour of this procedure as replacing both colotomy and excision. In many cases he considers it preferable to the former as being less dangerous, equally efficient, and more convenient; and he considers complete removal by excision impossible. Those surgeons who practise excision confine colotomy to those cases in which it is impossible to extirpate the whole mass, consequently the case in which opening of the colon is now

^a Gaz. des Hôp. October and November, 1872. And Gaz. Hebdom. March 27, 1874.

^b Gaz. des Hôp. December. 1872.

^c Compte Rendu. Par C. Lange, Secrétaire Général. Tome ii., Section de Chirurgie. P. 1.

practised would be incapable, in consequence of their extension, of relief by the linear proctotomy of Verneuil. The operation, therefore, must be compared with extirpation alone, and I think that the results now gained by the latter procedure will decide most surgeons in selecting it. For the treatment of non-malignant stricture linear proctotomy is an admirable method. The suggestion of Kelsey to make two vertical incisions posteriorly, and remove the mass of neoplasm from between them, gives more room certainly, but it is open to the same criticism as the more simple operation.

The third form of palliative operation is the removal, with a scoop or the fingers, of as much as possible of the cancerous mass. Such cases are described by Allingham, Cripps, and Volkmann; and the result was a removal of the obstruction. From the recorded cases, it appears that when the mass was thoroughly broken down and removed hæmorrhage was not excessive, and sometimes even partial cicatrization has been known to follow. Sir Joseph Lister states^a that he has seen in the practice of Simon of Heidelberg great advantage follow the scraping of epithelioma of the rectum with the sharp spoon.

The radical cure of cancer of the rectum may be attempted by a free excision from the perinæum, or through the sacrum, and where the disease is situated high up, the operation, to which Marshall has applied the term colectomy, may be performed.

Excision of the rectum is now a thoroughly established operation, and although at first it met with a great deal of opposition in this country, it is now pretty generally adopted as the best treatment in selected cases. Originally performed by Faget in 1763, it does not appear to have attracted much attention till 1833, when Lisfranc again brought it into

^a Lancet. May 20, 1882.

notice; but its establishment, as at present practised, is due to the German surgeons.

In order to arrive at a just conclusion as to the advantages of extirpation of the rectum, it is necessary to review the course which rectal cancer runs when not subjected to operation. It would appear, from a consideration of a large number of statistics, that the average duration of life is about two years from the appearance of the first symptoms, and during that time the condition of the patient is truly miserable. Where obstruction is present, the constant straining is a source of perpetual pain and annoyance to the patient, and even when this symptom is not present the continued mucous and bloody discharge, the extreme pain suffered when the disease encroaches on the bladder, the anus, or the nerves of the sacral plexus, combine to render this disease one of the most distressing that can possibly come under the observation of the surgeon; and it is little to be wondered at that any operation which can hold out a chance of remedying this condition should readily be grasped at by both surgeon and patient. We must, however, consider the question from more than one point of view: first, as to the immediate risk to life; second, as to the probability of complete cure, and, if so, the condition in which the patient will be left; and, lastly, supposing recurrence to take place, how long will it be delayed, and what will be the course of the secondary disease. I am convinced that a careful and unbiassed consideration of the facts bearing on these questions will serve to convince the impartial observer that they are not only sufficient to justify the operation in suitable cases, but that it is the duty of the surgeon to strongly recommend it.

Many cases have recently been recorded, more particularly by the German surgeons, showing a somewhat diminished death-rate, mainly due to improved methods of operation;

but the mortality must always remain somewhat high, as it is impossible completely to obviate stercoral fouling of the wound by any means at present at our disposal.

Let us proceed to consider these questions in detail. First, as to the immediate risks of the operation. In trying to estimate the mortality of any operation, more particularly one which has only of recent years been extensively practised (as is the case with the operation under consideration, in this country at any rate), it is manifestly useless to collect all the cases published in the journals, and from these deduce statistics, as there is a strong tendency amongst surgeons to publish isolated successful cases, while their fatalities are not so accurately recorded. Consequently, we must only place reliance upon the experience of those surgeons who give the results of the total number of operations which they have performed.

I have collected 175 cases in which, I think, we may be satisfied that the conditions necessary for faithful statistics have been carried out, so that we may take the result as fairly reliable. These give a death-rate of 16·5 per cent.; and, when we take into consideration the nature of the operation and the disease for which it is performed, we may consider this a fairly good result.

Upon looking to the cause of death in these cases, we find that in upwards of 80 per cent. periproctitis, or peritonitis, is stated to have been the chief factor in producing the mortality.

Although the full details of Listerian dressings are inapplicable to these operations, a great deal can be done in the way of antiseptic treatment to obviate the above preventable complications; and the more fully we appreciate the advantages of closing the deep parts of the wound completely by sutures, thorough drainage, frequent washings with antiseptic solutions and dusting with boracic acid, the more likely are we

to still further reduce the death-rate. Volkmann states that amongst his early cases he lost a great number from septic inflammation, but since he has adopted better methods of wound treatment his results have been very much better. He advocates continuous irrigation of the wound with an antiseptic fluid, such as solution of salicylic acid, or carbolic acid, until granulation is established. Billroth, between the years 1860 and 1876, lost 13 out of 33 cases, and all the cases died of septic periproctitis and peritonitis.^a Cripps^b gives twenty-three cases within his own experience, of which four died. The statistics given by Heuck^c of the practice of Professor Czerny for a period of six years appear to be the best hitherto recorded. Of twenty-five patients operated on, only one died as a direct result of operation.

In many respects the history of rectal extirpation resembles the early history of ovariectomy; and it is highly probable that with increased care in wound treatment and operative detail the rate of mortality will be materially lessened. It is, therefore, at present premature to be guided too much by statistics.

Let us now consider what are the probabilities of complete cure; or, if recurrence takes place, how long will it be delayed? Billroth, in 1881, had only two cases in which the patients lived two years after the operation; and Allingham speaks with great caution, apparently not considering that life is even prolonged by the operation; on the other hand, Cripps found, that out of twenty-three cases, in nine the disease recurred after periods varying from four months to two years, and he was able to trace six that remained well at periods varying from two to four years. Curling^d had

^a Clinical Surgery. New Sydenham Society. 1881.

^b Loc. cit. P. 397.

^c Archiv. für klinische Chirurgie. Band XXIX. Heft 3.

^d Diseases of Rectum. P. 164. 1876.

one case in which there was no return after six years; Velpeau records two cases which were well after ten years; and Chassaignac has had similar experience; but, probably, the best results obtained by anyone are those of Volkmann.* He states that three times he has had complete cures, and several cases of very late recurrence; once after six years, once after five years, and once after three. One died of carcinoma of the liver eight years after operation without local recurrence, and one case remained well eleven years after the removal of a very voluminous and high-reaching mass; in this case local recurrences in the shape of hard nodules in the cicatrix occurred twice, and were removed. In Czerny's experience, according to Heuck, nine were alive at the time of publication of the paper, and free from relapse. Of these, two had survived the operation longer than four years, one had been operated on three years and nine months before, three were well after intervals of at least two years, one at the end of twelve months, and two at the end of six months; while in fifteen cases (60 per cent.) there was a local recurrence within one year.

Dieffenbach records thirty cases in which the patients lived many years after operation, but this statement is usually looked upon with suspicion. In my own practice one patient remains perfectly well and free from return nine years after operation, while another has continued six years without recurrence.

Although the total number of cases is as yet small, and the opportunity of judging whether many of the apparent cures will be permanent is insufficient, the results hitherto recorded will compare most favourably with the records of operation for cancer in other parts of the body, notably the tongue and breast, both as regards the prolongation of life, and the possibility of complete cure.

* *Sammlung klinischer Vorträge.* May 13, 1878.

As to the condition of the patient after recovery from operation, we must remember the horrible disease for which that operation was performed, and compare the condition before and after its removal. When the sphincter has not been removed, the amount of incontinence is usually trivial, and it is only when there is diarrhoea that any trouble arises. This is generally easily met by the use of an antiseptic pad. When the entire lower end of the rectum has been removed a considerable amount of control often is maintained, but even in the worst cases of incontinence met with after ablation of the rectum the result compares favourably with the usual artificial anus following colotomy, and is vastly preferable to the state of a patient suffering from advanced rectal cancer.

A more troublesome sequela of operation than incontinence is stricture, which in many of the recorded cases appears to have given a very great deal of trouble in those cases where it has been found impossible to draw down the gut and suture it to the skin. As the extensive surface heals by granulation the orifice gradually becomes constricted, and in the hands of some of the most skilful surgeons treatment by means of tubes, incision, or even colotomy has been required. If, however, a small strip of mucous membrane can be retained down to the anus, or the mucous membrane brought down and sutured to the skin, as in the procto-plastic operation of Amussat for imperforate rectum, this trouble is not likely to arise. The freedom from incontinence which some of these patients enjoy is very remarkable. In a case of my own there is a slight prolapse of mucous membrane which occludes the anus, and prevents escape of fæces, except during defæcation. As O'Beirne pointed out long ago, the rectum in health is empty, except immediately before the act of defæcation.

Recurrence of the disease usually takes place as nodular

masses in the cicatrix; or in the deep lumbar glands, liver, or other internal organs. When occurring in the cicatrix, a secondary operation is often attended with good results. And even where not suitable for removal, these secondary growths are usually much less painful than the primary disease, owing to the destruction of the sensory nerves of the region at the time of operation. Death from internal cancer is also considerably less painful than that from unchecked cancer of the rectum.

The most complete and accurate directions as to the selection and the details of operations for excision of rectal cancer when situated low down, are those given by Volkmann.^a He classifies the cases met with under three heads:—

1. Where there is a localised nodule of disease which can be removed by dilatation of the anus, and the wound closed by suture; this is not attended with difficulty unless situated high up. 2. Where the greater proportion of the rectal circumference, including the anus, is diseased; in this case the anus must be surrounded by an incision extending into the ischio-rectal fossa, the rectum dissected up, and amputated above the seat of disease. Volkmann, in the paper alluded to, recommends the bringing down and suturing of the divided rectal tube to the skin, drainage tubes being inserted between the stitches. 3. Where the disease is altogether above the anus, involving the entire circumference of the bowel. A deep posterior incision to the coccyx is the first essential procedure in this instance; the rectum is then incised round its circumference above the external sphincter, the bowel dissected up and amputated. This operation is open to an objection not applicable to the other two, namely, that as the blood-vessels supplying the lower portion of the rectum are of necessity divided, gangrene of this portion is

^a *Sammlung klinischer Vorträge.* May 13, 1878.

apt to occur. The field of operation has recently been much extended, and cancers extending further up the bowel can now be successfully dealt with.

The following description of the *operation of perineal excision* includes the principal points to be borne in mind. In order to prepare a patient for operation, a dose of purgative medicine should be given for a couple of nights before, and the bowel well emptied by a copious enema on the morning of the operation. The patient should be retained in the lithotomy position by means of Clover's crutch, and an incision carried deeply from the back of the anus to the coccyx. This is an exceedingly important part of the operation, as it gives full room for further manipulations; and has been called, not inaptly, by Allingham, the "key" of the operation. If the entire circumference of the bowel, including the anus, is diseased, incisions should be now carried well clear of the disease round the anus, and deeply into the ischio-rectal fossa, the attachments of the levatores ani divided, and the dissection carried upwards posteriorly and at the sides. This can be readily accomplished, but in front there is always considerable difficulty, owing to the close attachments of the rectum to the bladder and urethra in the male, and the vagina and uterus in the female. In the former the presence of a full-sized sound in the urethra will prove of much assistance, and in the latter the occasional introduction of the finger into the vagina will serve a like purpose. For dissecting the intestine free, a pair of blunt-pointed scissors will be found the most convenient instrument; and assistance may be gained by the use of a blunt hook, using it in the same way that a strabismus hook is used to hook up the ocular muscles in an enucleation of the eyeball. If the disease has not implicated the anus, or if a vertical strip of mucous membrane be unaffected, the preceding operation should be so far modified as to leave as

much normal tissue as possible, care being always taken that at least one quarter of an inch of healthy tissues surrounds the disease upon all sides. The dissection having been carried up to healthy tissue above the disease, the rectum is to be amputated. For fear of hæmorrhage this has frequently been done with the *écraseur*, the Paquelin cautery, or even the ligature; but as the part is so well under control bleeding need not be feared, and the section can be made much more cleanly with a pair of curved scissors. A number of catch forceps should be at hand to secure vessels as they are divided, but there is not likely to be any free bleeding until the last section is made, and then the arteries can be picked up, and tied generally without difficulty. An important question now to decide is whether any attempt should be made to bring down the gut and suture it to the skin wound. Cripps strongly advocates leaving the wound to granulate without the application of any sutures, his objection to the stitches being that they cut out before union takes place, and that while in place they produce little pouches outside the gut in which fluids will collect, and become septic; while leaving the wound entirely open, with the patient in the recumbent position, ensures absolutely free drainage. Other operators give similar advice; while Volkmann and Czerny recommend stitching, so as to diminish wound surface as much as possible, and by joining mucous membrane to skin to obviate the tendency to stricture. It appears to me that a great deal depends upon the way the sutures are put in. If they are simply put through the skin, and then through the gut, they will, when closed, make a cavity outside the rectum; but if they are passed deeply through the surrounding pelvic structures as well, these cavities cannot be formed, and as the strain will be then divided over a larger surface, the tension will be ~~taken~~ off the gut so much that they will be much more likely

to hold (Fig. 7). If two such sutures are passed on each side they will bring the gut well down if it has not been divided very high up, and a number of superficial sutures should then be put in to complete the adjustment of the skin and mucous membrane. I consider the deep closing of

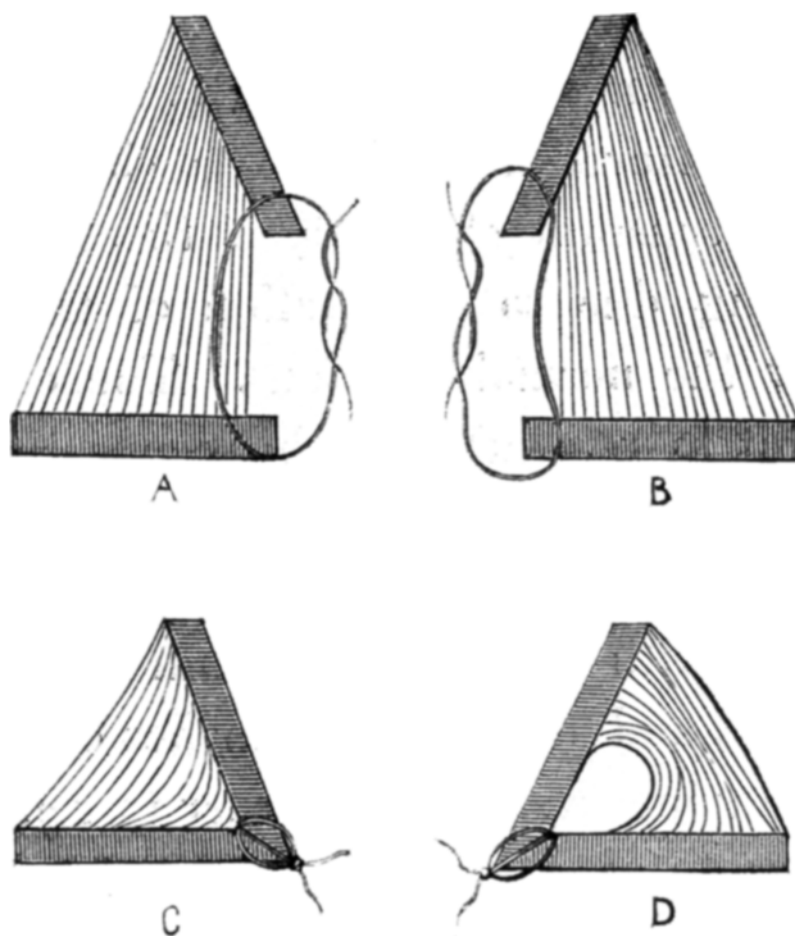


Fig. 7.—Diagram showing the method of passing Sutures.

A, Suture passed deeply ; C, the same suture closed ; B, suture passed through bowel and skin only ; D, the same suture closed.

the wound a most important element in the operative detail. After the operation an attempt may be made to keep back the fæces by plugging the gut with iodoform gauze or other similar antiseptic material, a catheter passed through the plug being left in the bowel to permit of the escape of flatus. If the gut will tolerate this plug, and it can be left *in situ* for a week or ten days, it will prove of enormous advantage, by permitting a complete adhesion of the gut to the perinæal wound to take place. The diet for the first fortnight after the operation should be carefully regulated, so as to leave as little solid residue as possible.

Complications of the Operation.—Wound of the peritoneum is of frequent occurrence, and careful anatomical measure-

ments have been made to determine the distance of the peritonæal pouch from the anus, so as to define the limits within which the rectum can with safety be removed. Such measurements are, however, comparatively useless. In the first place the measurements must vary with the different positions of the anus, and the amount of fluid in the bladder; and the relation of the serous covering to the bowel in health is no criterion whatever as to its state when the rectum is diseased, as the constant straining, if there is obstruction, and the dragging due to contraction of the cancer, will materially alter the normal relations. The only important anatomical point to remember in this connection is the fact that, in the female, the peritonæal pouch descends about an inch farther than it does in the male. Allingham states^a that he has met with peritoneum within two inches of the anus in a female, and removed five inches of gut in a man without ever having seen it. In order to render wound of the peritoneum less likely to take place, I have tried fully distending the bladder before operation, which I find has a much greater effect in lifting the peritoneum away from the bowel than the converse proceeding of distending the rectum has of clearing it away from the suprapubic region for lithotomy. This is manifestly of greater use in the male than in the female, and the distended bladder is more easily recognised and protected during operation than the empty one. Wound of the peritoneum does not, however, appear to be such a serious complication as some surgeons have thought. According to Heuck^b this accident occurred in eleven of Czerny's cases; in six of these the wound was sutured, while in the remainder the rent was left open, care being taken to join accurately the margin of the divided bowel to the skin, thus preventing extravasation. As Cripps,

^a Loc. cit. P. 281.

^b Loc. cit.

however, has pointed out, direct involvement of the peritoneum in the cancerous growth is a very serious complication, as it indicates such an implication of the lymph paths that recurrence of the disease cannot long be delayed.

Implication of the other pelvic structures is a very serious complication, and, when extensive, must be held to contraindicate operation. A slight involvement of the recto-vaginal septum, however, can easily be dealt with, the vaginal opening being either closed at the time of operation, or by a subsequent plastic procedure. Where, however, the bladder, prostate gland, and urethra are much involved, the prospect of useful interference is small indeed; although a case is recorded by Nussbaum in which a man was reported well three years after the removal of rectum, prostate, and neck of bladder;^a but such extensive operations have not since been frequently imitated.

Amongst the modifications of excision, the combination of colotomy with it is one of the most important. In a paper read at the Société de Médecine of Lyons, in May, 1884,^b M. Maurice Pollosson advocates the combination of laparocolotomy with extirpation of rectal cancer. He selects the left iliac region as the site for the operation, because there more readily than in the lumbar region can he close up the lower segment of the bowel, which closure he regards as a point of essential importance in the operation. This he does by invaginating some millimetres of the lower free end after dividing the bowel clean across, and closing up the opening completely by means of five or six catgut sutures, which thus bring into close apposition the serous surfaces. The artificial anus is completed by suturing the upper extremity of the bowel carefully into the wound. After the patient has recovered from this operation he proposes to extirpate

^a Bayr., ärztz. Intelligenzblatt. November, 1868. Quoted by Van Buren.

^b St. Louis Courier of Medicine. July, 1884.

the cancerous mass, which, by virtue of the preliminary operation, is practically removed from its relations as a part of the digestive tract, and converted into a pelvic tumour. Operating under the conditions so brought about, it is possible to apply the principles of antiseptic surgery much more thoroughly and efficiently than in the conditions existing without such a preliminary operation. In most cases he believes that it would be advisable to allow the patient to recover from the effects of the first operation before performing the second; though in certain cases he thinks that circumstances might be such as to make it better to go on and extirpate the cancerous mass at once after establishing the artificial anus.

Mr. James E. Adams has recommended^a the performance of lumbar colotomy as a preliminary measure in all but the very slightest cases, and as soon as the patient had recovered from this to excise the rectal cancer from the perinæum. The advantages of diverting the fæces from the wound during healing, and from the recurrent growth, should it take place, are sufficient in his opinion to quite justify the additional operation. In a case in which he performed the double operation, and in which the patient was under observation for two years subsequently, he states that the advantages were very obvious. Although a recurrence took place six months afterwards, the patient was quite unaware of its existence. The annoyance was so trivial, he contends, that by adopting the course indicated, any patient might pass through all the phases of this horrible and fatal malady with scarcely any pain at all.

I should not be disposed to adopt either of the above modifications except under very special circumstances, as the advantages of retaining the fæcal outlet in the perinæum are very great.

^a British Medical Journal. Aug. 15, 1884.

The Removal of Cancers situated high up.—There is a class of cases which, as Volkmann has well described, are too high for removal from the perinæum, and too low for removal by laparotomy. Dr. P. Kraske, of Freiburg,^a communicated to the German Surgical Congress a method which he had worked out on the cadaver. According to him access to the upper part of the rectum is made far easier by splitting the soft parts in the middle line from the second sacral vertebra to the anus, dividing the muscular attachments to the sacrum as far as the edge of the bone on the left side; excising the coccyx, and then dividing from the sacrum the attachments of the two sacro-sciatic ligaments, and drawing away the left edge of the wound. Still further access to the upper portion of the rectum is gained by chiselling away a bit of the lower left side of the sacrum. If the bone be divided in a line beginning on the left edge at the level of the third posterior sacral foramen, and running in a curve concave to the left through the lower border of the third posterior sacral foramen, and through the fourth to the left lower corner of the sacrum, the more important parts, especially nerves, are not injured; and the sacral canal is not opened. The upper portions of the rectum thus become so accessible that the rectum can be brought into full view and amputated without difficulty up to where it passes into the sigmoid flexure. Further, this procedure admits resection of the upper rectum with preservation of its lower end. Kraske tried this method on the dead body in a case of high rectal cancer; and then twice on the living subject. Once in a debilitated woman, aged forty-seven years, the cancer commenced a short distance above the anus, while its upper end could not be felt. The rectum was amputated (with avoidance of the sphincter) where it was wholly surrounded by peritoneum. The patient made a good recovery. His

^a *Annals of Surgery.* Vol. ii., p. 415. 1885.

second case was in a man, aged thirty-seven years; the lower extremity of the disease could just be reached with the finger. A portion of the lower bowel was spared, though divided posteriorly. The gut was pulled down, and the anterior two-thirds united by suture. The lower (posteriorly open) portion was closed later by a plastic operation.

Kraske's paper has opened up a field of operation in cases which before were considered quite inoperable, and his method has now been frequently adopted, and modified in several important details, particularly by the German surgeons. The method adopted by Bardenheuer (Volkmann klin. Vorträge, 296) appears at once the simplest and most satisfactory. An incision is carried from the back of the anus to the middle of the sacrum, the muscles divided from the sacrum, and the sacro-sciatic ligaments cut through; the sacrum is now cut through transversely at the level of the 3rd sacral foramen, and the posterior surface of the rectum cleared in the superior pelvi-rectal space (above the levatores ani, with their fascial coverings). As the whole hand can now be introduced into the pelvis, the bowel can be explored up to the sigmoid flexure if necessary. If the disease is situated entirely above the attachment of the levatores ani, the resection of the diseased bowel with circular suture of the intestine is indicated, or, where the anus is involved, this portion can be extirpated and the upper lumen of the bowel brought down and sutured to the most convenient portion of the incision.

I have adopted the trans-sacral extirpation of rectal cancer in three cases, in all of which a successful result was obtained. Of one of these (No. 10 in Table) I will give the details, as it may be taken as a typical case of the operation for high situated cancer:—

A woman, aged thirty, had suffered from symptoms of rectal cancer for eight months, with gradually increasing obstruction,

which at the time of her admission to hospital had almost become complete. Digital examination revealed a ragged, ulcerated surface entirely surrounding the rectum, commencing immediately above the anus and extending higher than the finger could reach. The tumour was freely movable in the pelvis, and its upper limits were made out by bimanual examination. An incision was made from the back of the anus to the middle of the sacrum, and the muscles and ligaments divided from the bone. The sacrum was now divided through the 4th bone, an American pruning shears being used for this purpose, which did the work much more rapidly than a saw, and without the crushing of an ordinary bone forceps. The piece of bone was removed and the rectum cleared with fingers and scissors. This portion of the operation is much more easily done from above than from below the levator ani muscle. As the anus was involved it was surrounded by an elliptical incision, and the entire rectum dissected free. In doing this the peritoneum was opened anteriorly. The rectum was divided close to its junction with the sigmoid flexure, about one inch above the highest limit of disease. As the strain would have been too great to bring down the gut to the normal position of the anus, it was brought out at the upper angle of the wound, where it was secured without undue tension in the position formerly occupied by the base of the sacrum and upper bone of coccyx. The peritonæal wound was adjusted by fine catgut suture, and the entire perinæal wound, including the former position of the anus, was carefully closed by a series of deep sutures passing under the bottom of the wound, and a few superficial stitches where required to adjust the skin accurately. Primary union ensued through the entire wound without a single drop of suppuration. The patient suffers little inconvenience from her sacral anus, as she has a very considerable power of continence. The tumour removed is illustrated (Fig. 3). It proved to be a colloid carcinoma.

Subjoined is a table of cases of excision of cancer from my own practice. The cases subjected to excision constitute only a small proportion of the entire number of cases of cancer of the rectum coming under notice. The vast majority, when presenting themselves, having such extensive pelvic adhesion that they were deemed inoperable, except where obstruction was marked when colotomy was undertaken.

Cases of Resection of Rectum for Malignant Disease.

Name	Date	Sex	Age	Hospital	Private	Method	Pathology	Result	OBSERVATIONS
1. B. M'L.	Nov. 1st, 1884	F.	60	H.	—	Post linear incision	Melanotic sarcoma	R.	Perfectly well, and able to earn living as a cook 8 years afterwards
2. Dr. N.	Oct. 5, 1886	M.	65	—	P.	do.	Cylinder-celled epithelioma	R.	Perfectly free from recurrence 6 years after operation
3. W. F.	Nov. 21, 1887	M.	62	H.	—	do.	do.	D.	Septic peritonitis
4. M. D.	July 16, 1889	F.	48	H.	—	do.	do.	R.	Vaginal septum implicated and removed; recurred in suture points 6 months subsequently
5. Mrs. M'K.	Oct. 18, 1889	F.	70	—	P.	do.	do.	R.	Died suddenly a year subsequently; no evidence of recurrence
6. Mrs. F.	Jan. 5, 1890	F.	60	—	P.	do.	do.	D.	Died of shock same day
7. Miss H.	Feb. 22, 1890	F.	45	—	P.	do.	do.	D.	Septic peritonitis
8. Mr. A.	Feb. 18, 1891	M.	55	—	P.	Transverse division of sacrum	do.	R.	Recurred as abdominal carcinoma a year subsequently
9. O. R.	March 19, 1892	M.	70	H.	—	do.	do.	R.	—
10. B. C.	Feb. 2, 1893	F.	26	H.	—	do.	Colloid cancer	R.	Continence good
11. Mr. A.	May 15, 1893	M.	60	—	P.	Perineal incision	do.	R.	Occurred in cicatrix of fistula operation

COLOTOMY.

The history of this operation is in many respects one of interest. Although it is upwards of a century and a half since it was first proposed, it is only within the last thirty years that it has been practised upon at all a large scale, as a means of obviating death in one of its most painful forms, viz.—by intestinal obstruction; and its present position as a recognised operation is mainly due to the efforts of English surgeons, notably Curling, Bryant, and Allingham. Apparently the first suggestion of the operation was made by Littré in the year 1710, but it does not appear that he performed colotomy; and it was not till sixty years afterwards that the operation was actually performed on the living subject by Pillore, of Rouen, who opened the cæcum in the right inguinal region. The dread of wounding the peritoneum, which, with our ancestors, was so great, suggested to Callisen the possibility of opening the descending colon, where it was uncovered by peritoneum in the left loin; but failing in this intention on the dead body, he does not seem to have attempted it on the living. In 1797 Fine, of Geneva, opened the transverse colon by an incision in the umbilical region. Subsequently Amussat published six cases, in which he was able to open the colon without wounding the peritoneum, five of these cases terminating successfully; and since then the operation of lumbar colotomy has borne the name of this distinguished surgeon, and is universally recognised as “Amussat’s operation.”

As the object of this procedure is to provide an alternative outlet for the intestinal contents, through which more or less incontinence of fæces is a necessary result, it follows that the condition of the patient afterwards is by no means pleasant to himself or those about him: it is, therefore, only to be undertaken in cases in which the indication is very

clear, and after the patient has been fully told of the inevitable result of the operation. In the case of imperforate infants, where perinæal incision has failed, it is the duty of the surgeon to lay the case fully before the parents, telling them that life may be possibly saved by means of colotomy, whereas without it death is certain. The onus of deciding for or against colotomy should be thrown on the parents in cases of imperforate rectum; but where the patient is an adult, suffering from obstruction, he alone must decide. In the latter case the pain and distress is usually so extreme that the sufferers generally gladly accept the conditions, and when the case is successful in relieving urgent symptoms, are loud in their thanks for the relief obtained. The surgeon has no right in these cases of his own motion to act as the arbiter between life and death; and, if he fail to recommend colotomy in urgent cases, is, in my mind, as guilty of dereliction of duty as if he refused to sanction tracheotomy for the relief of a patient suffering from obstructed glottis.

It is necessary to clearly indicate the conditions calling for this operation, and they may be conveniently grouped under the following heads:—1. Congenital malformations which cannot be relieved by perinæal incision. 2. For the relief of distress attending recto-vesical fistula. 3. For obstruction, the result of (*a*) pressure of tumours; (*b*) cancer of the bowels; (*c*) non-malignant strictures, which are of such an extent as to preclude perinæal operation. 4. As a means of treating extensive ulceration, by providing physiological rest to the part.

Operation of Lumbar Colotomy, Amussat's Operation.—This operation, which used to be the one most frequently recommended, and has until recently been generally adopted in all cases of obstructive disease of the rectum in the adult, is one of some little difficulty to the inexperienced operator; and it is therefore essential to bear in mind the anatomical land-

marks which indicate the position of the descending colon, in order to avoid the accidents which have not unfrequently happened during its performance. Allingham has directed special attention to this subject.^a He says: "The anatomical guide to the position of the ascending or descending colon is the free edge of the quadratus lumborum muscle, but this is by no means always easily found, and consequently it is better to substitute a more certain and unmistakable guide; and this may be obtained by marking a spot on the crest of the ileum fully half an inch posterior to a point midway between the two superior spinous processes. From more than fifty dissections and the experience of over eighty operations of my own and others, I can confidently assert that the colon is always normally situated opposite this point. Before operating I mark this spot with ink or iodine paint, and I have always found it, when the superficial structures are divided, a most useful landmark and guide to the exact position of the intestine."

The vertical incision of Callisen, and the transverse incision of Amussat, gave place to the oblique incision as recommended by Bryant, and for it the following advantages are claimed: More room is afforded for manipulation; the incision taking the course of the vessels and nerves lessens the liability to their injury; that, following the ordinary integumentary fold when the patient is recumbent, it facilitates repair and tends to prevent prolapse of the bowel.

Before operating the bowel should be as completely emptied as possible by means of laxatives, and an enema, if the obstruction is not complete. The patient should lie in the semiprone position, with a small, hard pillow under the opposite loin. An incision should now be made parallel to the last rib on the left side, midway between this bone and the crest of the ileum; the centre of this incision, which

^a Diseases of the Rectum. P. 302. Fourth edition.

should be about four inches in length, should correspond with Allingham's point. The incisions are now carried deeply, some fibres of the latissimus dorsi and posterior edge of external oblique muscles being divided; and the edge of the quadratus lumborum muscle and lumbar fascia next looked for. The fascia when found should be freely divided, and probably also a little of the outer edge of the quadratus lumborum. The fascia transversalis is now met with and divided, and the subperitonæal fat exposed. If the gut does not now present in the incision, two pairs of dissecting forceps should be taken, and with them the little masses of fat pulled asunder, and the search prosecuted, the most usual mistake being that of looking for the bowel too far forward. If any difficulty still be experienced, the body should be rolled a little forward; and at the same time air may be injected into the rectum by means of Lund's insufflator. This will usually have the effect of rolling the bowel into the wound. The colon thus reached and having been identified, deep sutures may now be passed through the entire thickness of the abdominal wall, and through the posterior wall of the colon. A longitudinal incision is now made in the gut, the loops of the sutures hooked out, cut, and tied, and as many more sutures as may be necessary to completely adjust the skin and mucous membrane put in. Immediately after opening there is often a free discharge of fæces; while at other times, especially if the bowel has been first well cleared, no fæces may pass for several days. In one of my cases nothing passed till the sixth day; and my friend, Mr. Thomson, tells me that in a case upon which he operated nothing passed for seventeen days. It is a considerable advantage when this is the case, as it permits of healing of the wound to take place quietly without disturbance. A pad of tenax, or other absorbent antiseptic material, should be kept applied, and changed whenever the bowels move; and it will much con-

duce to the comfort of the patient and those around him if large doses of charcoal are administered internally, which, in addition to making the motion harder, tend to remove the odour. I have recently tried for this latter purpose naphthaline in two grain doses, given wrapped up in wafer paper, and found it answer admirably as a deodoriser.

At first there is no control whatever over the motions, and the patient is very miserable if there is any tendency to diarrhœa ; but, later on, if the bowels are kept moderately costive, there is usually but one motion in the twenty-four hours, and, although the patient has no power to restrain it, he knows when it is coming sufficiently long beforehand to make the necessary preparation, and with an absorbent pad comfortably adjusted he is then tolerably comfortable. At any rate, the freedom from pain, and frequent straining, contrast now most favourably with the antecedent miseries of rectal obstruction.

Accidents during and consequent on Operation.—Wound of the peritoneum is of frequent occurrence ; and when there is a meso-colon present, its injury is inevitable. If the opening is at all free, prolapse of small intestine is likely to take place, and considerably complicate the operation. In such a case the proper course would be, having reduced the prolapse, an aseptic sponge should be plugged into the wound, and the search for the colon prosecuted, and as soon as it is found the peritonæal wound must be carefully closed before attempting to open the bowel.

In some cases the operator has failed entirely in finding the colon, some portion of the small intestine being opened in its place. It is hard to imagine how this accident has occurred on the left side, because the small intestine could only be reached after the peritoneum has been opened, and under these circumstances the appearance of the longitudinal bands and appendices epiploicæ are so characteristic of the

large intestine that with ordinary caution the distinction should easily be made. On the right side the mistake of opening the duodenum instead of the colon appears to me to be a much more real danger. One of the most experienced colotomists at present living has candidly admitted that this accident has occurred in his practice.

During the after treatment one of the greatest dangers is the occurrence of diffuse inflammation and suppuration along the areolar spaces of the abdominal wall. I have seen very extensive sloughing of the skin of the loin follow an operation of this kind.

Although it is impossible, from the nature of the wound, to follow strictly the rules of antiseptic surgery, much may be done in this direction with corrosive sublimate solution and iodoform; but the most important of all measures, I believe, is the accurate suturing of the mucous membrane to the skin, and thus preventing extravasation of fæces.

During the after treatment also, a collection of fæces in the lower segment of the gut is a troublesome complication. When occurring to any extent it may produce, as Bryant has pointed out, symptoms of intestinal obstruction, notwithstanding the fact that an outlet for fæces exists higher up; and even where this is not the case the irritation in cases of malignant ulceration defeats to a great extent the object of the operation, while in cases of vesico-intestinal fistula the trouble is even more exaggerated. In order to remedy this, several suggestions have been made:—(1) to pass the sutures deeply, so as to include the entire thickness of the bowel instead of its posterior aspect only. As this, however, necessitates the passage of the sutures across the peritonæal cavity it does away with the sole advantage claimed for lumbar colotomy. (2) It has also been attempted to bring out a knuckle of intestine at a very acute angle, in the hope that in this way a spur might be formed similar to that

which is found in artificial anus following hernia. (3) The only proceeding, however, by which the advantages of lumbar colotomy can be combined with absolute closure of the lower segment is by means of the operation recommended by Mr. Thomas Jones.^a He detached the mucous membrane from a prolapsed portion of gut, and from the lower margin of the colotomy opening, turning it on itself, and attaching the raw surfaces by means of catgut, and afterwards brought together the surfaces denuded of mucous membrane. No fæcal matter passed beyond the opening after this procedure had been carried out. Of course it is obvious that no attempt to close the lower opening should be contemplated when there is a possibility of establishing at some future date the normal exit for fæces.

Another troublesome after complication is prolapse of the bowel through the artificial anus. This is frequently due to the continued expulsive effort trying to get rid of the accumulation of fæces in the lower portion of the bowel. It is to be treated by the adjustment of a well-fitting pad, and, if possible, by the closure of the lower orifice. In a case of recto-vesical fistula, in which lumbar colotomy had been performed, I found this method answer admirably.

In common with all other extensive wounds of the abdominal parietes, hernia may occasionally occur. Of this accident Mr. Simpson records an instructive example.^b Upwards of four years after the operation of colotomy, the patient felt something suddenly give way while coughing, and a tumour appeared immediately below the artificial anus, and he died in two days. At the *post-mortem* the tumour was found to contain a large loop of ileum in part gangrenous.

*Operation of Inguinal Colotomy (Littre's Operation).—*Under

^a British Medical Journal. April 24, 1886. P. 782.

^b British Medical Journal. May 23, 1885. P. 1039.

this head is usually described the operation of opening the cæcum, or sigmoid flexure, by an incision in the right or left groin. It is with the latter alone that we are at present concerned in considering the treatment of rectal disease. It is, of course, obvious that in this procedure the peritoneum is necessarily injured. It is performed by making an incision through the muscular coats of the abdomen parallel to Poupart's ligament, and then drawing forward a loop of large intestine, securing it to the wound, and opening the bowel between the points of suture; the subsequent treatment being similar to that of lumbar colotomy. The operation has been pretty generally selected in preference to the retro-peritonæal procedure in cases of imperforate rectum, because in these cases the colon is very hard to find from behind, and is frequently attached by a meso-colon, which would necessitate a peritonæal wound.

Statistics of the Older Methods of Colotomy.—The most comprehensive record of cases of colotomy hitherto published is that by Dr. W. R. Batt;^a and the following is his analysis of cases, slightly condensed: Of a total of 351 operations, 154 were performed for malignant disease, 20 for fistula, 52 for imperforate anus, 40 for obstruction, 72 for stricture, 4 for ulceration, and 9 for miscellaneous causes. The recoveries were 215, deaths 132, equal to a mortality of 38 per cent., the result of 4 cases being unrecorded. Of these, the number of operations performed by Amussat's method was 244: 165, or 68·2 per cent., recovered; 31·8 per cent. were fatal; and the result in 2 cases is unrecorded. After Littré's method 82 operations were performed: of these, 38, or 46·9 per cent., recovered, and 43, or 53·1, proved fatal, the result in 1 case being unrecorded. After Callisen's method 10 were operated upon, 2 of which recovered, 7 were fatal, and in 1 the result is not stated. Four cases were performed by Fine's method,

^a *American Journal of Medical Sciences.* Oct., 1884. P. 423.

all of which are recorded as having been successful. In one fatal case a T-shaped incision was adopted, while in 10 the method of operating was not stated. Of these, 6 recovered and 4 proved fatal. Of the total number, 160 were males, 147 females, and in 44 the sex was not given. Of the 154 cases operated on for malignant disease, 105, or 68·4 per cent., recovered; 48, or 31·6 per cent., were fatal; and in one case the result is not stated. The patients in 72 instances were males, in 74 females, and in 8 the sex was not mentioned. Following Amussat's method were 124 cases, of which 91, or 73·5 per cent., recovered, and 33, or 26·5 per cent., were fatal. According to Littré's method there were 23 cases, with 12, or 52·2 per cent., recovering, and 11, or 47·8 per cent., proving fatal; of the 4 cases following Callisen's method all proved fatal, and Fine's case recovered. Of the 2 in which the method was not stated, 1 recovered and 1 died. The ages of the patients were as follows: 20 to 30 years, 22; 30 to 40 years, 22; 40 to 50 years, 30; 50 to 60 years, 29; 60 to 70 years, 18; over 70 years, 2; while in 31 cases the age was not given. With regard to the duration of life after operation in malignant cases, Dr. Batt has published the following details of cases in which the patients recovered from the immediate effects of operation: 13 died within six months, 15 between six months and one year, 10 died between one and two years, 8 died between two and three years, and one died four and a half years after operation. Of 20 cases operated on for fistula, 18, or 90 per cent., recovered, 2 alone proving fatal. Following Amussat's method were 17 cases, with 15 recoveries, and 2 deaths; and by Littré's method one case, which terminated favourably. The method of operating is not mentioned in two cases which recovered. Of the 52 cases operated on for imperforate anus, 24, or 47·1 per cent., recovered; and 27, or 52·9 per

cent., were fatal; and the result in 1 case is not stated. Following Amussat's method were 12 cases, 6 recovering and 6 ending fatally; and following Littré's method were 34 cases, 17, or 51·5 per cent., of which recovered; 16, or 48·5 per cent., ended fatally; and there is one case in which the result was not given. Five cases were operated on after Callisen's method, 1 of which recovered and 4 died. In 1 fatal case the method is not mentioned. Of 40 operations for obstruction, 19, or 50 per cent., recovered; 19 died; and in 2 the result was not mentioned; 24 were performed by Amussat's method, of which 13, or 59 per cent., recovered, 9 terminated fatally, and in two the result is not mentioned. Eleven cases were performed after Littré's method, of which 3 recovered and 8 proved fatal; and 3 are recorded by Fine's method, all of which recovered; in one case in which the method is not stated, and in one case in which a T-shaped incision was made, a fatal result followed. Of the 72 cases operated on for stricture, 41, or 57 per cent., recovered, and 31, or 43 per cent., ended fatally. Following Amussat's method were 59 operations with 35 recoveries, 59 per cent., and 24 deaths. After Littré's method were 10 cases, with 4 recoveries and 6 deaths. Callisen's method was performed in one case which recovered, and two cases are given in which the method is not mentioned, one terminating in recovery, the other fatally. Of the 4 operations performed for ulceration, 3 terminated in recovery and 1 in death. All were performed after Amussat's method. And of 9 patients operated on for miscellaneous causes, 5 recovered and 4 died. Amussat's operation was performed in 4 cases, Littré's in 2, and in 2 the method is not mentioned.

Arranged in a tabular form showing the various forms of operating, we find the following convenient summary condensed from Batt:—

Form of operation	Cases	Result not ascertained	Recovered	Died	Mortality per cent of terminated cases
Amussat .	244	2	165	77	31·8
Littre .	82	1	38	43	53·1
Callisen .	10	1	2	7	77·7
Fine .	4	—	4	—	0·0
Not stated .	11	—	6	5	45·4
Total .	351	4	215	132	38·0

According to these statistics, the mortality of inguinal colotomy is 20 per cent. greater than that of the retro-peritonæal operation. According to Erckelen's statistics,^a the mortality shows a difference of 10 per cent. in favour of Amussat's operation. I think, however, that it will be admitted that statistics of this kind, which are collected from published cases, are at all times misleading; but especially is this the case in the instance at present under consideration, for in the first place the inguinal operation has been selected in a large proportion of the total number as a treatment for imperforate rectum, and frequently not adopted until after an extensive exploration from the perinæum, when the patient was nearly exhausted. And, again, as these statistics contain the records for many years back, they embrace a period when peritonæal surgery of all kinds was in a very different condition from that in which it is at the present day, so that I think the time has come when the relative merits of both operations may be fully discussed without our being too much influenced by the results obtained under the older methods of wound-treatment, and at the present day the verdict in favour of anterior colotomy is, amongst modern surgeons, almost universal. The unquestionable advantages of laparo-colotomy are these: 1. It permits a thorough exploration of the abdominal cavity, which may

^a Archiv. f. klin. Chir. Langenbeck. P. 41. 1879.

enable the surgeon in some instances to perform a more radical operation for the complete removal of the disease, and if removal is impracticable it ensures that the opening is made above the seat of obstruction instead of below, as has happened with the lumbar operation. 2. The large intestine is found with ease and certainty. 3. A complete operation for closure of the lower lumen when considered necessary can be much more readily and completely carried out, thus making the artificial anus a *terminus*, and not a lateral outlet to the intestine. 4. A shorter distance of intestine intervenes between the opening and seat of disease. 5. The abdominal wall being thinner in front, the extent of wound surface is less, and the finer skin in the front abdominal wall permits a much more accurate coaptation of skin and mucous membrane. 6. The position of the wound is much more convenient for the patient, and it is interfered with less by the clothing. 7. A largely decreased death rate. So then the sole disadvantage of laparo-colotomy is that now exploded surgical bugbear, wounding of the peritoneum; and it must be remembered that even in the hands of skilled colotomists wound of the peritoneum in the lumbar operation has not unfrequently taken place. It is manifestly easier to deal with a peritonæal wound, advisedly and carefully made, than with an accidental opening at the bottom of a rather deep incision.

Delayed opening of the Intestine. “Operation à deux temps.”—The unequivocal advantage which has been found to follow the division of the operation of gastrostomy into two stages has naturally suggested a similar manner of proceeding in colotomy; and cases have recently appeared in which both laparo-colotomy and lumbar colotomy have thus been performed. In a communication made to the Clinical Society of London by Mr. Davies Colley,^a three cases are recorded in which the lumbar operation was performed in two

^a *Lancet*. March 21, 1885.

stages, the intervals being one, four, and six days respectively. It would appear from these cases that the procedure necessary to retain the loop of bowel in the wound was attended more or less with symptoms of intestinal strangulation, and in order to minimise this result as much as possible, Mr. Davies Colley has devised a form of clamp, in which two pairs of ivory studs placed on steel bars are made to grasp the bowel at two places, and by this means the loop of intestine is held without being strangulated, until sufficient healing of the wound has taken place to obviate any risk of extravasation. In two out of the three cases this instrument was used, and the resulting constitutional symptoms are described as being trivial.

The analogy between gastrotomy and colotomy, however, scarcely holds, because the mere fact of retaining a small portion of the stomach wall in the abdominal wound can have no direct influence one way or the other on the œsophageal disease for which the operation has been undertaken; while in the case of the colotomy a certain amount of obstruction will probably have existed before the operation, which will be increased by the drawing out the loop of intestine.

I operated on a case of rectal cancer in November, 1884, by laparo-colotomy, having chosen this operation deliberately, as, in view of modern surgery preferable to lumbar colotomy. A loop of the sigmoid flexure was drawn out, emptied by pressure upwards from the seat of obstruction, and caught between two clamps; it was now divided between the clamps; the wall of the lower segment was inverted so as to bring the peritonæal surfaces into apposition, and carefully sutured up, and the upper orifice was stitched to the wound. This patient lived for two years and a fortnight after the operation. Until a short time before her death she was able to go about and attend to the artificial anus without help; the bowels moved but once a day, and she was conscious that the

motion was coming sufficiently long beforehand to make all the necessary preparations.

I have now performed laparo-colotomy thirteen times altogether, and all of them recovered completely from the operation. I might have increased this number considerably had I advised the operation as a routine practice in cases of rectal cancer too advanced for excision. I have only recommended colotomy in cases where obstruction was a prominent symptom, or where some complication, as vesical fistula or extreme pain from involvement of anus, was present. I am satisfied that the majority of cancer cases which have passed the period for useful excision, will go on to their fatal termination quite as easily and slowly without colotomy. If, however, obstruction or other complication arises it is the surgeon's duty to recommend the operation.

The writings of Mr. Cripps and Mr. H. Allingham have done much to popularise this operation, and I cannot conceive anyone who has had experience of anterior colotomy again resorting to lumbar colotomy, except, possibly in cases of extreme meteorism, and even under these circumstances, if the incision is kept small, and a sponge at once introduced into the peritoneum prolapse of small intestine can be readily controlled.

Much has been done to simplify this operation. It can now be done with the greatest ease and rapidity, while the mortality inherent to the operation has been reduced to the most insignificant proportions. Instead of making the inguinal incision, recommended by most authors, I am convinced that the left linea semilunaris is the best position. It is the thinnest portion of the abdominal wall, and as frozen anatomical sections show, the sigmoid flexure usually lies against this line, and presents in the wound the moment the peritoneum is opened. No muscle is wounded, so that the wound can be brought accurately together, lessening the risks of abdominal hernia and extensive prolapse subsequently. If the incision

does not extend lower than a line joining the umbilicus with the middle of Poupart's ligament, the deep epigastric artery will not be injured.

Method of performing Laparo-Colotomy.—I have now quite discarded the use of any clamp, and conduct the operation as follows:—Make a short incision ($1\frac{1}{2}$ to 2 inches) along the outer border of the left rectus abdominis muscle, so that the lower termination is above a line joining the middle of Poupart's ligament with the umbilicus; divide the tendinous structures of the linea semilunaris and peritoneum the entire length of this wound; introduce a small aseptic sponge into the peritonæal cavity, and stitch with fine catgut the peritoneum to the skin by continuous suture all round the wound. If the colon does not directly appear in the incision, introduce a finger and feel for the sigmoid flexure as it passes over the brim of the pelvis; the colon can be recognised readily by the longitudinal bands and appendices epiploicæ. Pull out now a good loop of the colon; if there is difficulty in doing this from too short a meso-colon replace the loop first caught and take a piece higher up the sigmoid flexure where the meso-colon is longer; with a curved needle pass a strong double sterilised silk suture through the entire thickness of the abdominal wall about one inch from the margin of the wound, through the centre of the meso-colon and again through the abdominal wall, bringing it out at a corresponding point at the opposite side of the wound; remove now the sponge from the interior, and tie the double suture on each side tolerably firmly over lead buttons (see Fig. 8). A single stitch is now passed through either angle of the wound, including the longitudinal muscular band, but not the mucous membrane of the gut; the wound is now covered with boracic acid, taking care to well fill the angle between the gut and the abdominal wall. The operation can now be completed at once by cutting off the protruding portion and suturing the

mucous membrane evenly to the skin all round, or the opening of the gut may be left for a few days until adhesions have taken place. I have never experienced any ill effects from opening at once, and where obstruction is very marked, or if there is much meteorism, it has obvious advantages. If, however, there has not been urgent obstruction the removal of the protruding intestine may be delayed for a few days; and it is very remarkable the absolute insensibility of the gut, the patient being completely free from pain while it is being cut off with a pair of scissors. Absolutely reliable

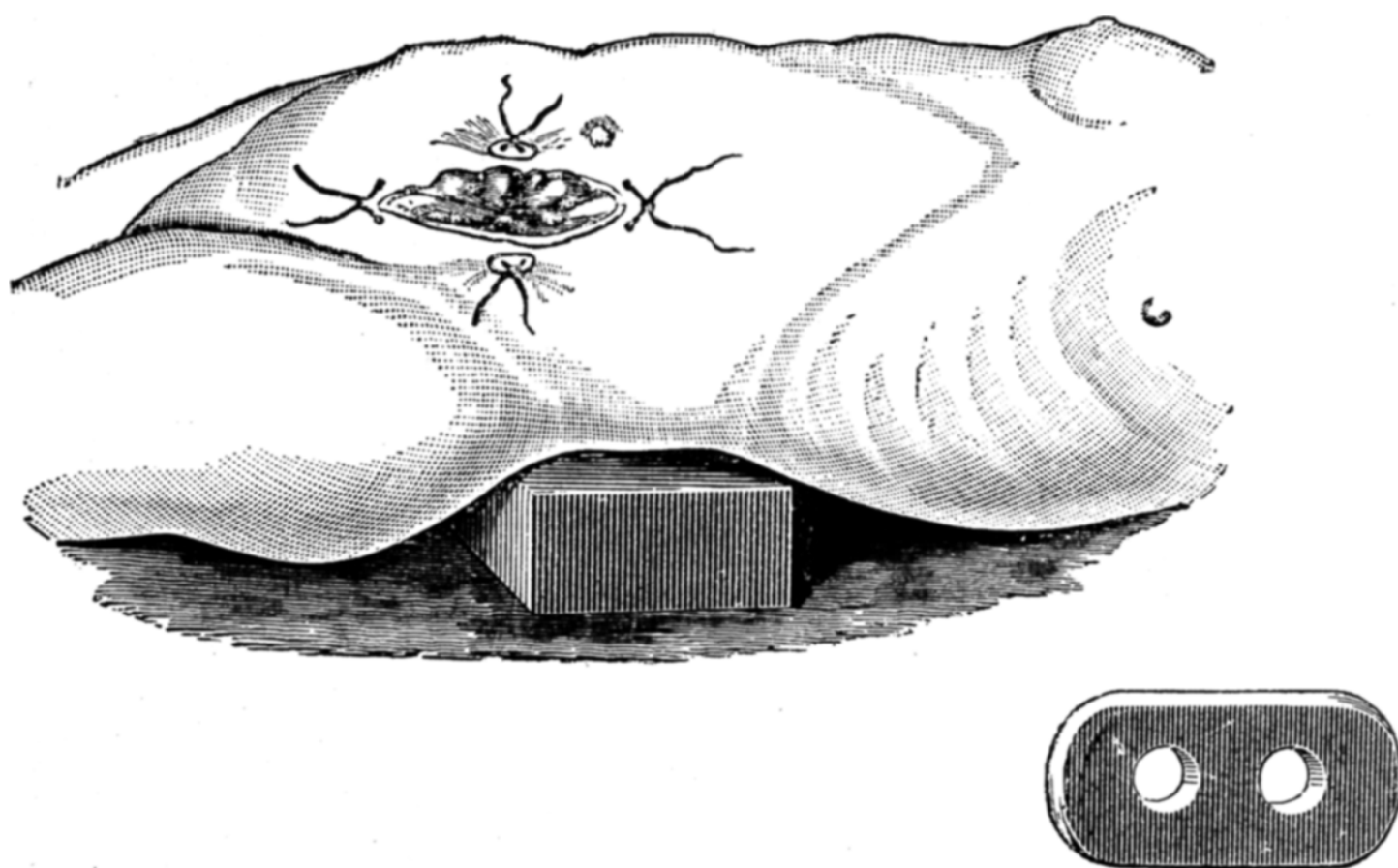


FIG. 8.—Author's method of performing Laparo-colotomy in the left Linea Semilunaris with fixation of the gut by leaded button suture through the meso-colon.

antiseptics are, of course, indicated at all stages of this operation. The after-treatment of laparo-colotomy is similar to that of lumbar colotomy.

Some surgeons have, in the endeavour to still further simplify this operation, used less perfect methods of suturing, or even dispensed with sutures altogether, relying on a pin or probe passed through the meso-colon and resting on the abdominal wall on either side of the incision to retain the

loop of gut. Such a method is highly dangerous, and has been attended with fatal consequences (Kelsey, *New York Medical Journal*, Feb. 18, 1893), hernia of the small intestine taking place beside the colon; while, on the other hand, when not sufficiently secured by suture, the colon has slipped back into the abdominal cavity. If the directions above given are adhered to neither of these accidents could possibly occur, provided the wound is not longer than two inches. If from extreme thickness of the abdominal wall it is necessary to make the incision longer than two inches it would be wise, as a precaution, to pass a few additional points of interrupted suture through skin and mucous coat of the bowel.

Prognosis.—In estimating the probable result of colotomy, it is necessary to carefully classify the cases. Where the operation has been performed for malignant disease, the duration of life can only be prolonged to a certain extent, the disease progressing, and ultimately proving fatal. According to Batt, in 32 per cent. of the cases operated on, death was apparently directly due to the operation when performed for malignant disease; and of 105 that recovered, and whose subsequent history was traced, it was found that six died within two months of the operation, seven died between three and six months after operation, fifteen died between six months and one year, ten died between one and two years, eight died between two and three years, and one died four and a half years after operation. Of thirty-two patients recorded as being well after the operation, only one had survived two years, and one, one year. It is, of course, obviously impossible to form any estimate of how long these patients could have lived if colotomy had not been performed. In my own practice I have performed colotomy sixteen times. For rectal cancer in three cases the lumbar operation was selected; one of these patients lived six months, another three years, and one two years; and in thirteen in which

laparo-colotomy was selected, one lived three years, two, two years, three died during first year, while three died four weeks after operation from extension of disease, the wound being quite healed; four are at present alive.

It has, however, been suggested that this operation has a direct influence in checking the growth of disease. There is in the Hunterian Museum a very beautiful specimen (Fig. 9), No. 2591, taken from a case of colotomy of 30 years' standing, in which the mucosa of the rectum below the opening has undergone atrophy and become villous, these changes being apparently the result of disuse. It is claimed that, as the form of cancer usually found in the rectum is so completely formed of glandular tissue, the abrogation of function of the rectum induced by the colotomy will be followed by atrophy of the morbid growth as well as of the normal structures. I do not think, however, it is safe to draw conclusions as to the result of a



Fig. 9.—Villous condition of Mucous Membrane from a case of Colotomy of thirty years' duration.

certain procedure on a pathological formation from the changes induced in normal structure, as the conditions of growth under the two circumstances are so essentially dissimilar; and the dreary record of early death after operation shows conclusively that the progress of disease in these cases is not to any great extent arrested.

That life can be prolonged when death is threatened by

obstruction is of course certain, and probably the diversion of fæces from the surface of the malignant growth, and absolute rest ensured for the part, tend somewhat to retard the growth, and anyone who has witnessed the relief afforded to a person, suffering from obstruction, by this operation will at once admit the complete justification of the procedure. The immediate result is much influenced by the stage of the disease at which the operation is performed; most of the fatal results being due to what Mr. Bryant has truly called "too late" cases.

I believe that the most important evidence that the case is too late for operation is the presence of extensive meteorism. Where the bowel has been hyper-distended it has passed into such an atonic condition that it may be unable to recover itself after an outlet has been provided, and if such should prove to be the case, a rapidly fatal result will probably follow. Extensive meteorism is in itself also a very serious complication to the manipulative details of laparo-colotomy. I recently witnessed an operation under such conditions. The moment the abdominal incision was made, a very extensive prolapse of small intestine took place, which could not be restrained. The recommendation of Mr. Greig Smith was followed, and an incision made in the small intestine, which was then as far as possible evacuated; the incision sutured, and the intestine returned to the abdominal cavity; the colon was now drawn out, and the operation completed; but the patient never recovered power over the intestine, and died in two days. By making a small incision, and immediately plugging this with a sponge, while the further stages of the operation are being completed, prolapse of small intestine can be largely prevented; but in very extreme cases it is well to consider the advisability of substituting the lumbar operation.

Of colotomy for imperforate anus, according to Batt's

statistics, 47·1 per cent. of the cases were successful. Of course when once the patient has recovered from the operation there is practically no limit to the duration of life, as there is in the case of malignant disease already discussed, but the children are frequently ill-developed, and die early from other causes, comparatively few having reached adult life. In the twenty cases operated on for fistula 18 (90 per cent.) recovered. This would appear to point out clearly that the dangers of the operation itself are comparatively trivial, and that the greater degree of mortality of the other classes is mainly due to the damage done by intestinal obstruction. Of the four cases in which the operation was performed for the relief of ulceration three recovered. In these cases the operation should be so performed that when the ulceration healed the artificial anus could be closed. In the few cases in which it was attempted to close an artificial anus the result of colotomy, considerable difficulty was experienced, and although "Dupuytren's spur" is not so marked as in the artificial anus following hernia, it is sufficient to give some trouble. Mr. Barker^a has suggested an ingenious addition to the means at our disposal for the cure of artificial anus. He introduces into the bowel a piece of flexible rubber sheeting one and a half inches long by five-eighths of an inch broad; this is secured on the internal aspect of the orifice by means of two wire sutures, one at either end; the anus is then closed by paring the edges, and inserting sutures in the usual way, the object of the rubber being to protect the wound from fæces. As soon as the wound is closed the wire sutures can be removed, so allowing the rubber to pass away with the fæcal contents of the intestine. Although in the case given by Mr. Barker this plan did not completely answer the purpose intended, it appears to be well worthy of more extended trial.

^a *Lancet*. Dec. 18, 1880.

Cases of Laparo-Colotomy.

Name	Date	Sex	Age	Hospital	Private	Pathology	Opening of bowel	Result	OBSERVATIONS
1. A. T.	Nov. 10, 1884	F.	60	H.	—	Cancer of rectum and obstruction	Immediate	R.	Lived in tolerable comfort for two years
2. T. J.	July 6, 1885	M.	57	—	P.	do.	do.	R.	—
3. R. B.	Oct. 26, 1886	F.	49	—	P.	do.	do.	R.	Lived 18 months
4. A. N.	Nov. 24, 1886	F.	50	H.	—	do.	do.	R.	Lived three years
5. J. K.	March 3, 1888	M.	27	H.	—	Sarcoma filling pelvis; complete obstruction	Immediate in linea alba	R.	Rapid increase; death a month after
6. Mrs. S.	June 4, 1888	F.	45	—	P.	Cancer of rectum; obstruction	Delayed	R.	Lived two years
7. Mrs. W.	Dec. 13, 1889	F.	58	—	P.	Cancer; recto-vesical fistula	do.	R.	Lived 18 weeks
8. P. B.	Nov. 14, 1889	M.	45	H.	—	Cancer of rectum and obstruction	do.	R.	—
9. Mr. B.	Feb. 24, 1870	M.	55	—	P.	Obstruction due to recurrence of rectal cancer (resected)	do.	R.	Only lived four weeks
10. Dr. B.	April 24, 1890	M.	60	—	P.	Recto-vesical fistula	do.	R.	Large calculus with faecal nucleus removed from bladder 12 months subsequently
11. Miss B.	May 28, 1892	F.	58	—	P.	Cancer of rectum and obstruction	do.	R.	Died of cardiac disease a month after
12. M. F. H.	Feb. 27, 1892	F.	45	H.	—	do.	do.	R.	—
13. Mrs. B.	Nov. 19, 1892	F.	70	—	P.	Complete malignant obstruction	Immediate	R.	Great meteorism and stercoral vomiting at time of operation

The PRESIDENT could not help endorsing the statement of Dr. Ball that in many cases diseases of the rectum are allowed to go on for a very long time without being satisfactorily diagnosed. He would therefore wish to impress upon younger surgeons the great importance and necessity of careful manual examination. He was not competent to speak very particularly as to operation by removal of part of the sacrum, but in removing rectal tumours he always found less difficulty with their posterior relations than with their anterior ones.

MR. THOMSON said he entirely concurred as to the number of cases coming into the hands of the surgeon when it was too late to do anything for them, the gravity of the symptoms not having been recognised. With regard to the removal of the rectum as compared with colotomy, there was a serious difference in the mortality returns. He thought that excision of the rectum was successful just in proportion as they found the disease low down and easily removable. But when the disease was near the sigmoid flexure and out of the reach of the finger, it required a very serious operation for removal. With regard to the contamination of the wound by fæces, why should they not prevent mischief by diverting the discharge through an opening in the colon? In cases where the cancer was very high up he would first perform colotomy, and when the patient had recovered from that he would then proceed to the removal of the disease. He was also very glad to hear that Dr. Ball insisted on the small incision. He (Mr. Thomson) usually secured the bowel in the cord by a simple pin, which he passed transversely behind the colon and left there for 48 hours. In one operation the time occupied was only 10 minutes.

MR. FRANKS thought that surgeons might approach cases of cancer of the rectum with more confidence than hitherto. If they only got them in reasonable time they might hope that the disease would not return, and in this way he thought it was closely allied to epithelioma of the lip. In proof of this he instanced the case of a lady from whom he removed the whole of the anus and a good deal of the rectum 6 years ago, and she is still leading a perfectly healthy life. He condemned the extremely deleterious treatment of caustics, but concurred with Mr. Thomson as to the necessity of performing colotomy before excision.

MR. THORNLEY STOKER said he cordially endorsed the view that cancer should not be removed except in cases where the tumour was movable. He thought that the operation of proctectomy had

been greatly rushed in late years. The preliminary operation of colotomy in all serious cases of cancer of the rectum recommended itself strongly to his judgment—first, because the danger of septic inflammation might be avoided; and, secondly, it was a question whether, after removal of cancer of the rectum, any fæcal matter should ever be allowed to pass through it again. It was better to ablate the rectum altogether than to attempt to preserve the old passage. He also thought it was a much easier operation in the female than in the male subject. He endorsed the view that colotomy should not be undertaken in every case of cancer, because a certain proportion of cases do not end in obstruction. He thought that the operation of inguinal colotomy would eventually beat the lumbar out of the field. The lumbar one was not only awkward, but it was also much more difficult and dangerous. Besides, the inguinal operation was much more certain, because of the variations which the great bowel is subject to. His own practice is to open the bowel where distension is indicated, in the semilunar line, and not too near to Poupart's ligament, because it would be difficult to wear a truss in that position. He had a special pad constructed which he found very effective in preventing the escape of fæces or fluid. He passes the pin behind the bowel and allowed it to lie on the surface of the abdomen. This forces the posterior wall of the bowel forwards, and forms a spur which is useful afterwards in preventing the discharge of fæces down into the distal portion of the bowel. He had also learned one practical point from Mr. Thomson. That was, to dust the surface of the bowel with iodoform and cover it with guttapercha tissue. Gauze always adhered to the lymph on the bowel, and caused much trouble at the dressing.

MR. MYLES said there were some statements in the paper with which he was forced to join issue. There was great danger, when the bowel was removed by making a section of the sacrum, on account of the whole length of the spinal canal being exposed. They could not divide the 3rd sacral vertebra without exposing the whole canal. If, however, a previous colotomy be performed, and contact with the spinal canal prevented, the operation might possibly be successful. He never yet saw the colon jumping into the wound unless when artificially inflated, and he never saw the sigmoid flexure lying in the position in which it is given in the books. Whether it lies in the pelvis or in the left iliac fossa appears to depend on the condition of the bladder. If the bladder is distended it will be found in the left iliac fossa, and *vice versâ*. He next

referred to the incisions in anterior colotomy, and said, as it was made in the vertical axis of the abdominal muscles, the wound must necessarily gape. He would make his incision parallel to the fibres of the external oblique, which would form an automatic sphincter. He thought that cancer which does not go above the level of the sphincter was an ordinary squamous epithelioma of the skin, and could be easily removed. With great respect, he could not see how anyone could excise the whole rectum through the perinæum.

MR. TOBIN referred to a case of stricture which, in a short time, was cured without the necessity of any operation of colotomy. The patient was taught to wash out the bowel, and the result was very successful. He also advocated the necessity for teaching patients how to use an enema.

DR. BENNETT mentioned a case in which he removed the rectum by means of a transverse incision through the sacrum. The man was in great agony, but had no obstruction of the bowel and no bladder trouble. It was clearly impossible to remove it by perinæal incision, and the hæmorrhage from the middle sacral artery was very little indeed.

DR. BROOKS, in referring to the danger of sepsis, said that the cauda equina extends no lower than the 2nd sacral vertebra. With regard to the semilunar incision, in a certain proportion of cases he found the sigmoid flexure coming up into the opening, and in other cases the small intestine; and by pushing the latter aside the sigmoid flexure could be drawn easily into the wound.

DR. BALL, in reply, said he was obliged to condense his paper owing to the time allotted, and some of the points omitted were made the subject of discussion. In reply to Mr. Thomson in the first case exhibited, he removed 4 or 5 inches of the rectum for melanotic cancer, and the patient would have certainly died in a few months had he not done so. The second case was one of the glandular form, and he had as yet no opportunity of seeing one of the squamous type. There was a danger in leaving the colon without sufficient sutures, and he much preferred the flexible sutures with buttons to the stiff pins. He believed careful and accurate suturing was one of the most essential elements to success. In reply to Dr. Myles, he said the canal was not opened up, but if they went above the 3rd sacral vertebra paralysis of the bladder was likely to occur. He did not say that the colon ever jumped into the wound. With regard to the incision in the semilunaris, prolapse less frequently occurred than when it was made lower down.



PLATE I.—(See page 169.)

From micro-photograph of margin of cancerous noduli
($\times 10$ diameter).

A. Normal mucous membrane.

B. Infiltration of muscular structure by glandular tissue.

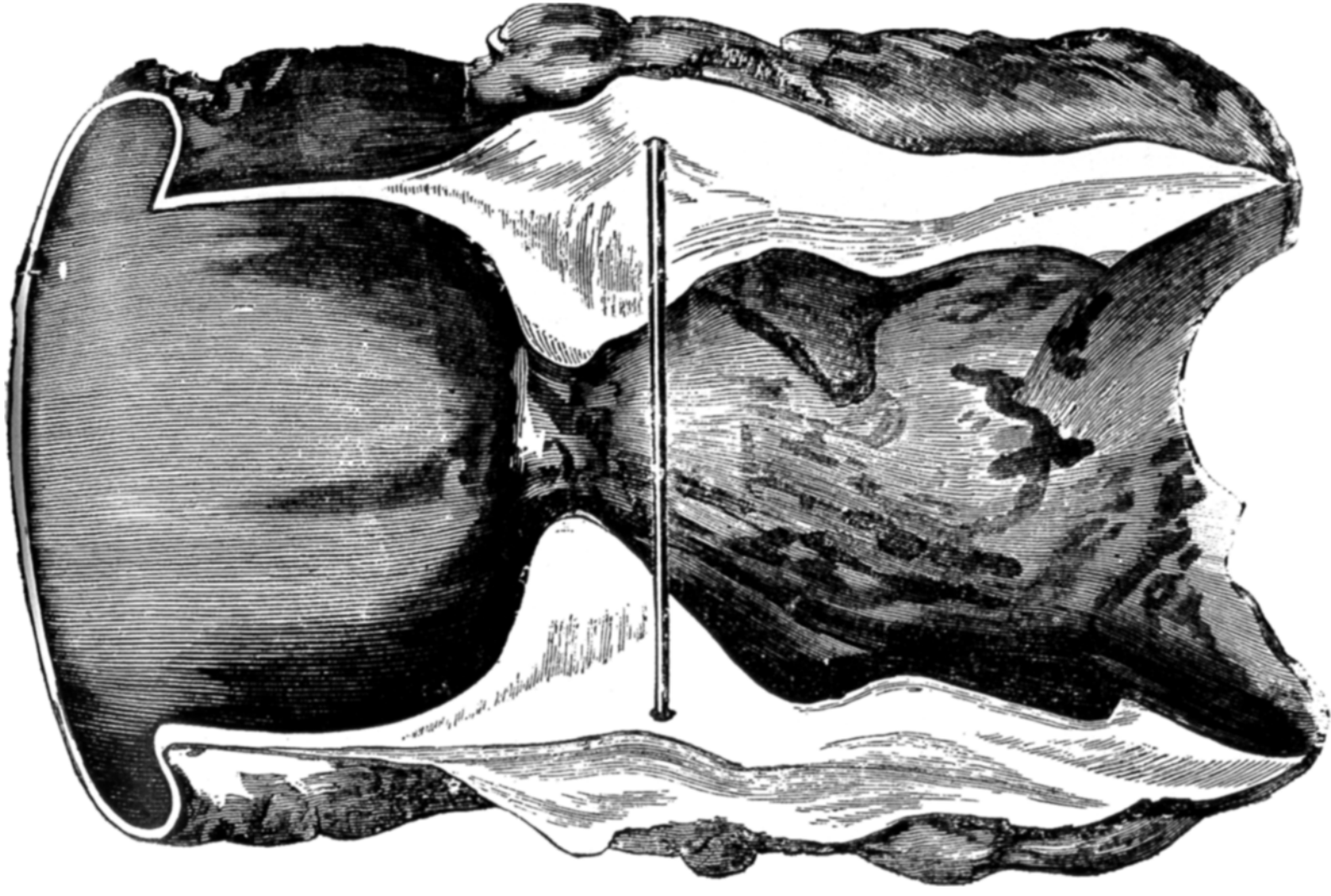


PLATE II.—(See page 180).

Case of colloid cancer of rectum, natural size, removed
by trans-sacral incision.