A NOTE ON THE PARASITIC PROTOZOA LATELY FOUND IN CANCER.

By H. G. PLIMMER, M.R.C.S., F.L.S.

At the present moment much is being written, both in England and abroad, concerning the parasitic origin of cancer, and as I have had opportunities of examining several cases lately, with reference to this parasitic origin, I wish to place the few following observations on record.

The protozoa, which have been discovered in cancerous tumours, have been most carefully described by Dr. Armand Ruffer, and Mr. J. Herbert Walker, in the *BRITISH MEDICAL JOURNAL* in July and November, 1892, and more fully in the *Journal of Pathology*, October, 1892, and I have been able to confirm their observations entirely. I have examined specimens from thirteen cases of recent carcinoma, prepared specially for the purpose of demonstrating these organisms, and also fifty-three specimens, taken from thirty-seven cases of various carcinomata, prepared according to the ordinary pathological methods during the last eight years, and in all of these cases, without exception, I have been able to demonstrate the parasite; with some difficulty in those specimens prepared by the older methods, but still with certainty. After examining these specimens most carefully with powers up to 3,000 diameters, and by the aid of photography, I have no doubt whatever that the bodies described by Dr. Ruffer and Mr. Walker are parasitic protozoa. They have no resemblance in structure, or position, to the many forms of cells undergoing degeneration, which we so often see in cancers; and they cannot be confounded, when once they have been seen, with the appearances caused by the endogenous formation of cells. They are found most plentifully near the growing edge of the cancer, and in the glands which become secondarily affected; but they are not found, or only found in very small numbers, in that part of the cancer which is undergoing degeneration, so that it is sometimes necessary to cut sections from various parts of the growth, in order to demonstrate the presence of these bodies satisfactorily. They are not to be found either in the very fibrous parts of cancers, and I have never seen them in cells undergoing karyokinesis, although I have often met with them in the very next cell to that undergoing division. The structure, too, of these bodies is very typical: they are nearly or quite round, with a nucleus, which is always visible in well prepared specimens, and with a capsule which can also be seen in every instance; from this capsule in a certain number of specimens rays extend centripetally towards the nucleus, and from the nucleus also rays extend radially towards the capsule, these latter being usually fainter and finer than the capsular rays. But these are not seen in every instance, and their significance is as yet undetermined. The size of the bodies varies considerably, even in the same specimen; in one lately under observation I measured some varying between 0.0137 m.m. and 6.317 μ ; and in many specimens small chromatin granules are scattered through the protoplasm of the organism.

During the observations I have made on these bodies I have obtained, I think, evidence of the amoeboid nature of the cancer cell, and, as this is a matter of great importance, especially as regards the method of secondary infection in cases of cancer, further observations in this direction will be made.

Dr. Ruffer and I have lately tried a variety of fixing reagents, and so far the method by which these organisms are best demonstrated is the following:

Small pieces of perfectly fresh tissue are fixed for twenty-four hours in Foa's solution, which is made as follows: Equal parts of a 5 per cent. solution of bichromate of potash and of a saturated solution of perchloride of mercury in 0.75 per cent. salt solution, mixed just before using. The pieces of tissue are then washed in running water for twenty-four hours, and they are then placed for twenty-four hours in 30 per cent. alcohol, then for twenty-four hours in 60 per cent. alcohol, then for twenty-four hours in 90 per cent. alcohol, and then, until hardened, in absolute alcohol. They are

afterwards imbedded in paraffin, and sectioned, and stained on the slide with the Ehrlich-Biondi triple stain, washed out with alcohol, cleared with xylol, and mounted in xylol balsam. This method, although somewhat complex, gives greatly superior results to any other of the many methods we have tried.

RECTAL CANCER.

RECTAL EXCISION FOR CANCER: THE SELECTION OF SUITABLE CASES AND THE PROGNOSIS.¹

By HARRISON CRIPPS, F.R.C.S.,
Assistant Surgeon to St. Bartholomew's Hospital.

It is only within comparatively recent years that rectal cancer has been dealt with to any extent by direct surgical treatment. The operation formerly found little favour in this country, and had practically dropped out of use until its revival fourteen or fifteen years ago. The disfavour with which the operation was viewed rose from the extremely unfavourable results both as regards the immediate mortality of the operation and the speedy recurrence of the disease.

By the increase of our knowledge in the treatment of wounds the mortality following surgical operations has materially diminished, so that the intrinsic risk following excision of the rectum is less than formerly, but those who have had any considerable experience of rectal cancer must know only too well that excision can never become the treatment for all or even the majority of cases, and that any attempt to make it so will again bring discredit on the operation. Recent surgical ingenuity has somewhat extended the range in which rectal cancer can be removed, and if this ingenuity was always tempered with discretion useful progress would be made. It is not sufficient to show that an extensive operation can be performed, involving even the partial resection of the sacrum, unless it can be further shown that a fair proportion of patients survive the operation with a substantial amelioration of their condition, or even a fair chance of a permanent cure.

If these conditions are to be fulfilled, a careful selection of cases suitable for operation will have to be made. There are doubtless occasionally cases in which severe and high operations may be justifiable, but such instances are rare. Speaking generally, no operation should be undertaken unless there is a fair prospect of a complete removal of the disease. If the entire growth be not taken away the portions left seem to grow more rapidly than ever, the embryonic scar tissue forming a favourable nidus for extension.

According to my researches into the pathology of rectal cancer, there is practically only one form of the disease—adenoid carcinoma; yet, by the bedside, growths have very different clinical features. The length of time that the disease has been in progress accounts for some of this difference, but it is by no means the only factor. In some cases the growth may have been present for many months, or even a year or two, yet only have affected the bowel in a comparatively superficial manner, it having chiefly crept along the mucous and submucous coats without completely perforating the muscular layers of the bowel. In other cases, even from the first, the cancer extends more rapidly in the deeper parts than on the surface, quickly invading and perforating the muscular coats, and then spreading widely into the neighbouring tissues. It thus becomes bound to the sacrum behind, the bladder, prostate, or uterus in front, and it is especially apt to invade the peritoneum of Douglas's pouch.

So long as the disease has not perforated the muscular coats, the prospects of an operation are hopeful. It means that the cancerous affection may still be confined to the rectum, and that, by the removal of the whole or a portion of that organ, it may possibly be eradicated. On the other hand, when it has once extended beyond the bowel, the prognosis becomes most unfavourable. It is true that surgically the rectum can be dissected out from the neighbouring organs, and surrounding indurated portions of tissue can be subse-

¹ Read in the Section of Surgery at the Annual Meeting of the British Medical Association held in Nottingham, July, 1892.

to the posterior half of the bowel, the lower border of the disease was $\frac{1}{2}$ inch from the anus, and the upper border 4 inches. It was closely adherent to the coccyx and lower sacral bone, but was dissected off without removing either bone. The patient for two years used a bougie daily on account of contraction. This has now entirely disappeared. He has become stout, and has been in excellent health ever since the operation. There is no sign of any recurrence (May, 1892), and the patient has perfect control over his motions.

CASE III. *After Four Years.*—M. M., aged 61, was sent to me by Mr. Doran, and was operated on by me in 1878. Two inches and a half of the bowel were removed. In three months there was a slight spot of recurrence, which was removed, the portion being not larger than a pea. About a year later a recurrence took place, and again a small nodule was removed. I frequently saw the patient during four years, and the parts remained thoroughly sound and healthy.

CASE IV. *After Five Years (nearly).*—S. P., aged 35, was operated on at St. Bartholomew's Hospital in October, 1887. The disease, which had surrounded the bowel, had extended high, and had implicated the lower half of the rectovaginal septum, a fistula having formed through which a fungoid mass protruded into the vagina. Rather more than 4 inches of the bowel were removed, including about half of the whole thickness of the rectovaginal septum. The wound was allowed to heal over a large sized bougie, but, notwithstanding this, contraction gave some trouble, and for the first year she had very little control over the motions. By the end of the second year the tendency to contract had almost ceased, but as a precautionary measure I advised her to pass the bougie once a fortnight. In 1890 she was confined of a fine healthy baby, and, when last examined in 1891, there was no sign of recurrence, the part being soft and supple. The appearance of the parts resembled what is seen in a bad case of ruptured perineum, but the patient had acquired fair control over her motions.²

CASE V. *After Six Years.*—The patient was a lady, aged 40. On the anterior wall of the rectum, nearly 5 inches from the anus, was a typical patch of adenoid cancer about the size of a florin. It could only be felt when the patient strained down, and the portion of bowel on which it was situated became invaginated. With the assistance of Dr. S. Smith, the patient's medical attendant, I removed the disease, dissecting it off together with a portion of the muscular coat, treating the remainder of the base with the actual cautery. In six months the disease had recurred. It spread at an alarming rate, and there was a growth the size of a five shilling piece, with indurating overlapping edges and a hard ulcerated base. Assisted by my colleague, Mr. Butlin, I was enabled, by vulsellum forceps, after making the posterior cut, to drag the bowel some distance downwards. I completely cut round the growth, including the whole thickness of the bowel wall, a portion of the peritoneum being removed, and the opening closed with catgut sutures. Some contraction followed, necessitating the prolonged use of the bougie. There is still no sign of recurrence (July, 1892), and the patient has given up the bougie for two years. There is now a scarcely perceptible contraction, and the patient has complete control over the motions.

CASE VI. *After Six Years.*—T. H., aged 62, was admitted into St. Bartholomew's in August, 1885, and I removed the last 3 inches of the bowel for adenoid cancer. He was again admitted, three months later, with a slight recurrence in the form of a small nodule in the lower part of the wound, which was removed. The patient was lost sight of till 1891, when he came to see me at the hospital. He stated that he had been quite well till within a few weeks previously, when he noticed a little blood with his motions. I found a small crack in the cicatricial tissue in the middle line behind. I was in some doubt as to the nature of this, and thought it probably a slight traumatism from a hard motion. I gave him some astringent ointment, and he promised to see me again, if not better, in a few weeks.

CASE VII. *After Twelve Years.*—Miss D., aged 40, a patient of the late Dr. Matthews Duncan, was operated upon by me, assisted by Mr. Butlin, in July, 1880. About 3 inches of the bowel were removed, involving nearly the whole circumference, but a narrow strip was left. As in the former cases contraction was considerable trouble at first, but ceased to be so after two or three years. The patient now leads an active life, has good control, and has remained perfectly well from the date of the operation to the present time (somewhat over twelve years).

It will be seen from the foregoing reports that there are two prominent features which have an important bearing on the after-treatment of rectal excision. The first, and one that is common to nearly all cases, is the tendency to contraction, and the second that, in no fewer than three of the cases, there was a recurrence which was successfully treated by a second operation.

The contraction, which is so troublesome, can to a great extent be avoided by the proper treatment of the wound during the healing process. The contraction seldom commences till the third or fourth week, but will, if not prevented in the course of a few months, lead to almost complete closure of the outlet. This complication can in a great measure be prevented by introducing into the bowel a full sized rectal bougie an inch and five-sixteenths in diameter. This should be commenced at the end of a fortnight, and allowed to remain in for some hours daily for a month. The patient should then be directed to pass the bougie once daily for a year or even longer. The tendency to contraction seems gradually to disappear, and gives comparatively little trouble after the second year. The recurrence, which was successfully treated in three of the cases, was almost certainly due to minute portions of the disease being left behind at the

operation, and the fact of the second removal proving so successful is very encouraging, and I think that we should not hesitate to operate a second time provided the recurrence is within reach and its removal practicable. From the facts which have been stated, very brilliant results cannot be claimed, but it must be remembered that we are not only dealing with malignant disease, but with that disease when situated in a peculiarly inaccessible part of the body.

I claim, however, to have shown, from an experience of a considerable number of cases, that the mortality of the operation is less than 8 per cent., and that, while if the disease be left alone death is inevitable, an excision in suitable case holds out a fair prospect of relief, and even of a permanent cure.

RADICAL CURE OF HERNIA: A NEW METHOD.

By HENRY O'HARA, F.R.C.S.I.,

Senior Surgeon to the Alfred Hospital, Melbourne, Australia.

SINCE September, 1888, I have performed an operation for the cure of inguinal hernia in males sixty times; in every case complete recovery followed, and in no instance has there been necessity for the re-employment of a truss or other artificial abdominal support. The ages of the patients ranged from 14 months to 73 years.

It is my intention in this paper to describe an operation differing from any yet advocated, and to give the details of the more interesting cases, with any complications that arose, merely tabulating those in which there was nothing special to note.

SPECIAL FEATURES OF OTHER OPERATIONS.

No difference of opinion exists with regard to the first step of the operation—that of exposing the sac, an incision being made, as for herniotomy. Banks, having separated the *vas deferens*, applies a ligature round the neck of the sac as high up as possible, and dissects out and removes the fundus. Having pushed the ligatured portion up the inguinal canal, he trusts to silver wires to hold together the pillars of the ring. Ball twists the neck of the sac, and secures it between the pillars of the ring by sutures passed through these structures. Macewen uses the whole sac to plug the internal opening. Barker divides the neck of the sac after having ligatured it high up, but does not dissect out the fundus. He pulls the stump by means of the ligature that he has already placed round it to the internal opening, and, after having brought the ligatures through the internal pillars, from within outwards, he manages, by tying them, to approximate the sides of the canal.

OBJECTIONS TO THESE OPERATIONS.

After a very varied experience, I have come to the conclusion that even Mr. Barker's operation, which, to my mind, is the best of those quoted, can be improved upon. My objections to the methods advocated by other surgeons lie, first, in their leaving the stump in the canal; and, secondly, on their relying on ligatures to hold its margins together, feeling convinced that where a cure is effected it is the result of plastic inflammation and its resulting adhesions. I cannot see any advantage to be gained by dissecting out the fundus of the sac. In congenital herniæ it must be allowed to remain to form a tunica vaginalis, and in the acquired herniæ it has generally developed so many adhesions that its dislodgment, in my opinion, causes an unnecessary amount of disturbance to the tunica vaginalis and its contents, leading, in many cases, to severe orchitis.

THE OPERATION PROPOSED.

I have adopted a method of keeping the stump at least two inches from the inner ring. Having freed the *vas deferens*, a long, strong, carbolised gut or sterilised silk ligature is tied round the neck of the sac; a second ligature of finer material is placed about a quarter of an inch lower down, and the neck of the sac divided between the two. I then introduce the index finger of my left hand as far as possible up the inguinal canal, anterior to the peritoneum, and having satisfied myself that no important structures lie between the tip of it and the

² Since reading this paper, a small nodule of recurrence was observed, this has been removed and the patient is now free from disease.