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CANCER OF THE RECTUM

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THE HISTORY OF

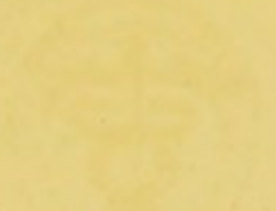
THE REIGN OF

EDWARD THE FIRST

BY

JOHN GOWER

OF



OF

THE HISTORY OF

CANCER OF THE RECTUM

ESPECIALLY CONSIDERED WITH REGARD TO
ITS SURGICAL TREATMENT

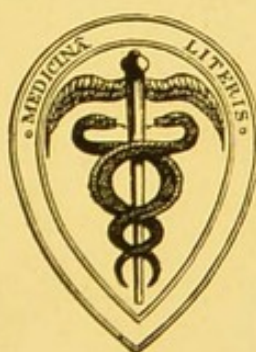
Jacksonian Prize Essay

BY

HARRISON CRIPPS, F.R.C.S.

ASSISTANT-SURGEON ST. BARTHOLOMEW'S HOSPITAL; JACKSONIAN PRIZE
ESSAYIST, ROYAL COLLEGE OF SURGEONS, 1876; LATE SURGEON GREAT
NORTHERN HOSPITAL; ASSISTANT-SURGEON ROYAL FREE HOSPITAL;
FORMERLY SURGICAL REGISTRAR AND ASSISTANT DEMONSTRATOR
OF ANATOMY, ST. BARTHOLOMEW'S HOSPITAL

THIRD EDITION



LONDON

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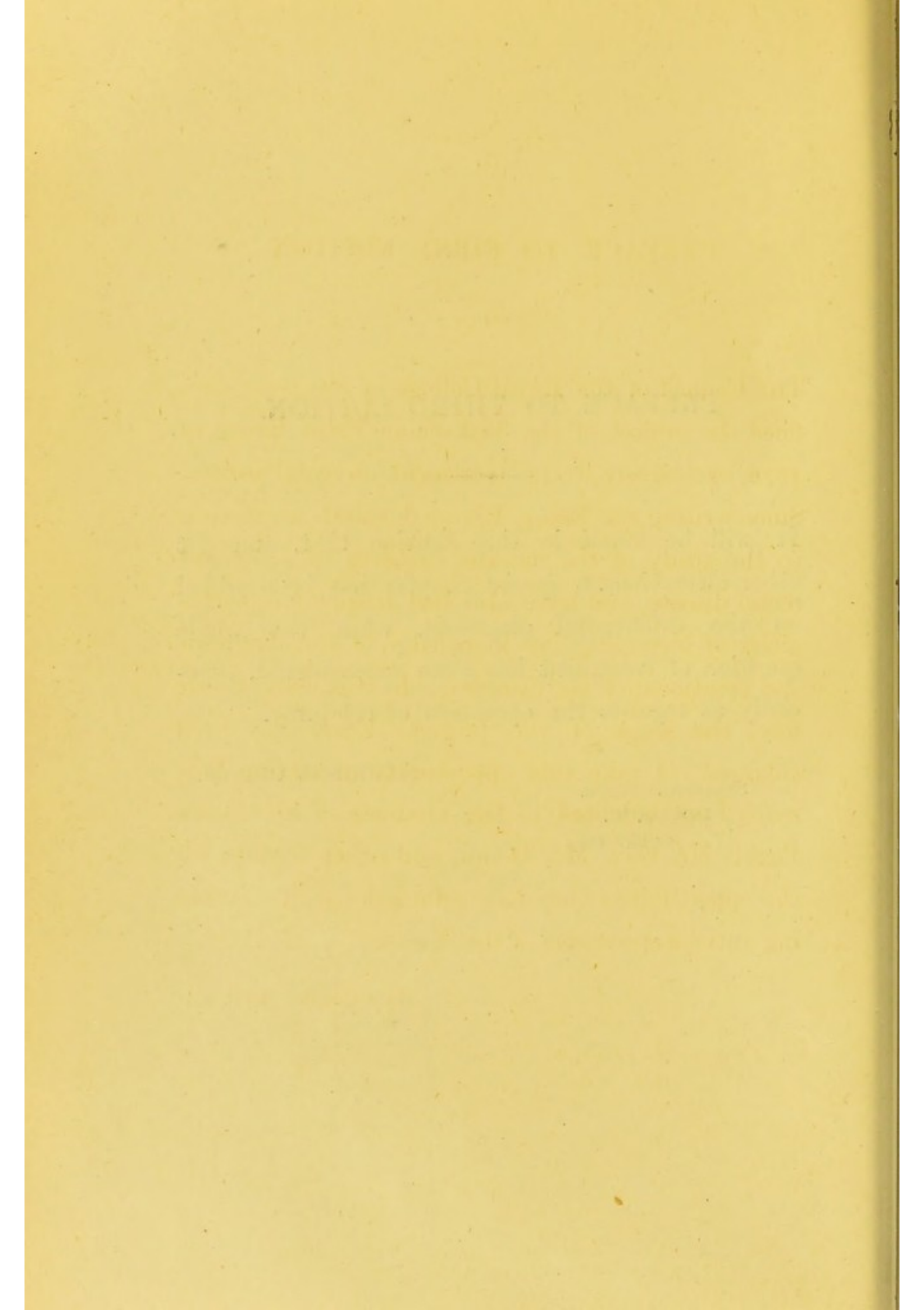
PREFACE TO THIRD EDITION.

It will be found in this Edition that, amongst other alterations, a special chapter has been added on the differential diagnosis, while the whole question of treatment has been reconsidered, especially as regards the operation of colotomy.

STRATFORD PLACE,
LONDON, W.

October 1889.

HARRISON CRIPPS.



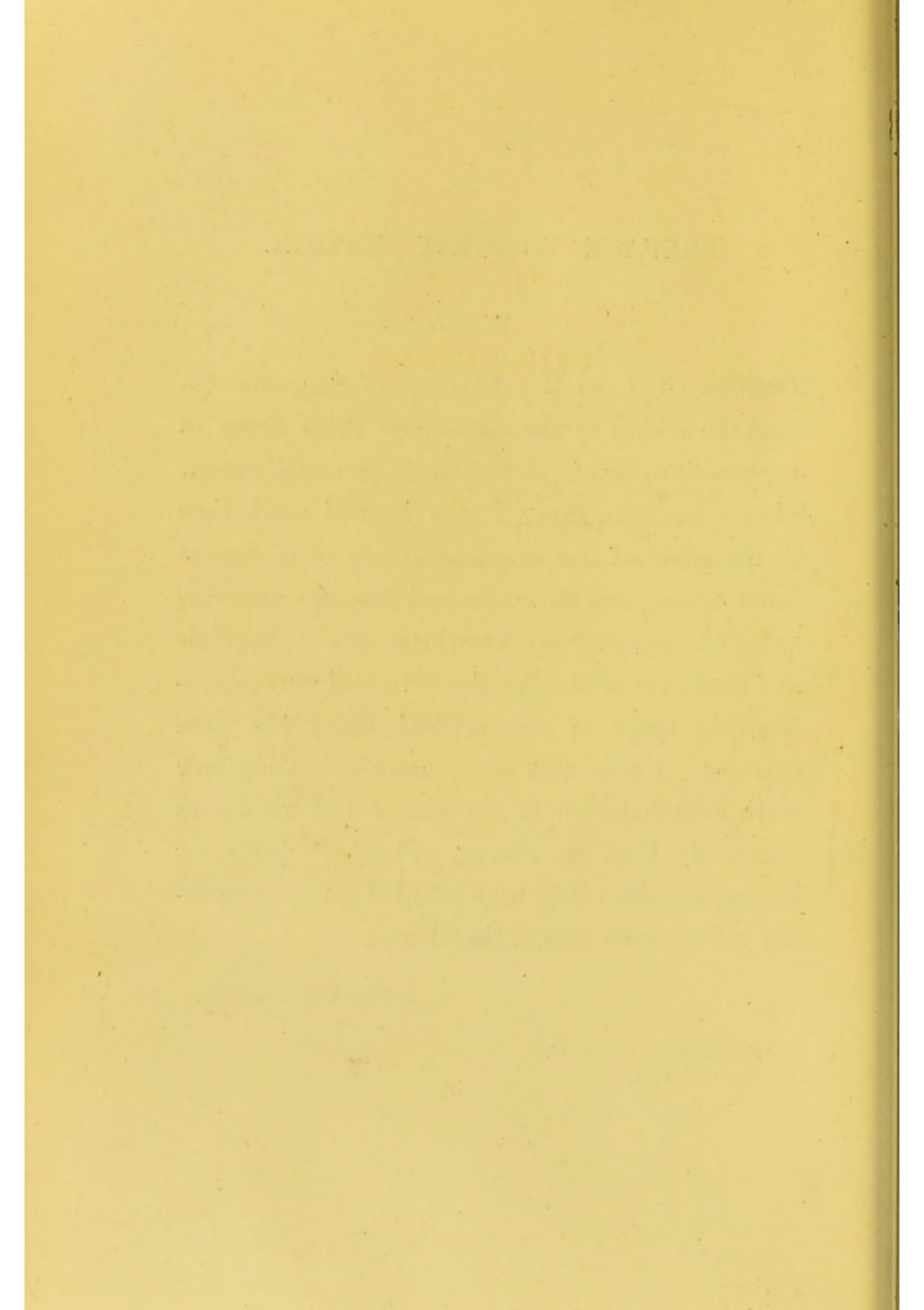
PREFACE TO FIRST EDITION.

THE Council of the Royal College of Surgeons confined the subject of the Jacksonian Prize Essay in 1876, exclusively to the treatment of rectal cancer. Since writing the Essay, I have devoted much time to the study of the minute anatomy of malignant rectal disease, and have also had frequent opportunities of increasing my knowledge of the diagnosis and treatment of the disorder. In this work, therefore, the scope of the original Essay has been enlarged. I take this opportunity of stating how much I am indebted to the kindness of Sir James Paget, Mr. Gay, Mr. Doran, and other friends, for the opportunities they have afforded me of examining various specimens of the disease.

HARRISON CRIPPS.

2 STRATFORD PLACE, W.

1879.



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DESCRIPTION OF PLATE I.

FIG. 1.—A vertical section of the rectal wall of a rabbit.

FIG. 2.—A section of a healthy human rectal wall.

FIG. 3.—Adenoid growth (*b*) extending between the muscular (*c*) and mucous coats (*a*).

FIG. 4.—A vertical section of the muscular coat of the rectum. The morbid adenoid growth (*bb*) is seen taking the place of the muscular fibres (*a, a*), while the inter-muscular fibrous bands are greatly thickened.

DRAWN BY HARRISON CRIPPS.

PLATE I.

Fig. 1.

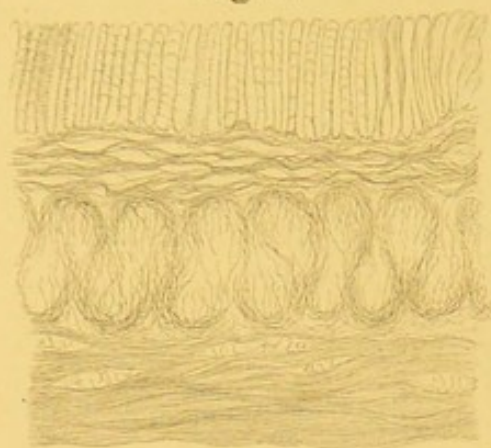


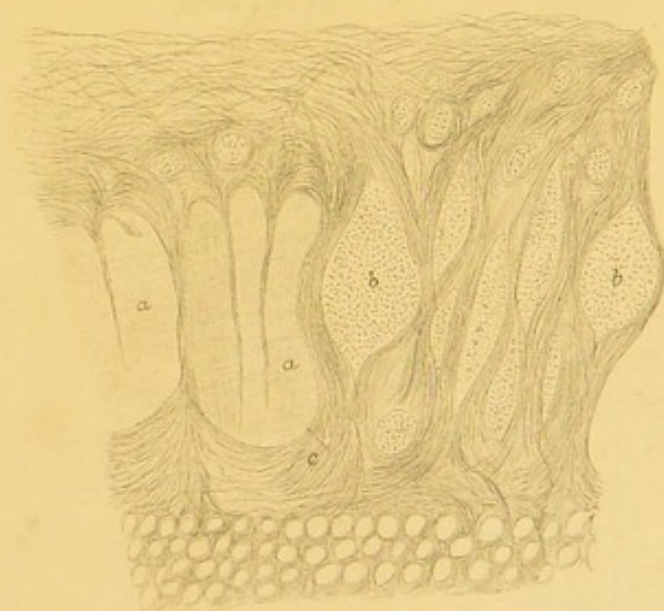
Fig. 2.

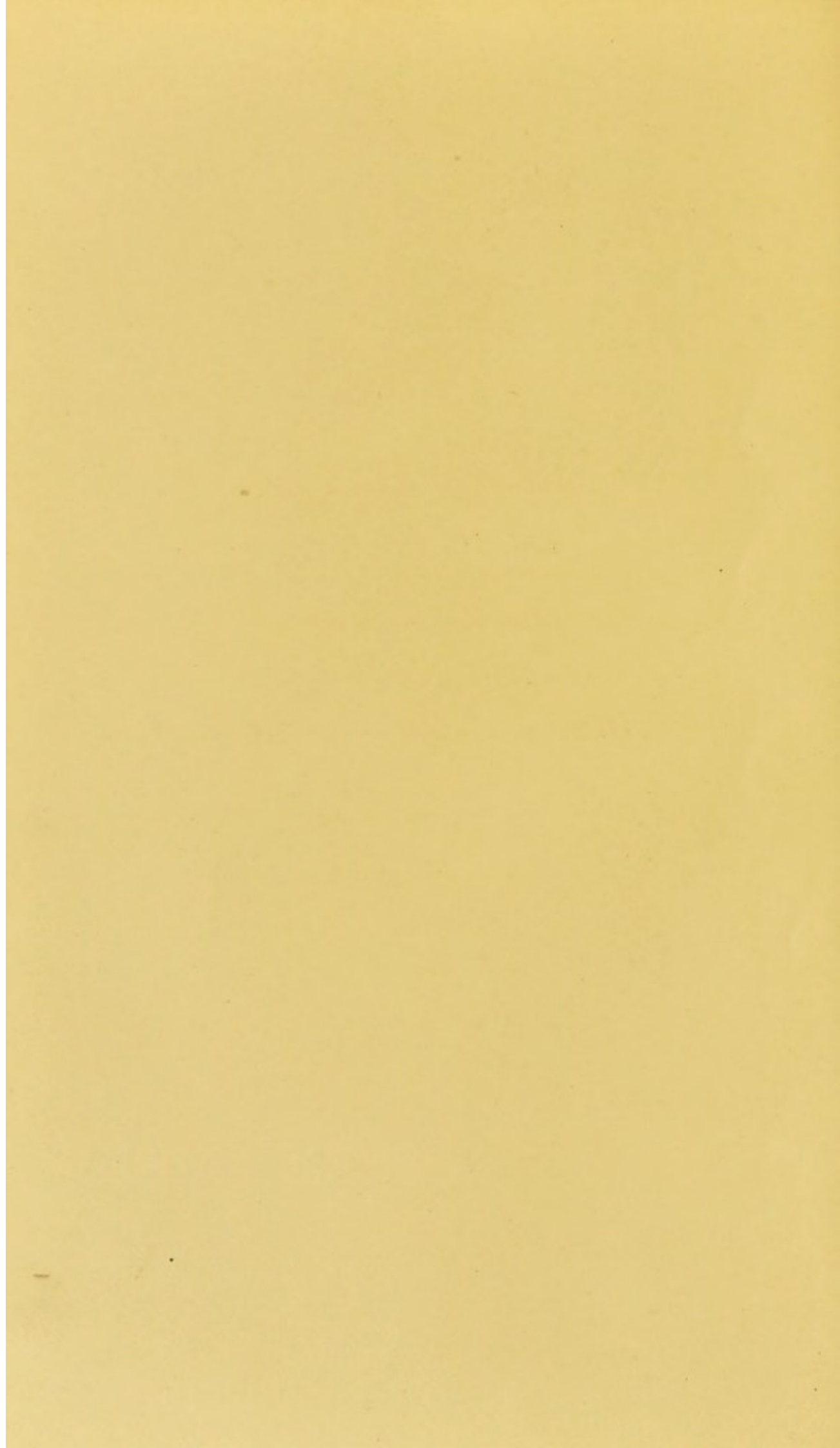


Fig. 3.



Fig. 4.





DESCRIPTION OF PLATE II.

FIGS. 1 to 8 represent cells from the surface of adenoid tumours.

FIGS. 9 to 19 represent cells from deeper portions of the growth.

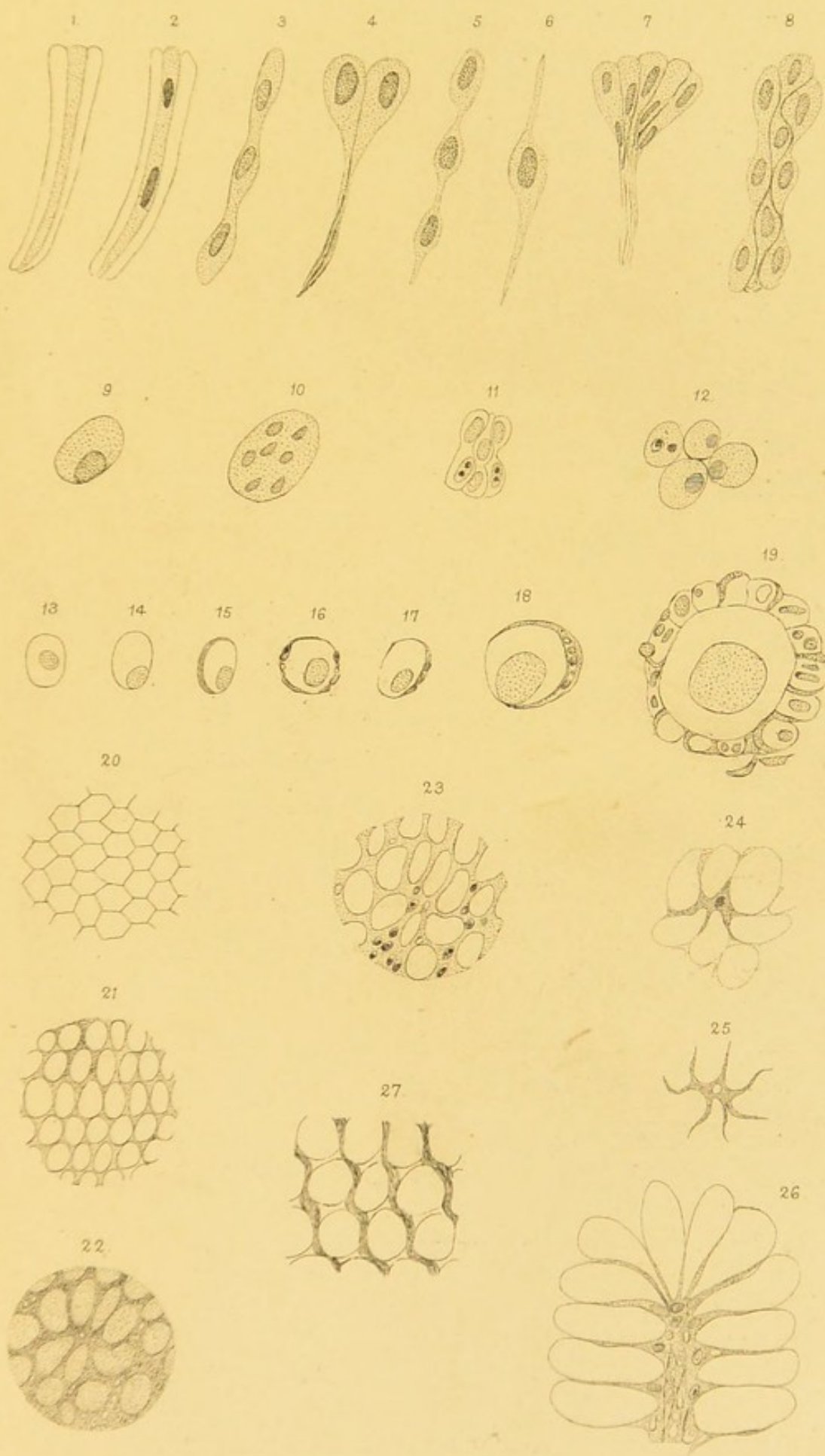
FIGS. 20 to 22 represent horizontal sections of epithelial cells.

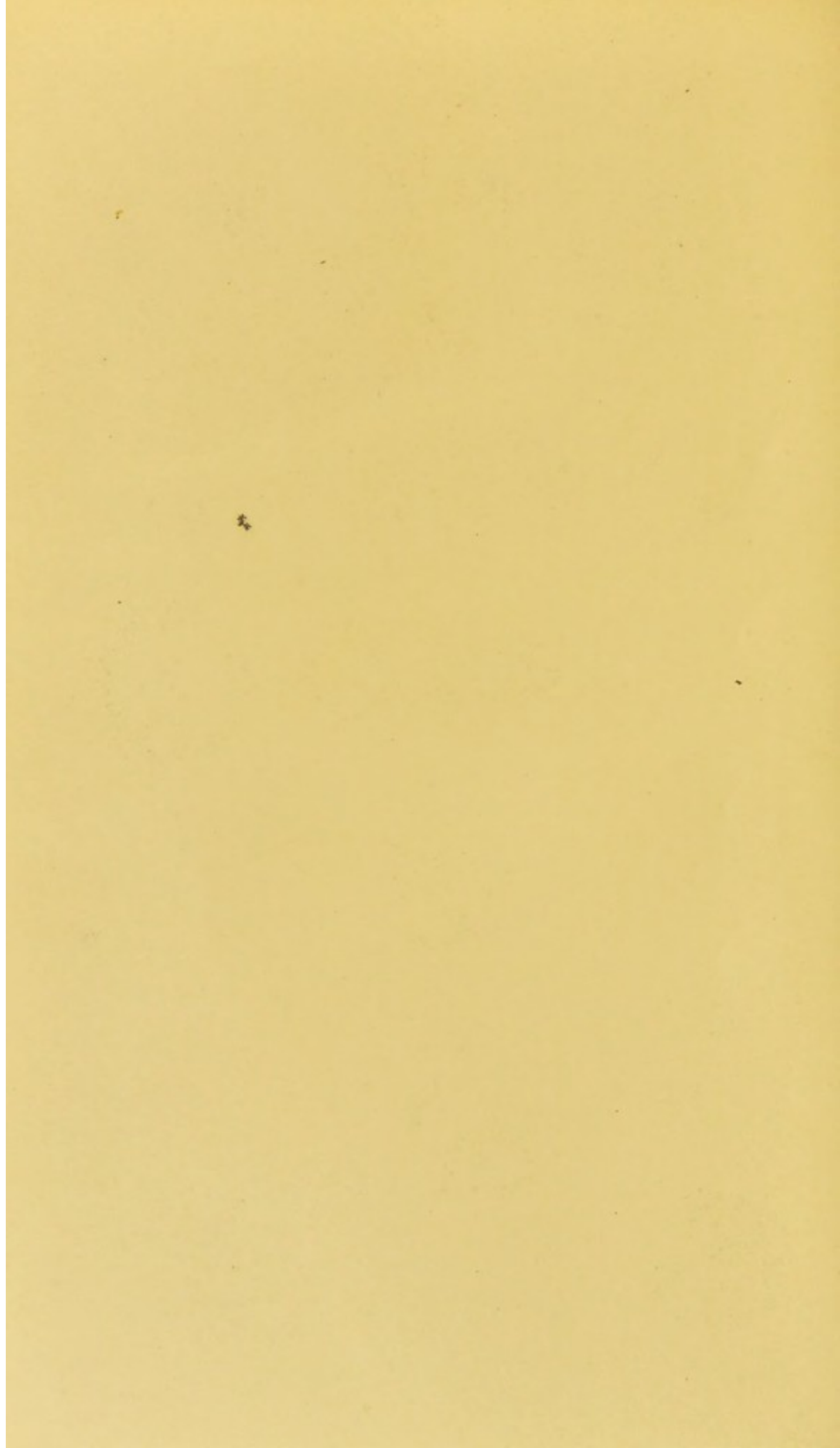
FIGS. 24 and 25 illustrate the delusive appearance of so-called stellate cells.

FIGS. 26 and 27 illustrate the formation of fibrous tissue from cell walls.

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PLATE II.





DESCRIPTION OF PLATE III.

FIG. 1 represents retiform tissue converging into fibrous band.

FIG. 2 is a similar section, the cellular contents having been washed out.

FIG. 3 represents a section of cells in their long diameter, showing their connection with the intercellular tissue.

FIG. 4, a similar specimen, the fluid contents having fallen out.

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PLATE III

Fig. 1.

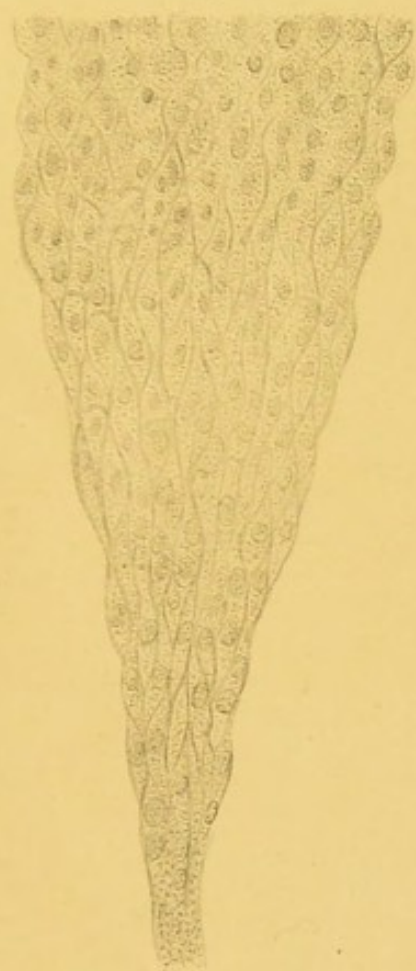


Fig. 2.

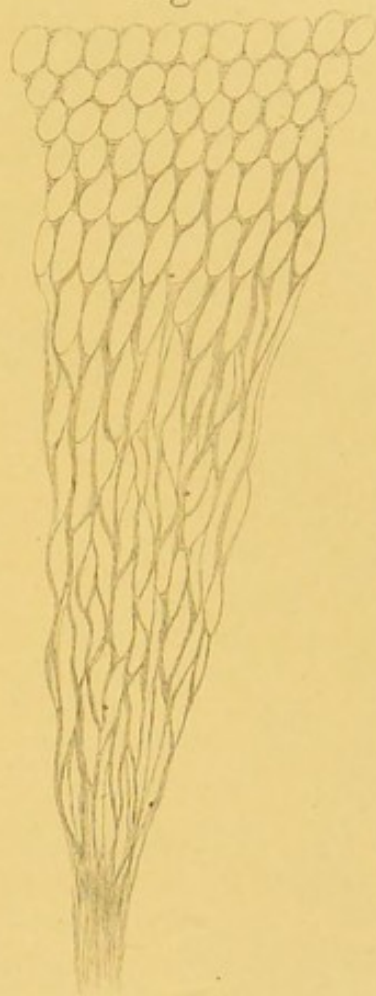
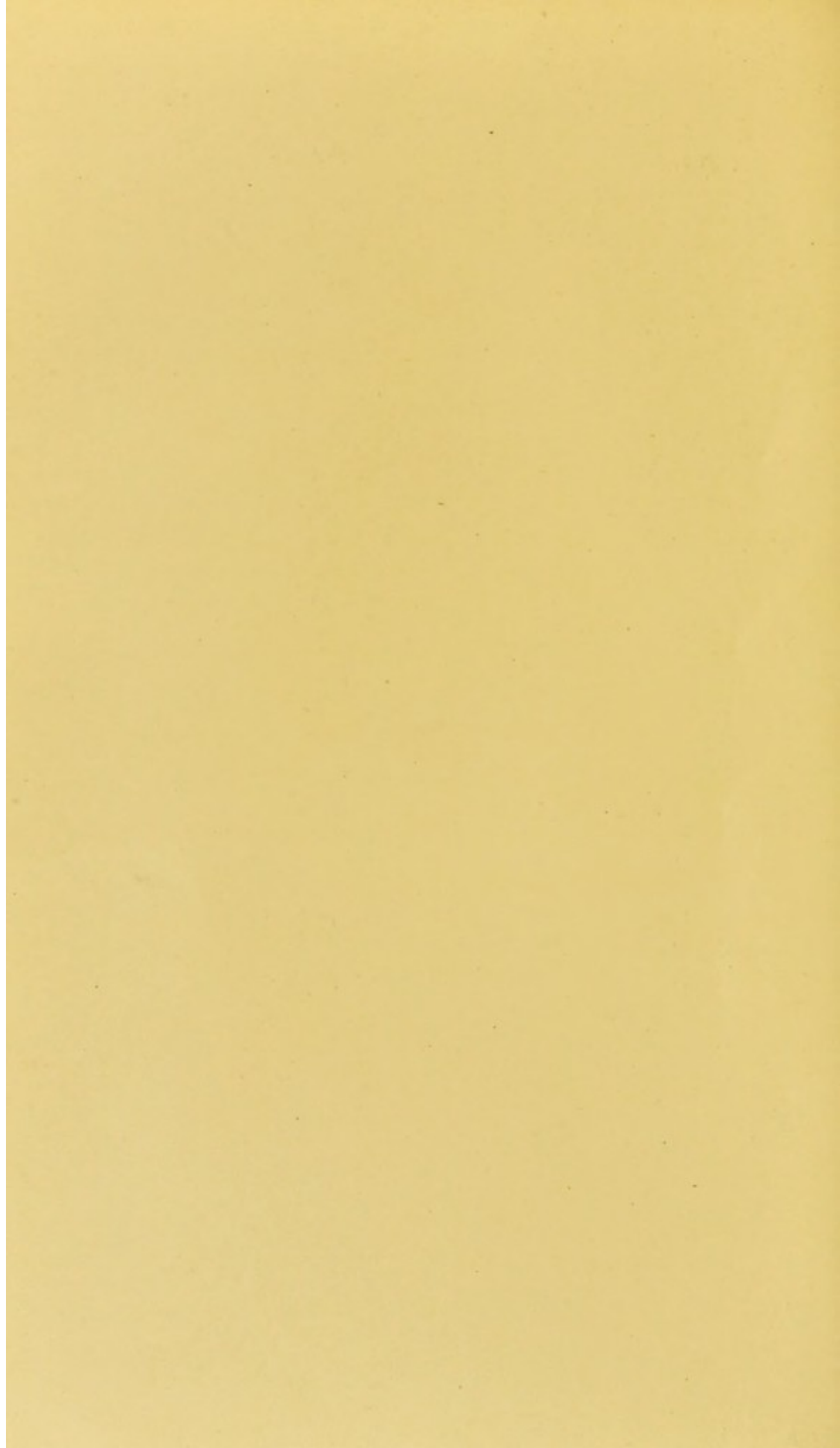


Fig. 3.



Fig. 4.





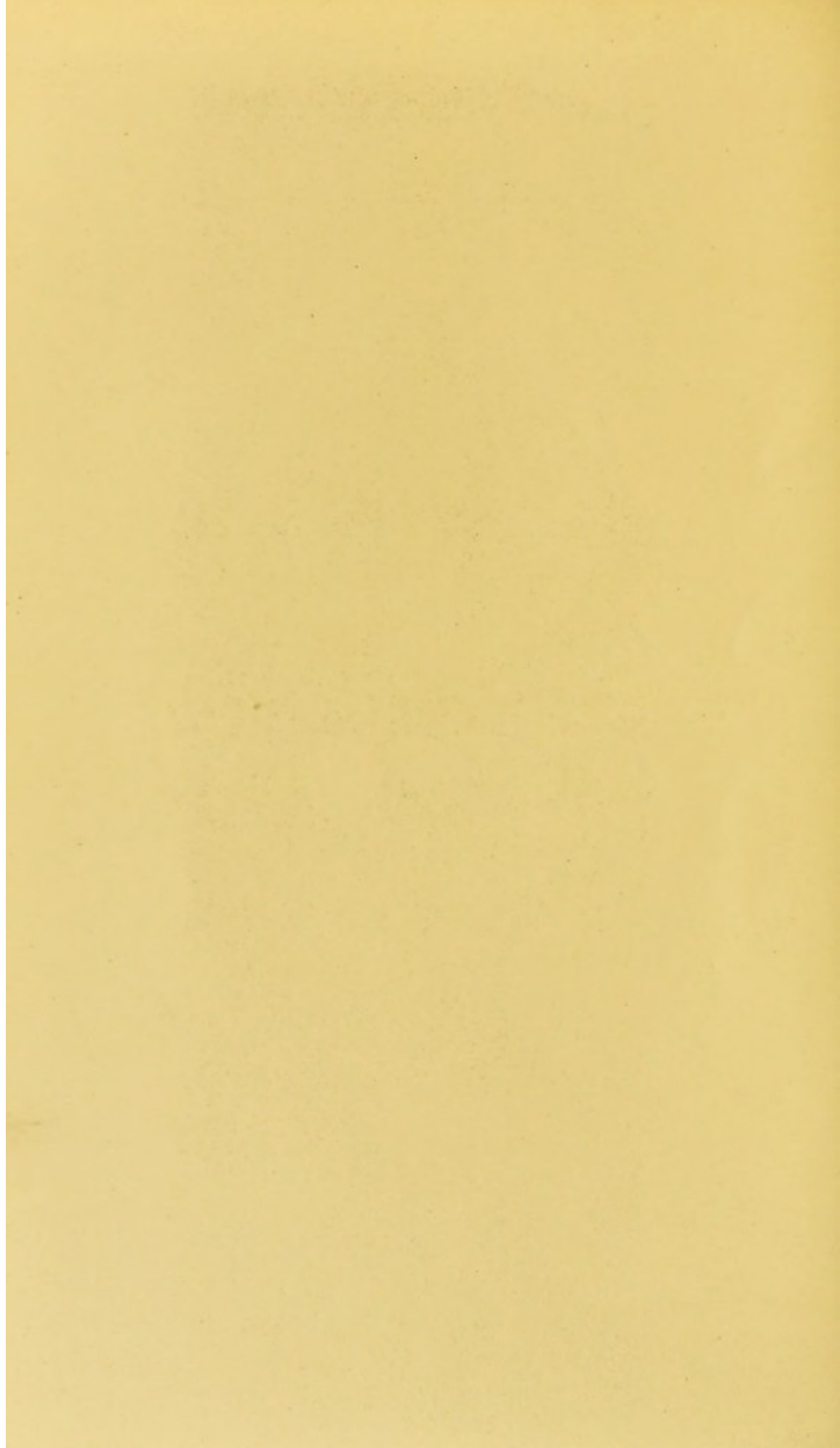
DESCRIPTION OF PLATE IV.

Section of adenoid growth, extending along the submucous tissue, between the mucous membrane and the muscular coat. The section is cut at right angles to the surface of the bowel.

- a.* Gelatinous material of doubtful nature (mucus?) covering the free surface of the bowel.
- b.* Greatly hypertrophied Lieberkühn's follicles.
- c.* Upper part of submucous coat, crowded with leucocytes.
- d.* New growth of morbid adenoid tissue. (Hartnack obj. 4.)

DRAWN BY B. HARRISON CRIPPS.





DESCRIPTION OF PLATE V.

FIG. 1.—Section from surface of innocent adenoid growth (polypus).

FIG. 2.—Section from surface of a growth in a case of multiple polypi.

In these sections a single layer of columnar epithelium forms the free surface. The fibrous tissue forms a central stalk from which fibres radiate, and expanding into a delicate retiform tissue, form the framework for supporting the epithelium.

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PLATE. V.

Fig 1.

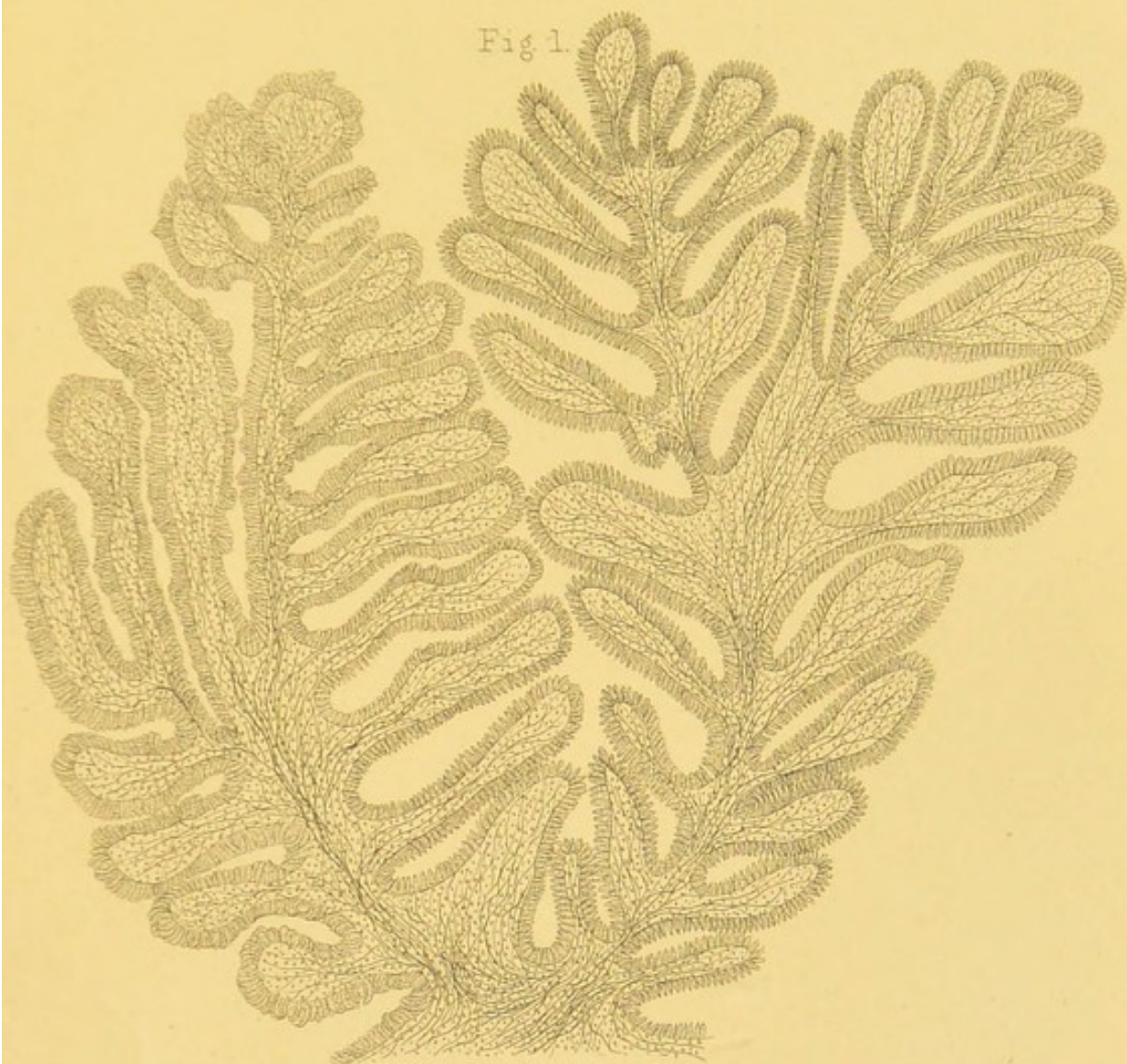
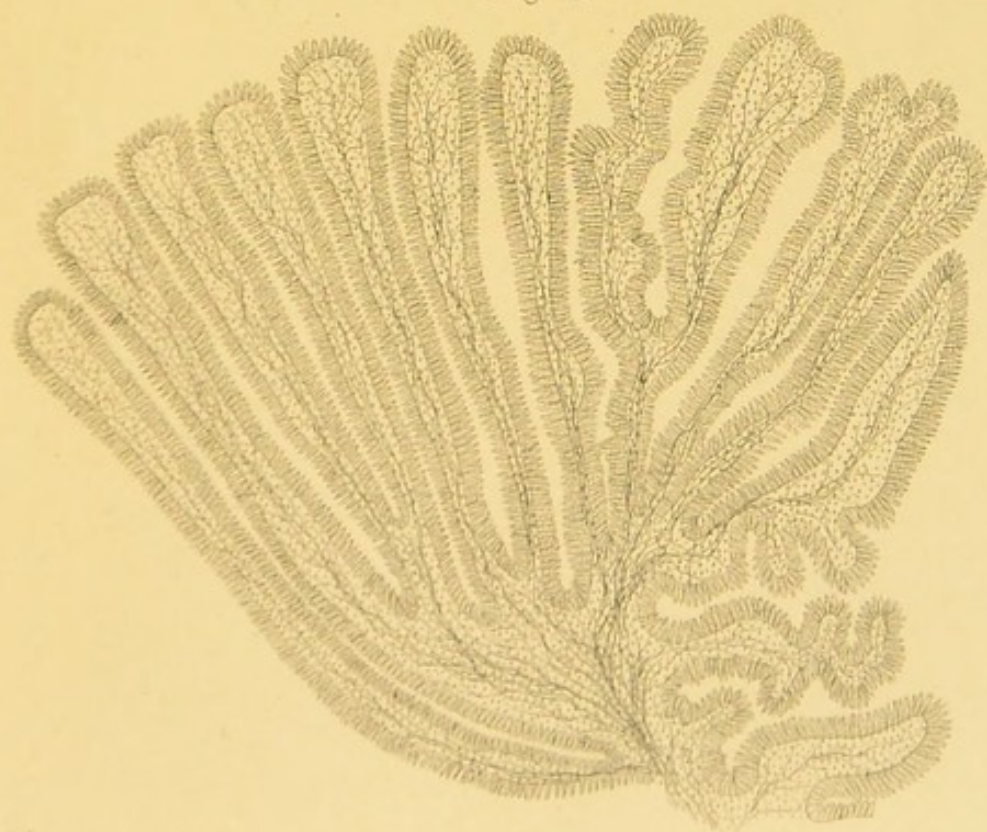
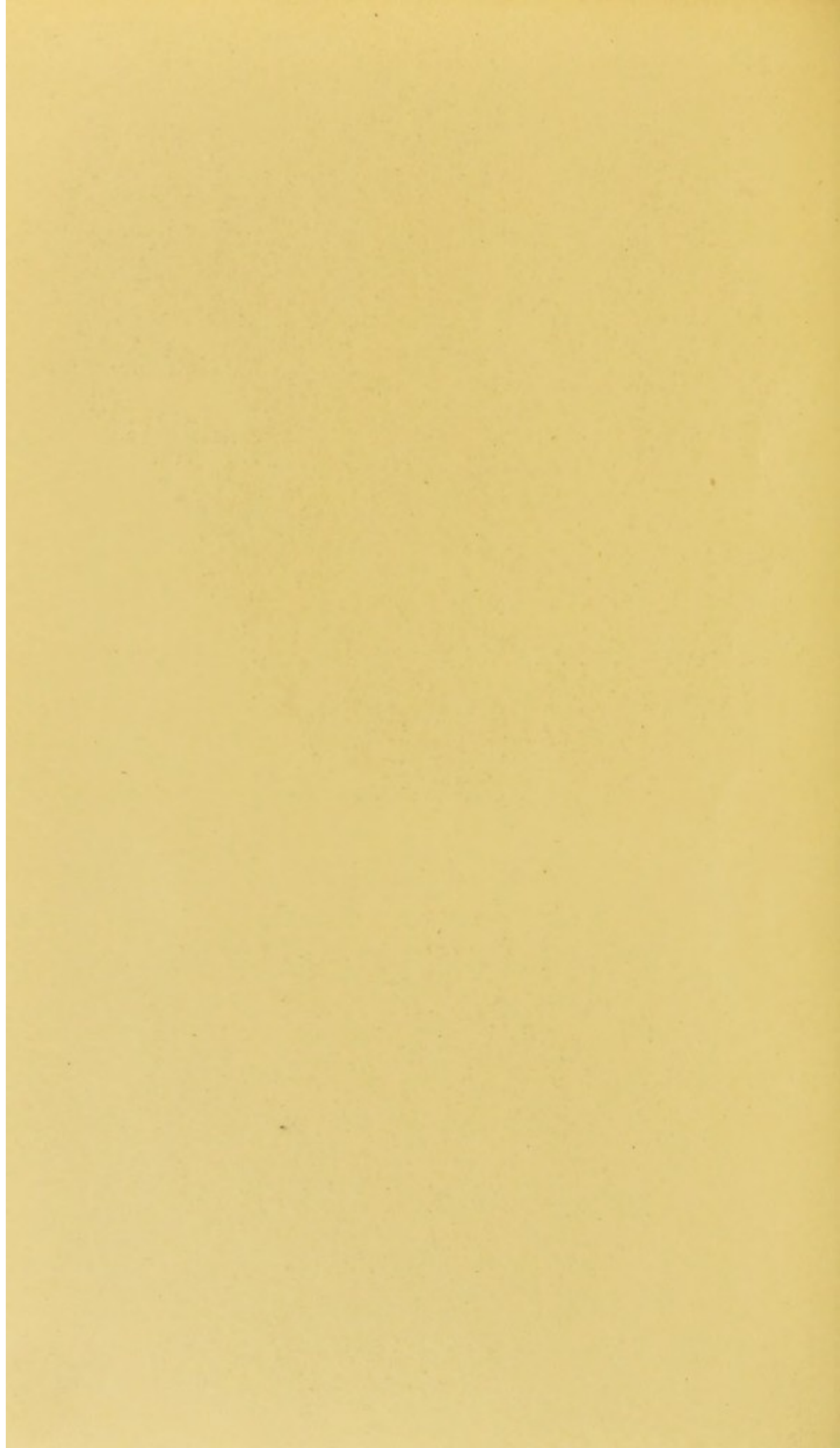


Fig. 2.





DESCRIPTION OF PLATE VI.

FIG. 1 represents a section of adenoid growth cut at right angles to the surface, and shows how the epithelium lining the cavities in the deeper part of the tumour is in reality but an invagination of that from the surface.

FIG. 2.—Portion of surface of a malignant adenoid growth.

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PLATE VI

Fig 1.

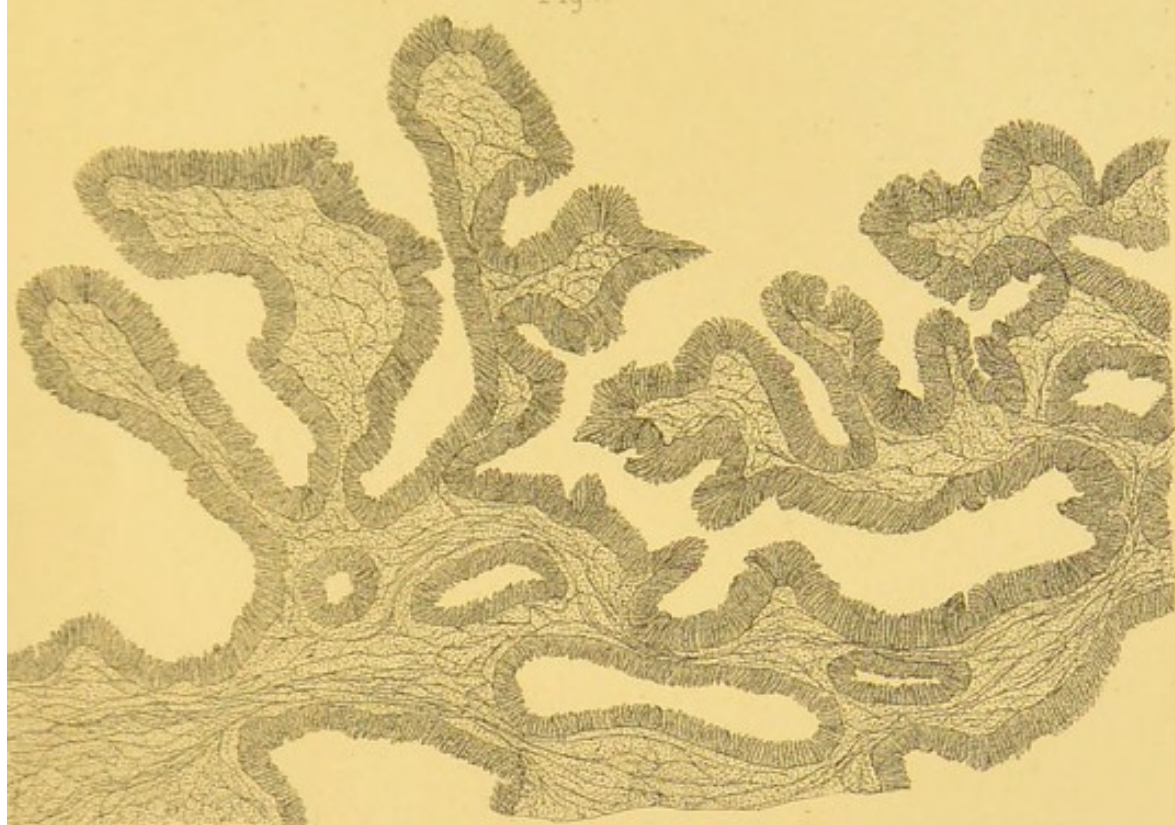
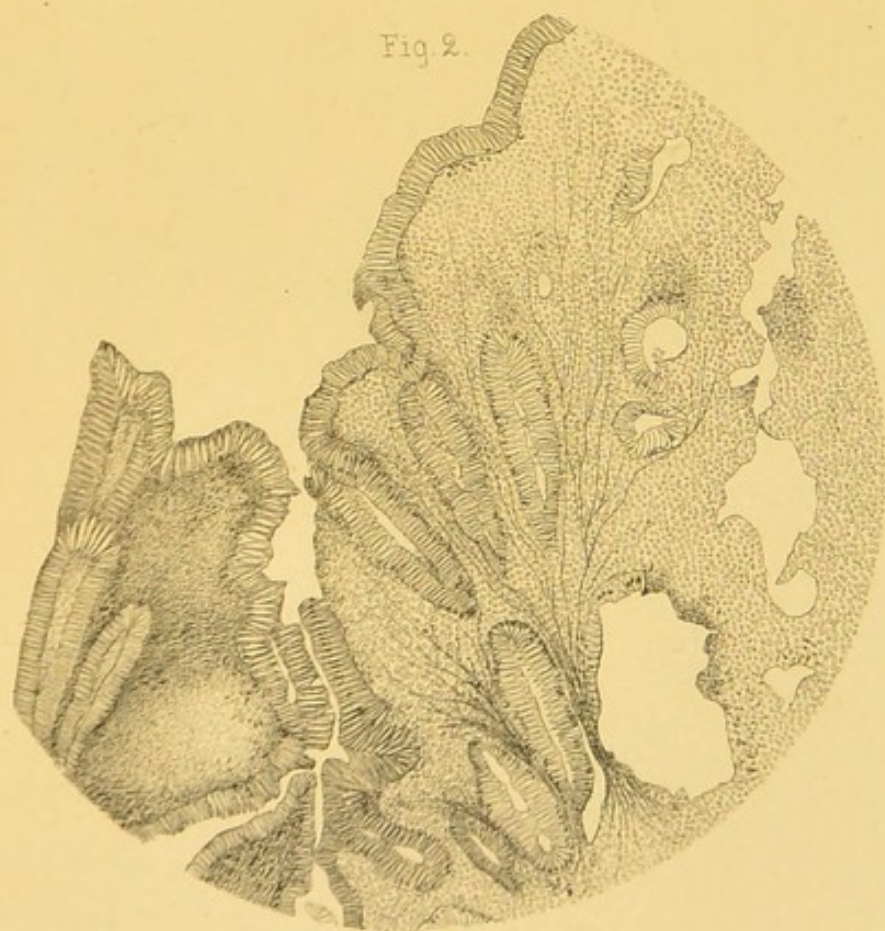
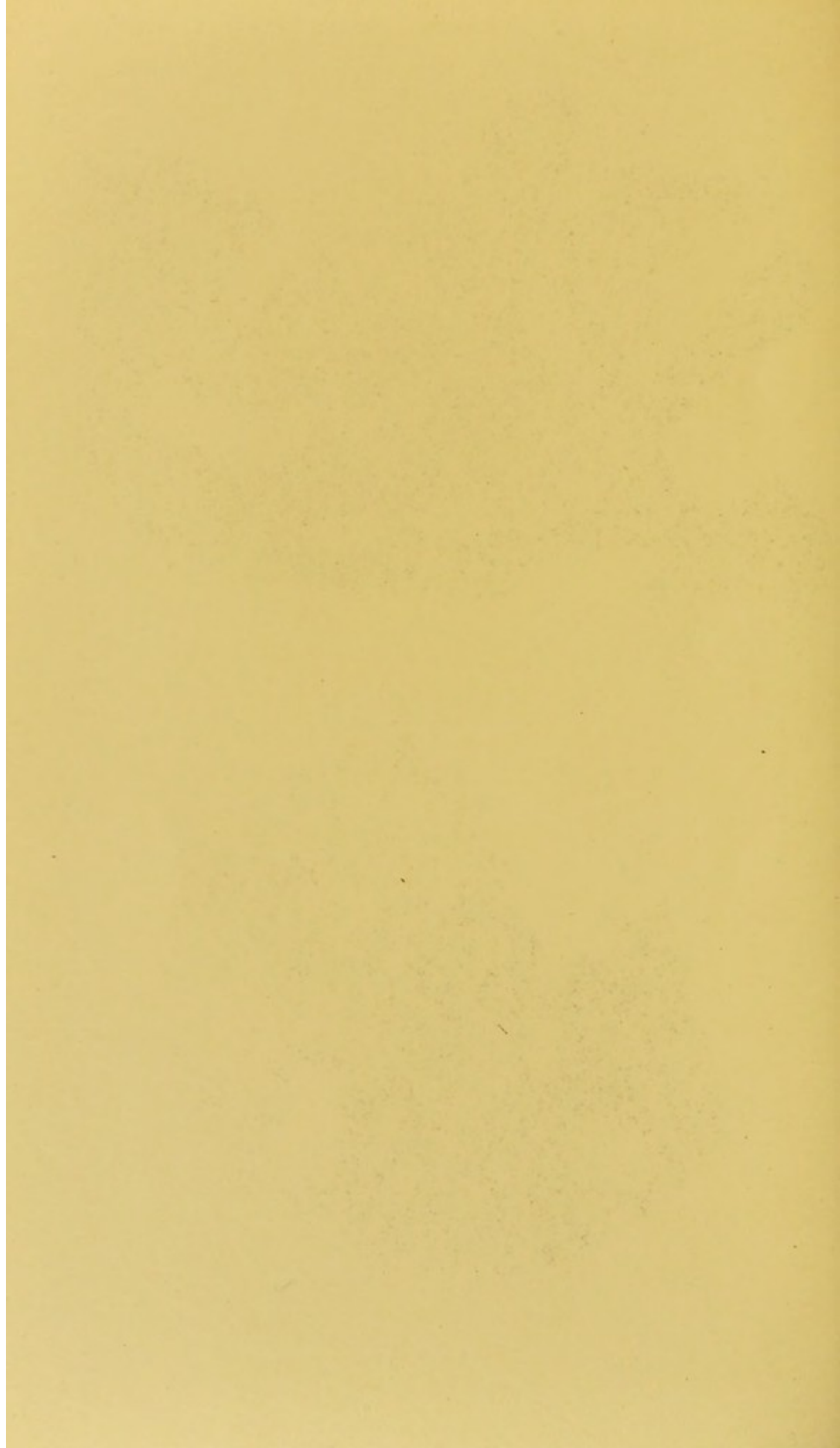


Fig 2.





DESCRIPTION OF PLATE VII.

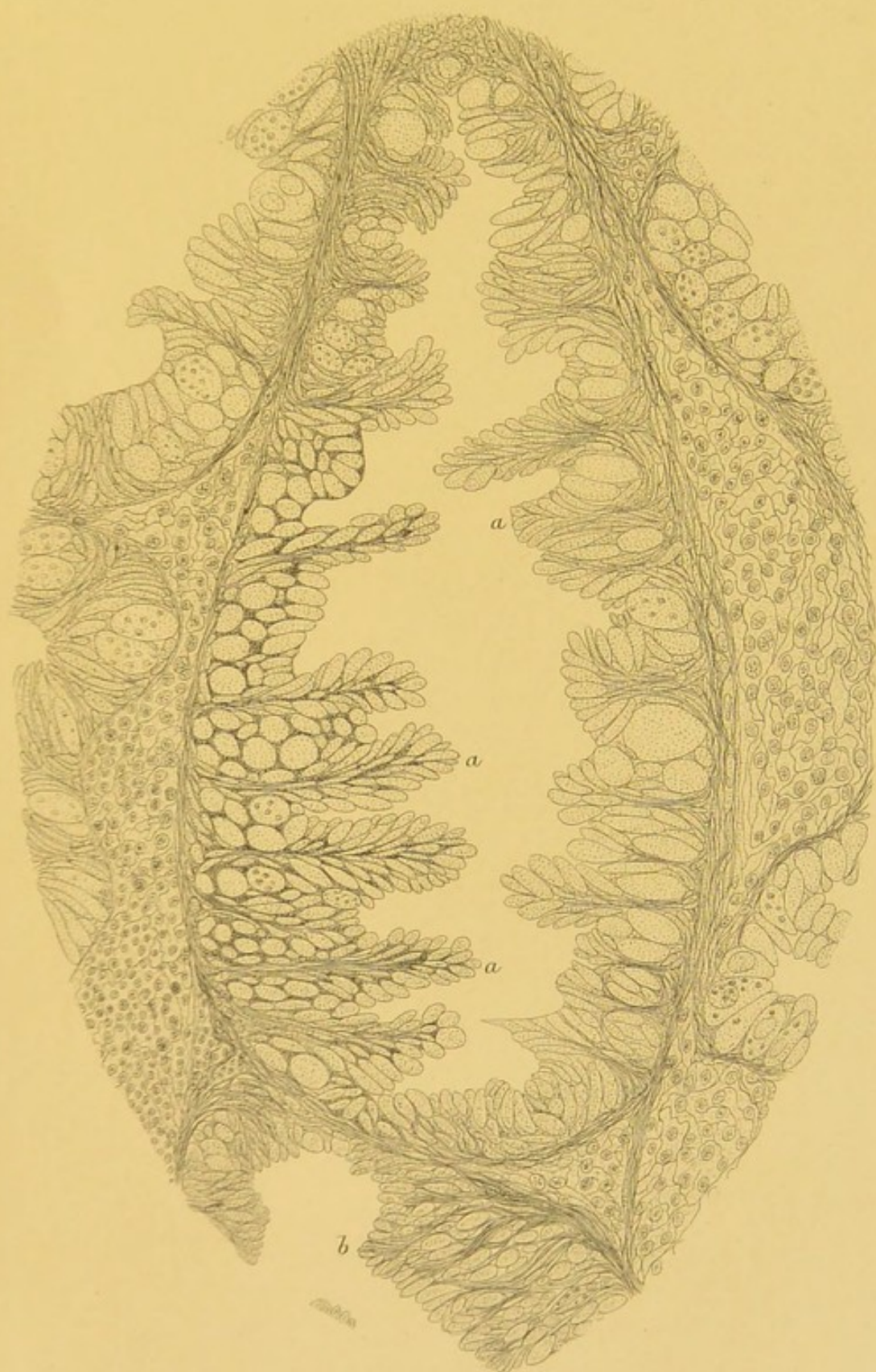
Section of a follicle in an adenoid growth. The cavity is becoming filled by secondary growths (*a, a, a*) from the lining walls.

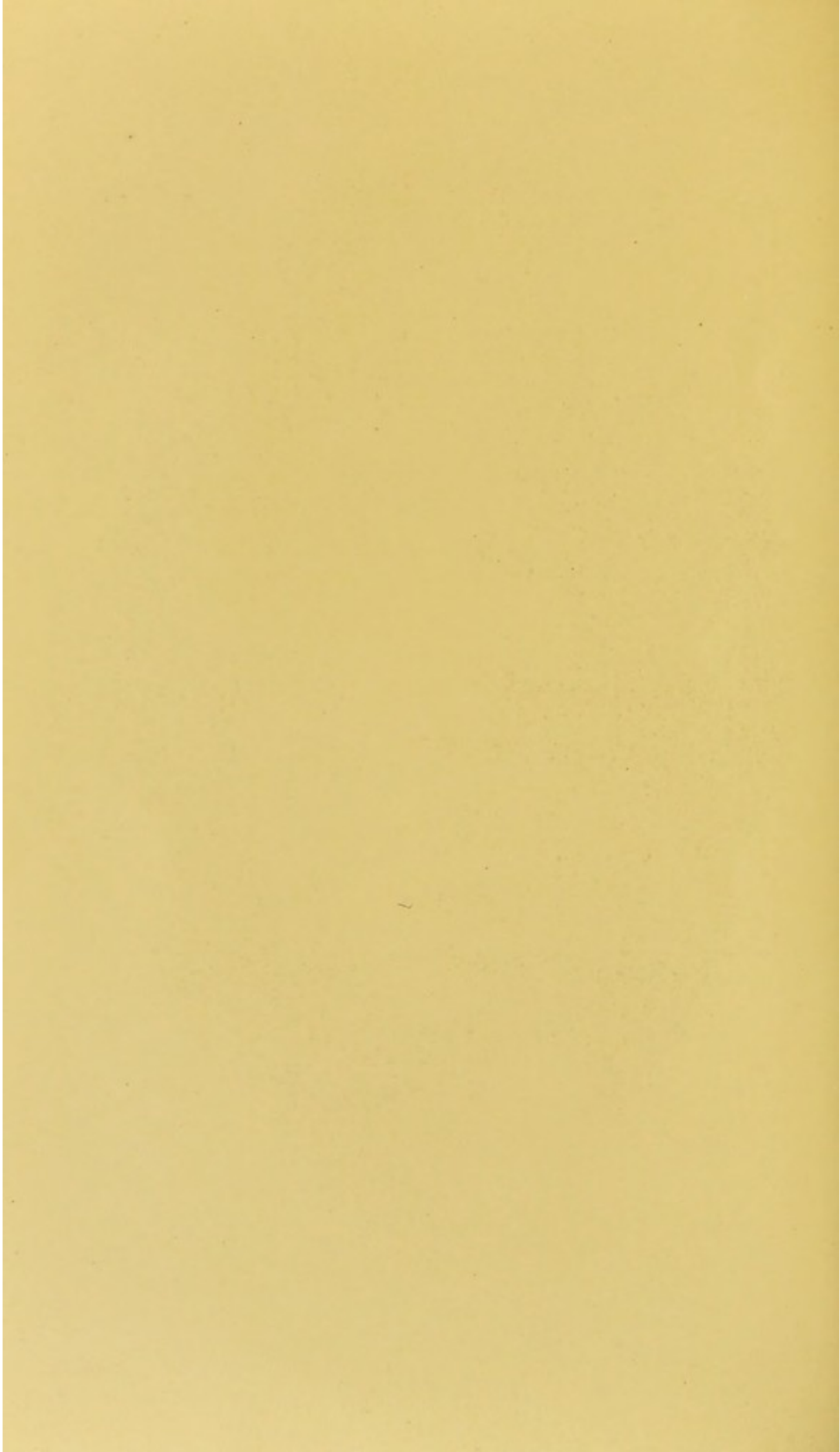
As the young cells are formed at the summit of a bud, they gradually elongate, and bend over at right angles to its axis.

In the lower portion of the section at *b* the formation of fibrous tissue from the epithelial cells can be traced. (Hartnack, obj. 7.)

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PLATE VII.





DESCRIPTION OF PLATE VIII.

FIG. 1.—Section of slow-growing adenoid rectal tumour (malignant) extending into the muscular coat.

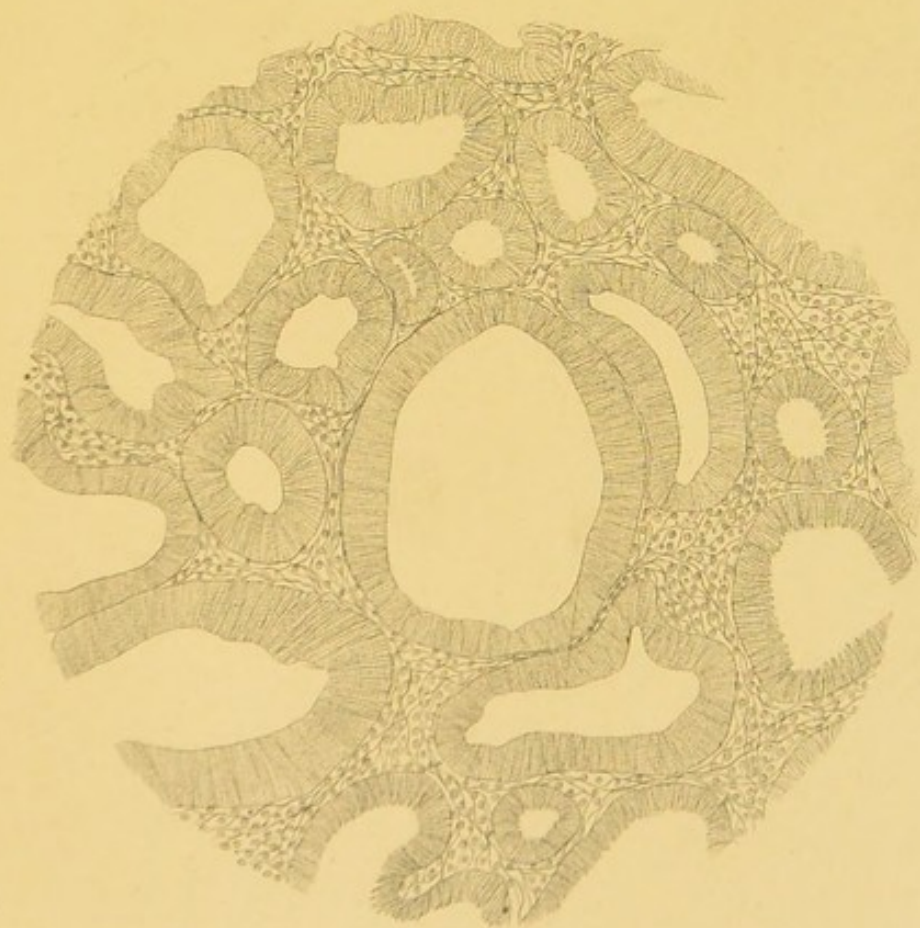
FIG. 2.—From a very slow-growing adenoid tumour (innocent). The epithelial cells are very regular, and the intervening retiform tissue clearly marked. (Hartnack, obj. 4.)

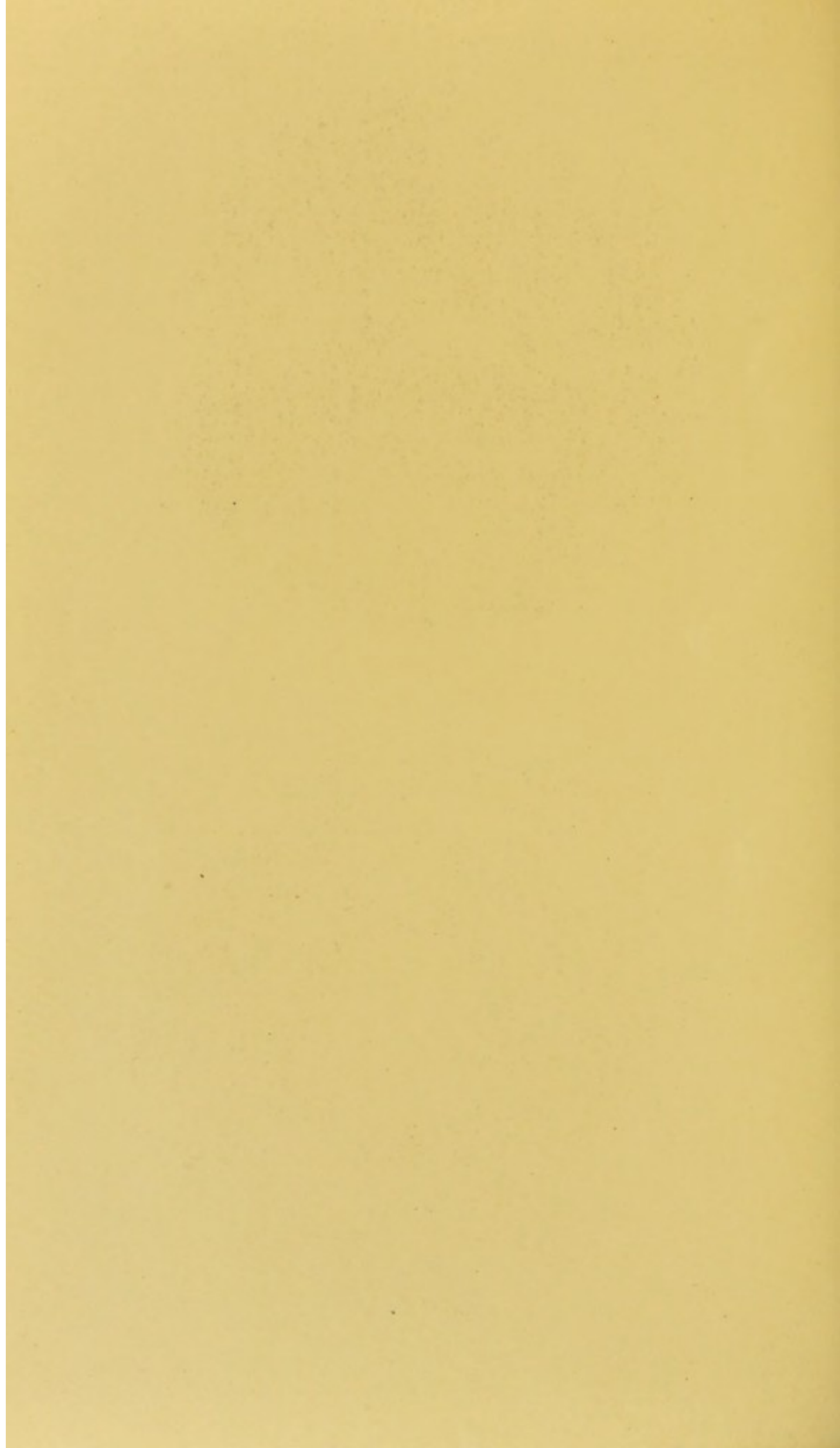
DRAWN BY B. HARRISON CRIPPS.

Fig. 1.



Fig. 2.





DESCRIPTION OF PLATE IX.

FIG. 1.—From rapidly growing recurrent fungous mass forming a large tumour in a few weeks. It is clearly seen to be of an adenoid nature, and is formed on the same plan as the growth in Plate VIII. The cavities, however, are very irregular. The epithelial lining and the intervening retiform tissue are embryonic and ill-defined. (Hartnack, obj. 4.)

FIG. 2.—Portion of the same under a higher power. The epithelial lining is scarcely recognizable as consisting of individual cells, for it rather resembles a mass of nuclei with their long axes pointing towards the cavities. The intervening retiform structure is so ill-developed as to represent little more than a spindle-celled tissue.

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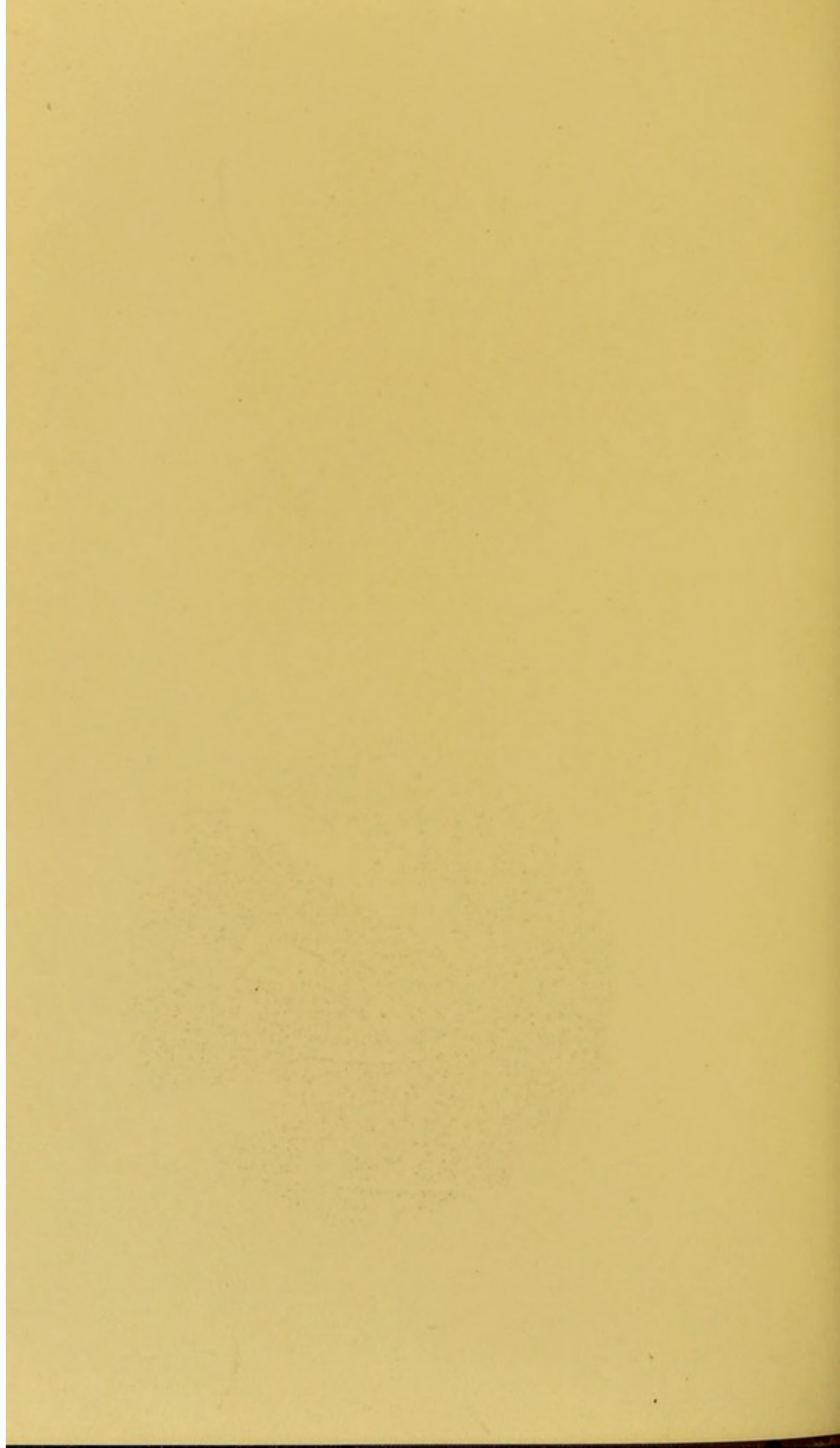
PLATE. IX.

Fig. 1.



Fig. 2.





DESCRIPTION OF PLATE X.

FIG. 1.—Section near margin of growth, showing the supposed identity of the nuclei of the epithelium, with the leucocytes of the retiform tissue.

Both the nuclei and leucocytes are darkly stained.

FIG. 2.—A section of the epithelial margin of a growing tumour showing the absence of basement membrane, and the intimate connection between the growing epithelial cells and the supporting retiform tissue. (Hartnack, obj. 7.)

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Fig. 1

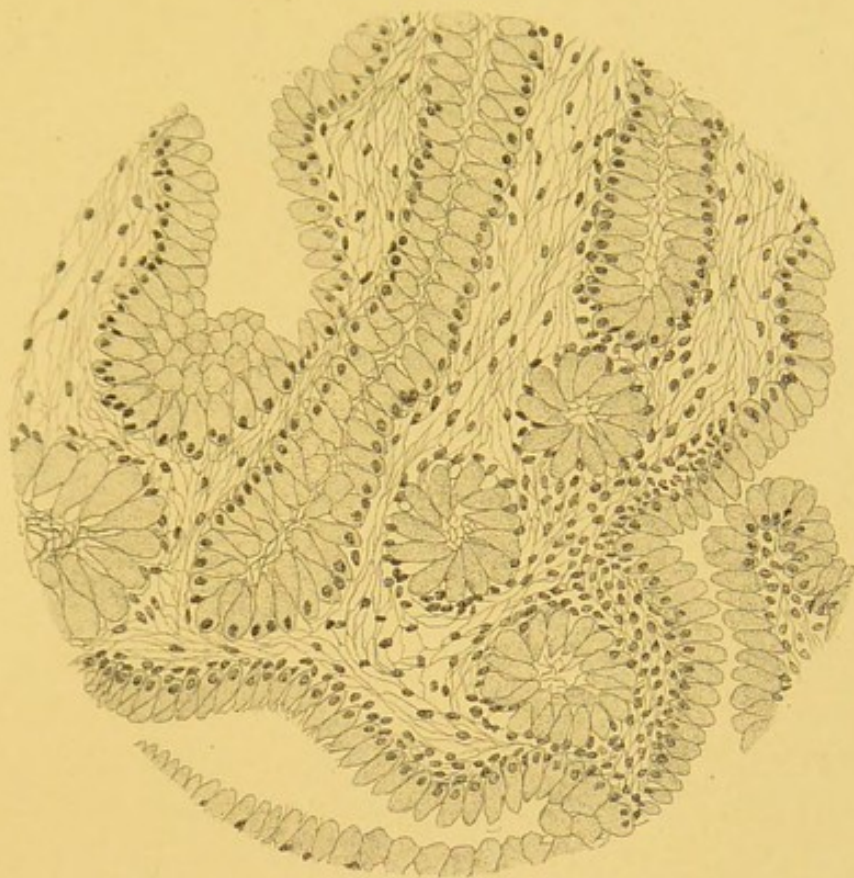
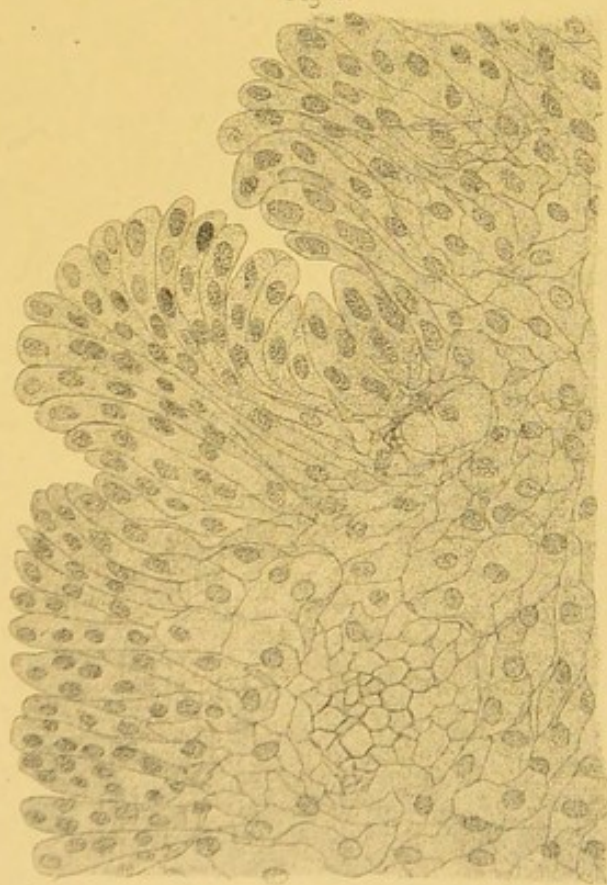
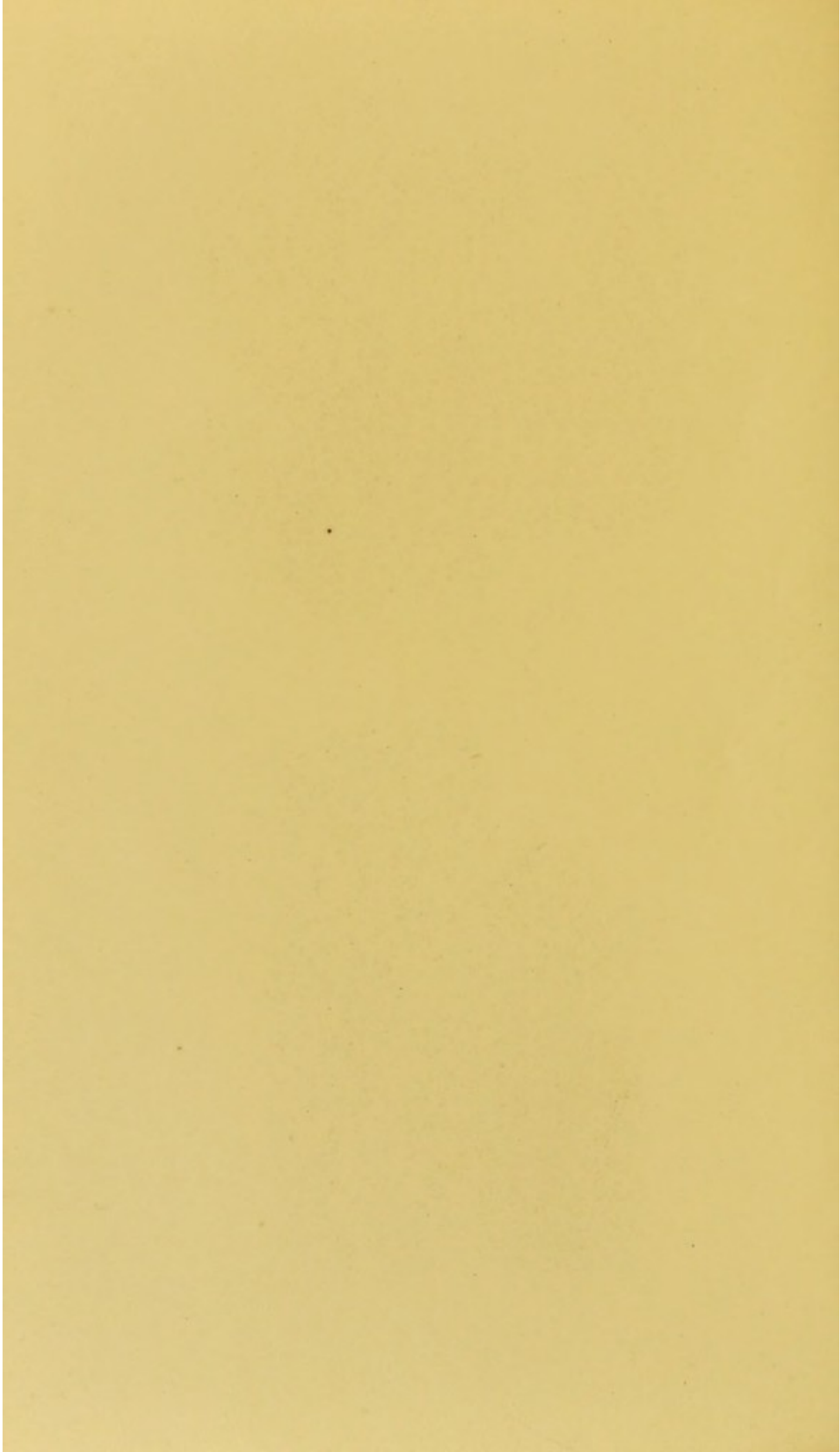
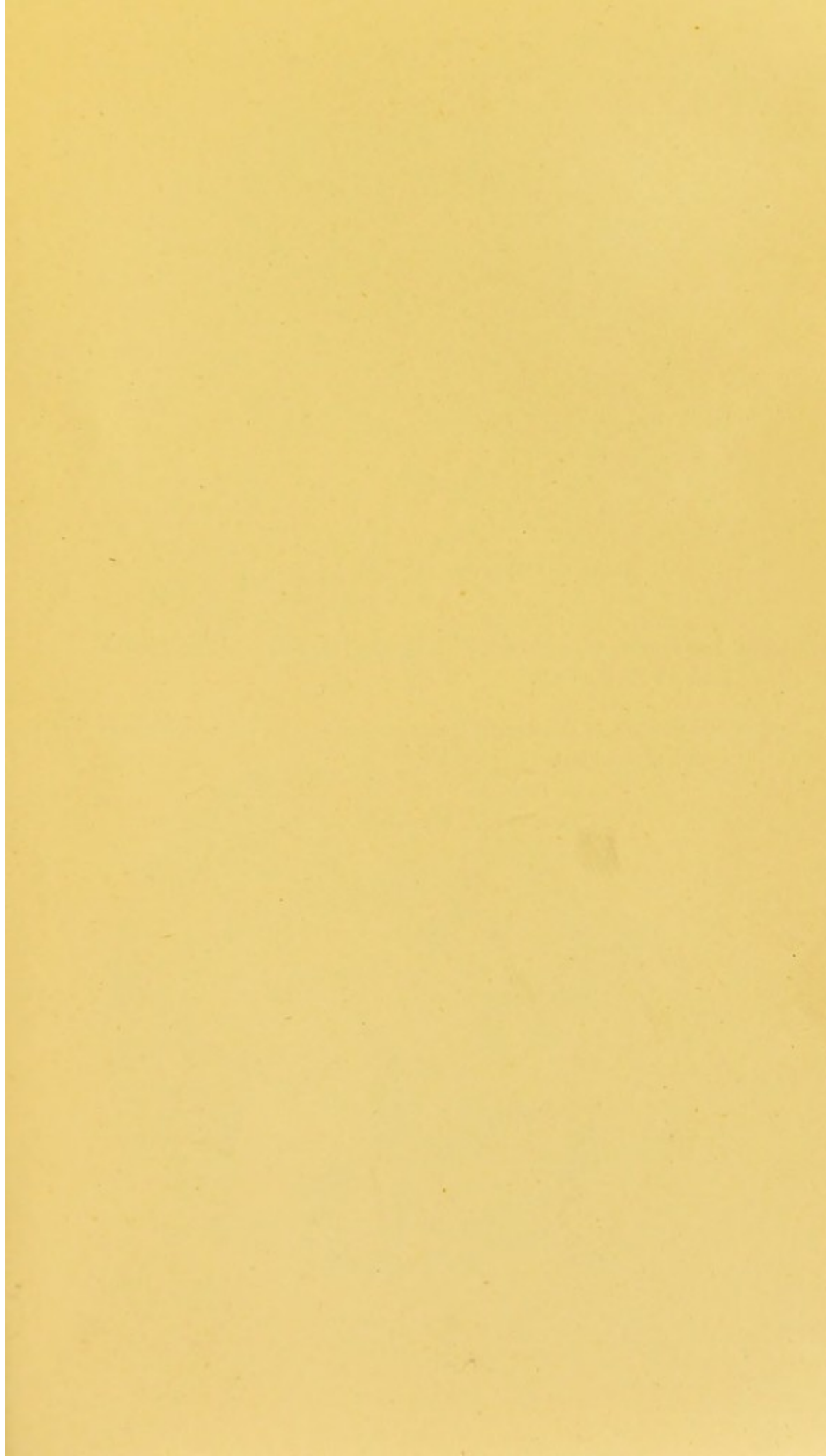


Fig. 2







DESCRIPTION OF PLATE XI.

FIG. 1.—Section through fat, showing the infiltration of the growth between the fat-cells.

FIG. 2.—Surface of an adenoid tumour seen through a one-inch power with a direct light.

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Fig. 1.

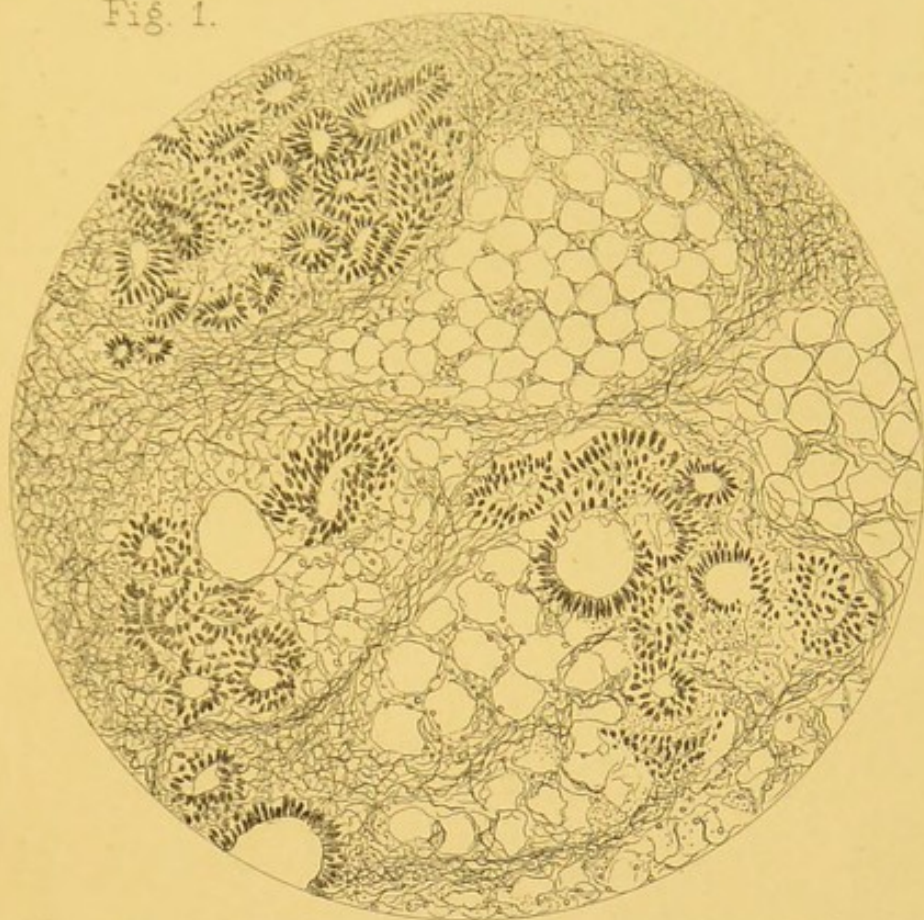
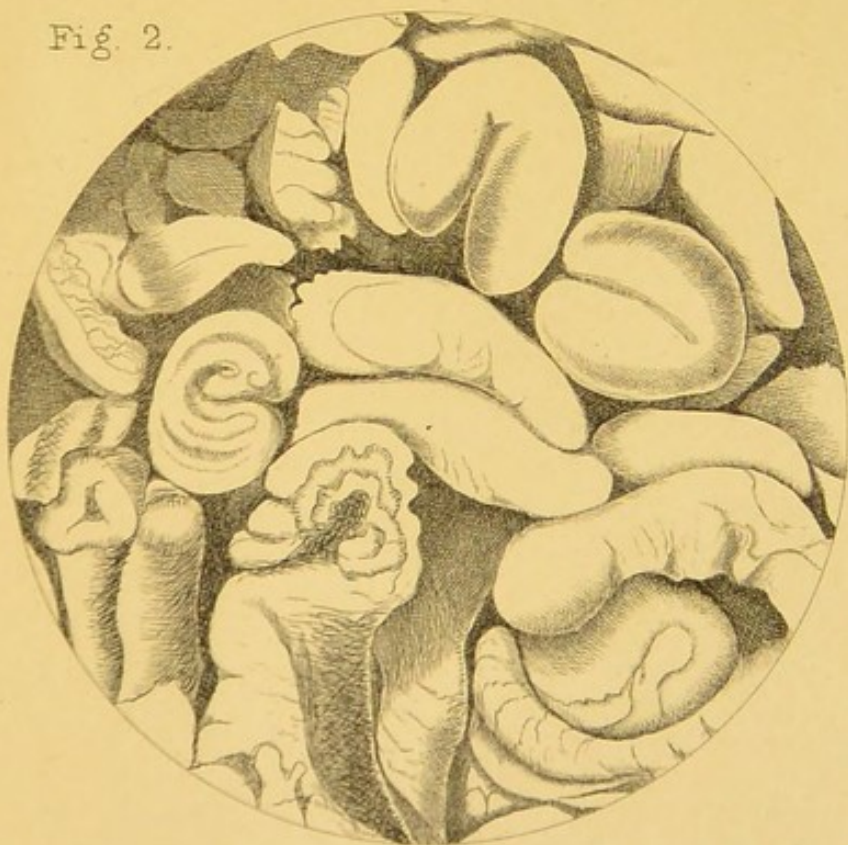
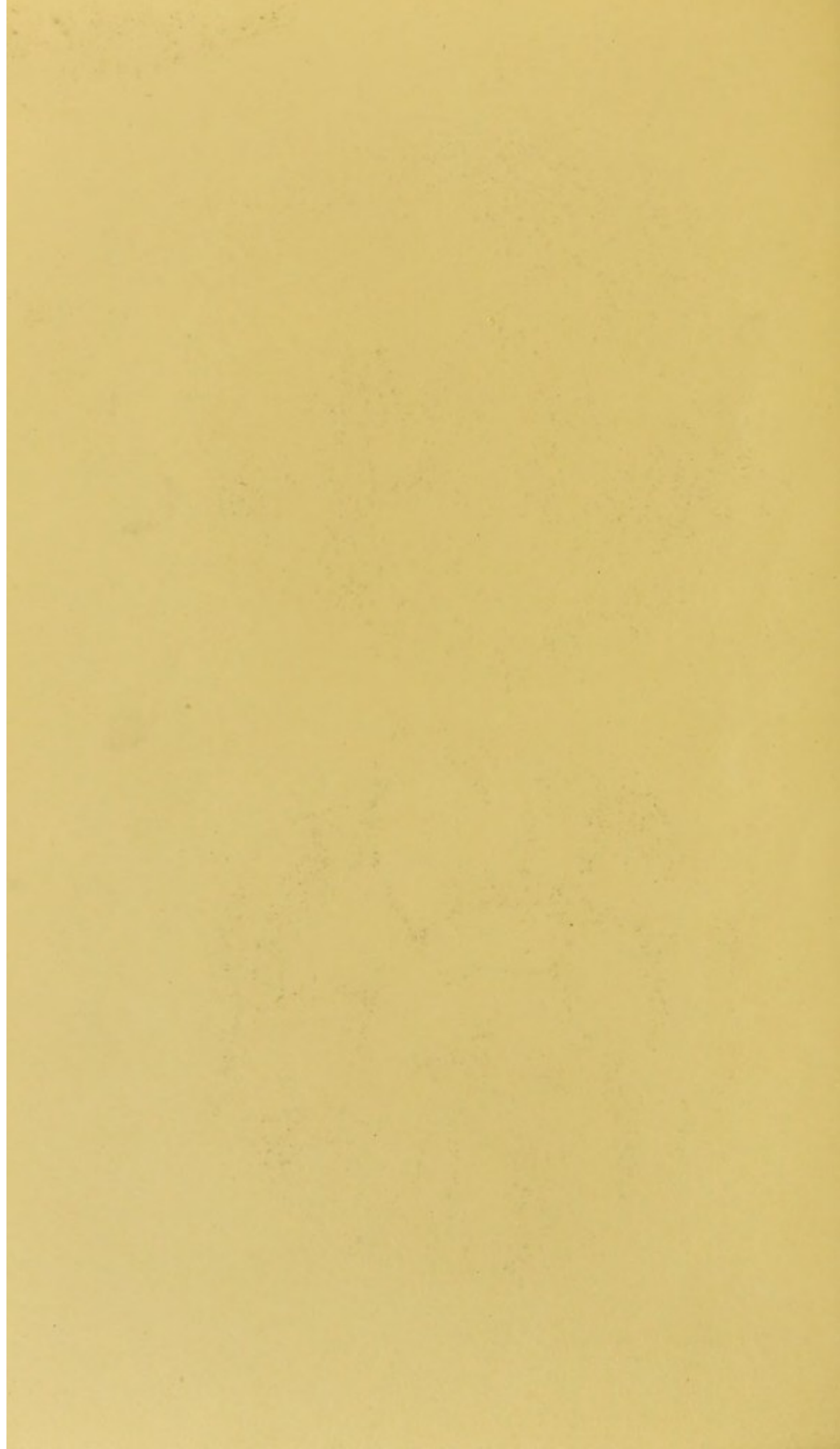


Fig. 2.





DESCRIPTION OF PLATE XII.

FIG. 1.—Section of fat-cells near the margin of the tumour. Between the fat-cells can be seen an infiltration of small lymphoid cells.

FIG. 2.—A section from the same specimen as Fig. 1, but cut from nearer the morbid growth. The lymphoid cells have acquired a distinctly epithelial character. In places the cavities of the original fat-cells remain, in others they have become obliterated. (Hartnack, obj. 9.)

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PLATE XII.

Fig. 1.

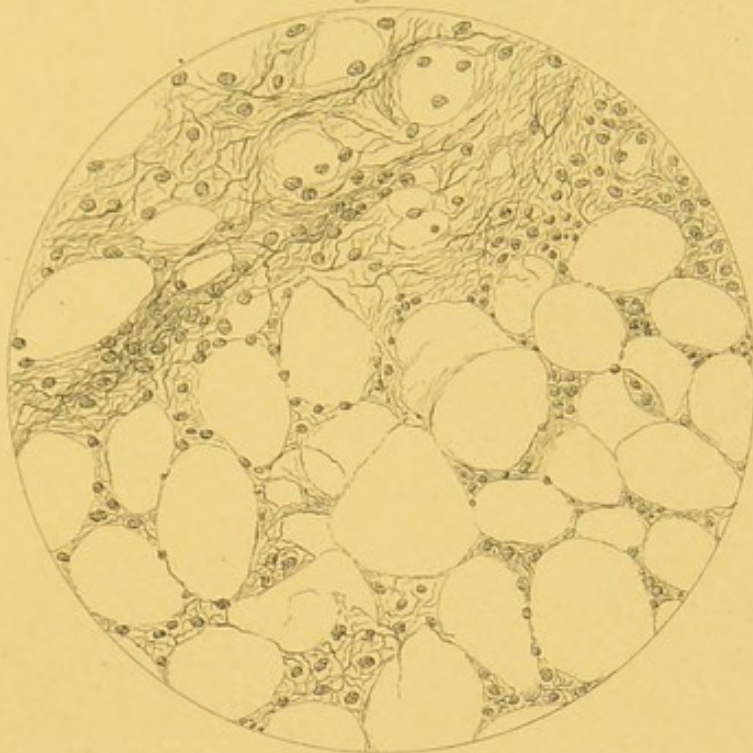
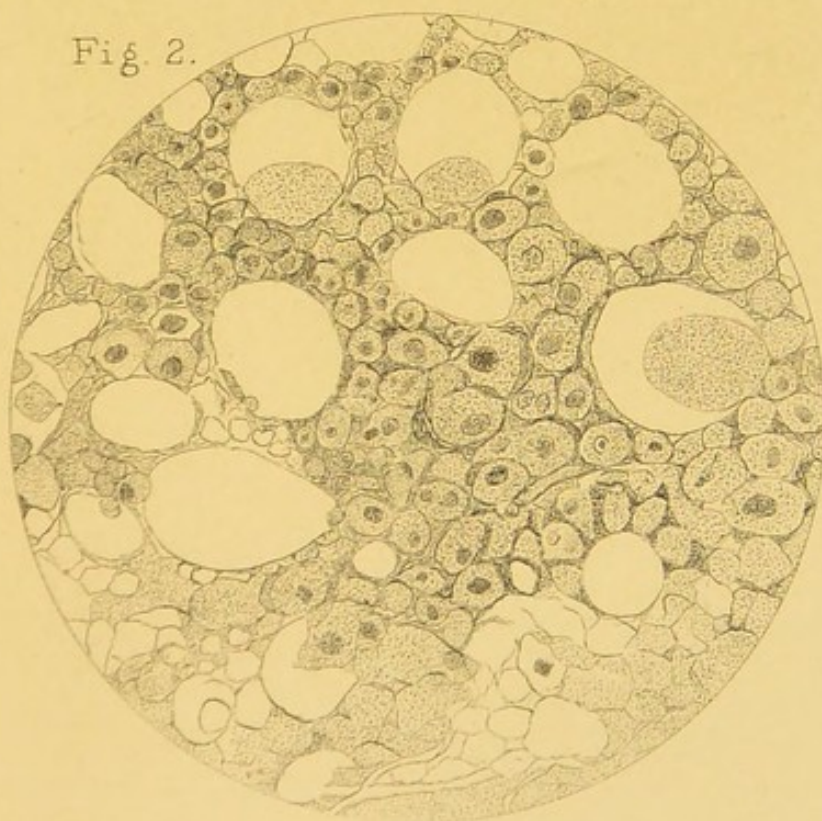
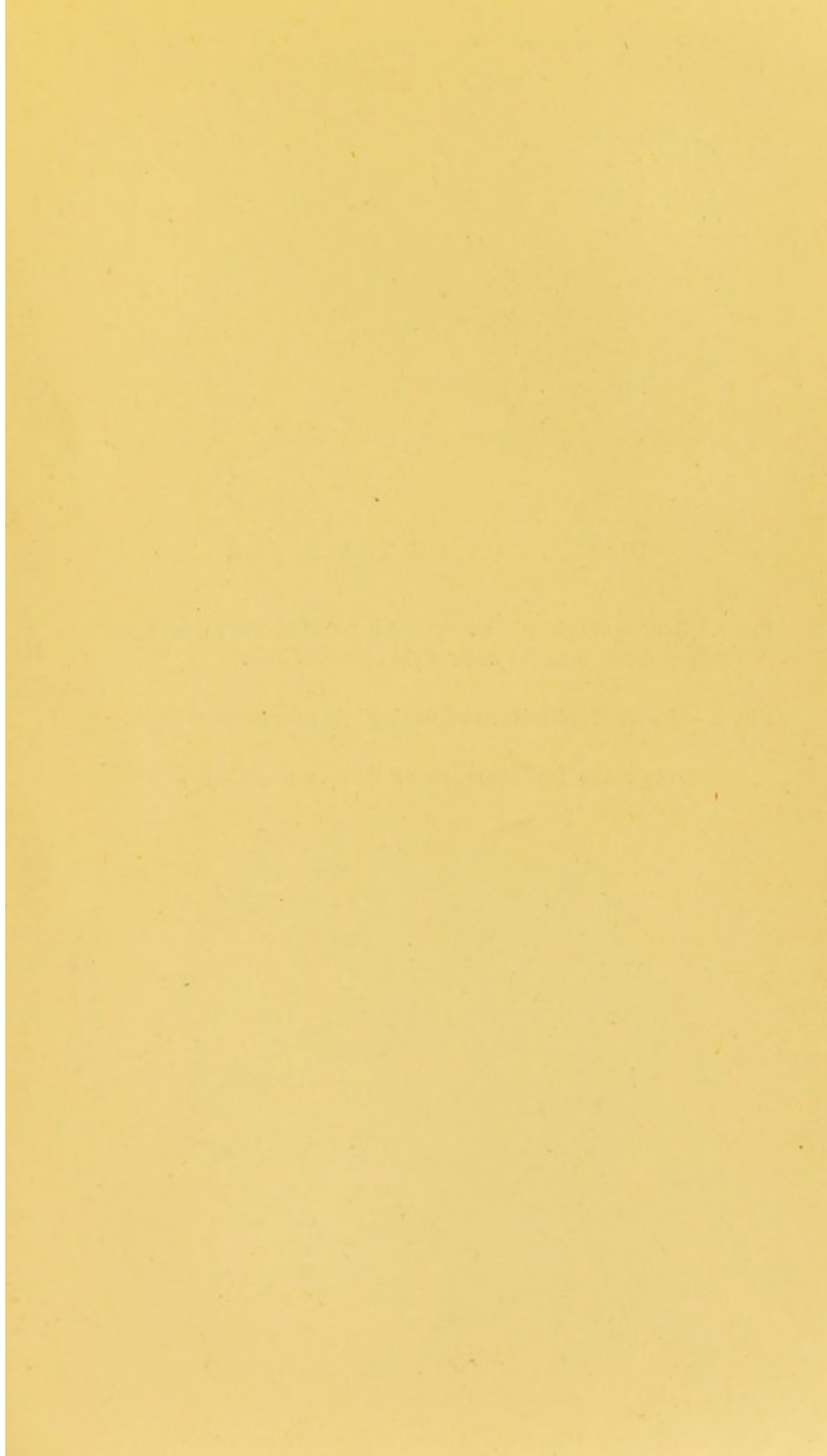


Fig. 2.







DESCRIPTION OF PLATE XIII.

FIG. 1.—Section of epithelioma. Slight bands of fibrous tissue appear to be forming from the walls of the epithelial cells.

FIG. 2.—Border of epithelioma advancing into subcutaneous tissue.

DRAWN AND LITHOGRAPHED BY B. HARRISON CRIPPS.

Fig 1

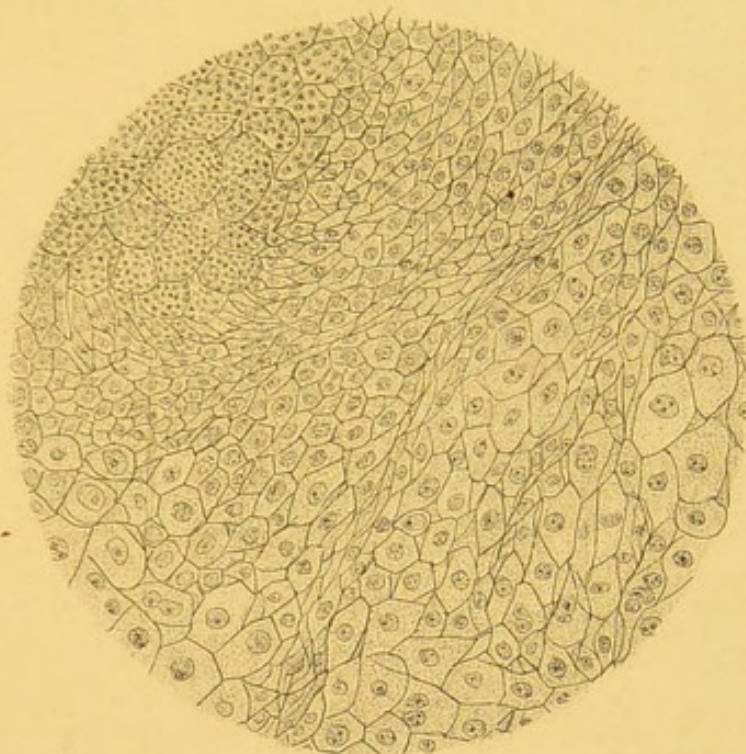
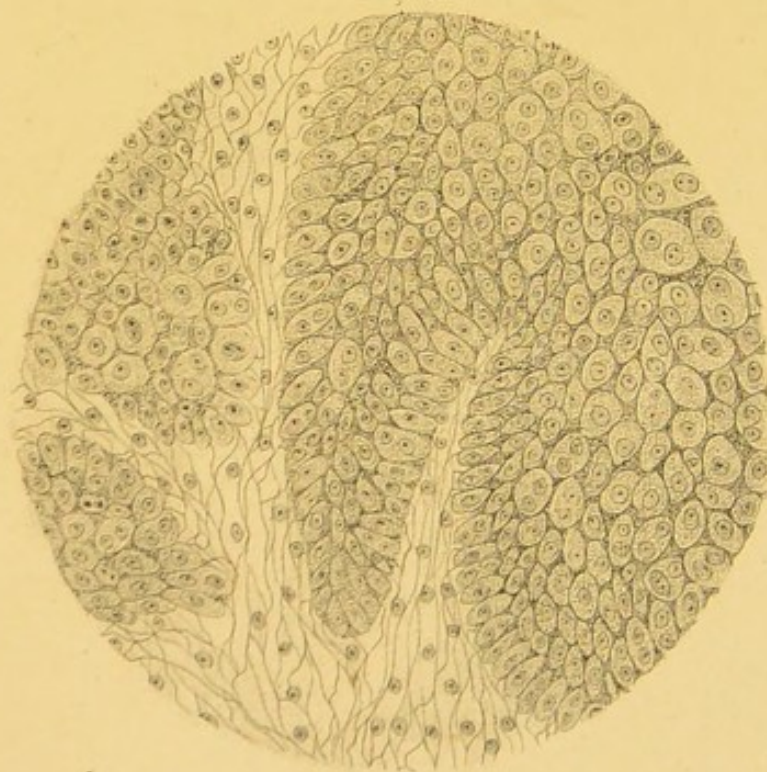
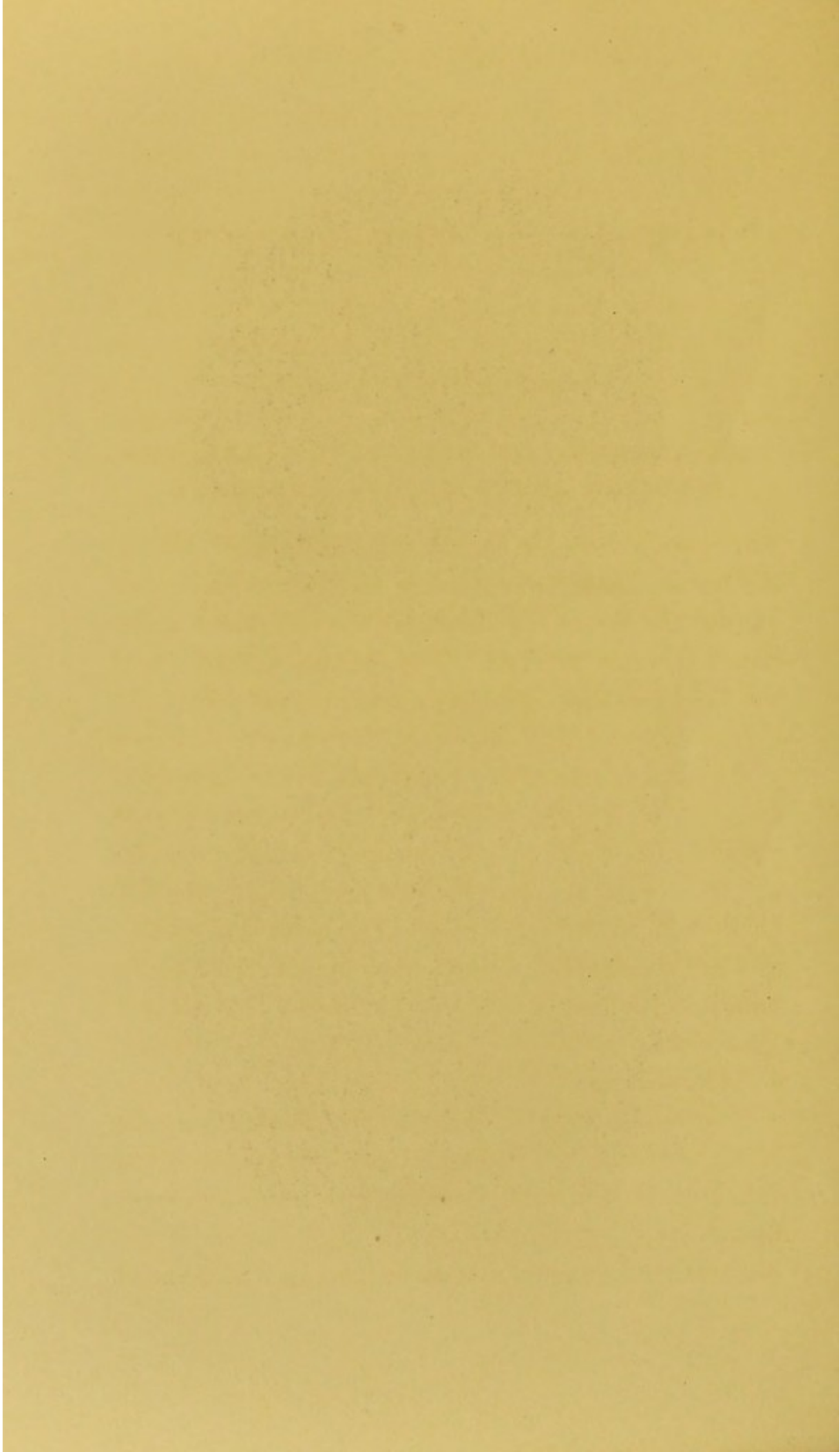


Fig 2





CANCER OF THE RECTUM.

CHAPTER I.

THE ANATOMY OF THE RECTUM AND THE FUNCTION OF ITS MUCOUS MEMBRANE.

THE rectum varies in length from six to eight inches, the latter measurement being more common in advanced life, for, as age increases, the tortuosity of the bowel is more marked. The rectum extends from the left sacro-iliac symphysis to the anal orifice, the course at first being obliquely downwards for three or four inches slightly to the right of the middle line. It then regains the middle line and follows almost precisely the curve of the sacrum and coccyx as far as the prostate, making another bend slightly backwards to the anal orifice. The rectum is smooth and not sacculated, the separate longitudinal bands found on the rest of the large intestine being absent. Immediately above the anus is a dilatation, often of considerable size.

The rectum may be conveniently divided into two equal portions. Of these portions, the upper will be found in relation behind with the sacrum, separated from it by the pyriformis muscle, by branches of the internal pudic artery, and sacral plexus. In front, it

is in contact with the posterior surface of the bladder (in man) when distended, and when the bladder is empty, with the coils of the small intestine. At its commencement the rectum is generally surrounded by the peritoneum, which binds it to the sacrum, but lower down the peritoneum covers its front surface only, and is then reflected on to the bladder, forming the recto-vesical pouch. In the female the vagina and uterus are interposed between it and the bladder. A knowledge of the exact distance to which the peritoneal pouch descends is of much importance. Anatomists vary considerably in their estimates of the distance from the anus at which the peritoneum is met with, but the want of uniformity in their results probably depends more on the manner employed in obtaining measurements than in any material deviation in the subjects experimented upon.

Dupuytren¹ gives the distance as about 70 millimètres, and further states that, if the bladder and rectum be completely empty, this distance is reduced, the peritoneum falling to the prostate.

Lisfranc² gives the distance as six inches in the female, four in the male, but does not state whether the bladder was distended or empty in his experiments.

Sappey, Velpeau, and Legendre nearly agree in giving the distance as about five and a half centimètres when empty, and eight centimètres when the bladder is distended. The English anatomists, Gray and

¹ La Médecine Opératoire de Lagutiere et Dupuytren, tom. iv. p. 218.

² Cancer du Rectum, Vidal, 1842.

Quain, make the distance four inches, but do not mention the state of the bladder or make a difference between the male and female. After careful measurement in a large number of bodies, I believe that two and a half inches when the bladder and rectum are both empty, and an additional inch when distended, will be about the average distance; the raising of the pouch by the distended bladder can be shown by injecting water through the ureter when the abdominal cavity is exposed. One of the means I employed in obtaining the measurements was by injecting the peritoneal cavity with plaster of Paris, and then thrusting a needle through the skin of the perinæum until its point impinged upon the plaster. My measurements correspond pretty closely with those of J. B. Roberts, who made a very complete and careful set of experiments in determining this question, his results being published in an interesting paper¹ read before the Philadelphia Medical Society.

The peritoneal pouch is pretty firmly fixed in its position, and in a healthy body can scarcely, if at all, be dragged down by pulling on the lower part of the rectum. In disease, however, especially if accompanied by a stricture, the constant straining of the patient during many months seems to render both the pelvic fascia and the peritoneal pouch much more mobile, and under such circumstances it is more readily drawn down.

The lower half of the rectum, extending from the

¹ Medical and Surgical Report, Philadelphia, June 9, 1877.

third piece of the sacrum to the margin of the anus, is in relation behind with the sacrum, coccyx, and fibres of the levator ani. Anteriorly it is in relation with the vesiculæ seminales, the base of the bladder, and the under surface of the prostate in the male, while in the female it is in connection with the posterior surface of the vagina. At its termination it is surrounded by the sphincter muscles, while it is also partly supported by the levatores ani. In the male the distance from the anterior margin of the anus to the bulb of the urethra is usually a good inch. Dr. Symington, in an able and interesting paper,¹ calls special attention to the relations of the opposed walls of the empty bowel to each other. By making frozen sections of the parts he demonstrates that in the last inch of the bowel (anus) the mucous membrane is seen thrown into numerous longitudinal folds—the columns of Morgagni—but the canal is essentially a longitudinal slit—with its lateral walls approximated. On the other hand, the rectum immediately above the anal canal presents the form of a distinct transverse slit, its antero-posterior walls being in contact. Dr. Symington thus agrees with Dr. Hart.²

The **Arteries** of the rectum are derived from the superior, middle, and inferior hæmorrhoidal, and sometimes a branch or two from the vesical. Of these, the superior hæmorrhoidal is the most im-

¹ Journal of Anatomy and Physiology, vol. xxiii.

² On some points in the Physics of the Bladder and Rectum, *Edin. Med. Journ.*, 1882.

portant ; it is the direct continuation of the inferior mesenteric, and runs down behind the rectum, slightly to the left of the middle line, between it and the sacrum, from about four to four and a half inches from the anus. It then divides into two branches, which almost immediately break up into three or four smaller branches, and run down parallel to one another close to the anal margin. These branches become looped, and anastomose freely with the middle and inferior hæmorrhoidal vessels. The main branches of the superior hæmorrhoidal running parallel with the bowel account for the smallness of the hæmorrhage from incisions made in its long axis and the profuseness of the bleeding from cuts made at right angles to its length. The fact of the lower part of the rectum being chiefly supplied by these branches, which run down in its coats, explains the comparative freedom from bleeding when isolating the lower end of the bowel from its lateral connections.

The **Veins** returning the blood from the anal margin are the middle and inferior hæmorrhoidal, the blood from which eventually finds its way into the internal iliac, but the rectum proper returns its blood by the superior hæmorrhoidal, from whence the blood passes by the inferior mesenteric to join the portal circulation. The superior hæmorrhoidal veins commence close to the anal verge, rather beneath the muco-cutaneous surface than the mucous membrane proper.

Some ten or a dozen minute primitive branches

starting from little pouch-like dilatations pass up the bowel for an inch or more, gradually converging into five or six larger veins, which, uniting, eventually form the inferior mesenteric. For the first three inches the rectal veins run beneath the mucous membrane between it and the muscular coats. They then perforate the muscular coats running the rest of their course external to the bowel. Much attention has been called to the fact that the veins pass through the muscular walls, especially by Verneuil, who believed that the contraction of the muscular fibres of the rectum was one of the active causes of internal hæmorrhoids, by obstructing the flow of blood to the portal circulation, a view which I consider there is little evidence to support. Most standard works on anatomy¹ state that the hæmorrhoidal branches of the inferior mesenteric veins inosculate freely with those of the internal iliac, thus establishing a communication between the portal and venous system. Such a communication may exist at the anal margin of the rectum, but I believe it is extremely slight, and moreover, if it does exist, the flow of blood can only be in one direction—viz., towards the iliacs.

This I have been able to demonstrate by the following experiments :—1st. The hæmorrhoidal plexus cannot be injected through the iliac veins, proving that if a communication exists that valves must prevent the blood flowing in this backward direction.

¹ Gray's Anatomy, 5th edition, p. 438; also Quain's Anatomy, 7th edition, vol. i. p. 479.

2nd. The hæmorrhoidal plexus can be at once injected through the inferior mesenteric, but the injection will not pass on into the iliac veins, so that if any communication exists it must be very slight.

The foregoing experiments in great measure corroborate the view so ably maintained by John Gay,¹ on his well-known work in hæmorrhoidal diseases.

The **nerves** supplying the highly sensitive surface about the anal margin are derived both from the fourth sacral and the pudic, while the external sphincter and levator ani also obtain muscular filaments from both these sources. The terminal branches of these nerves communicate freely with the small sciatic, and through it with the sacral plexus and great sciatic. These communications probably explain the phenomenon of transferred pain sometimes experienced in rectal disease.² The rectum receives its nerve supply from the hypogastric plexus of the sympathetic.

The **lymphatics** of the anus are generally distinct from those of the rectum, the former running to the inguinal glands, the latter to the sacral and lumbar glands. It is important to remember this, for it will account for the constancy with which the inguinal glands become infiltrated after the anus has for any length of time been cancerous ; while cancer of the rectum will often run its course without any external symptoms of glandular enlargement. I say occasionally, for notwithstanding that the cancer is

¹ On Hæmorrhoidal Disorders, 1882, by John Gay.

² See case mentioned by Brodie in his Lectures, vol. iii. p. 141.

well within the rectum and has not spread to the anus, the inguinal glands sometimes become infected, such as in two cases mentioned in the chapter on Cancer,

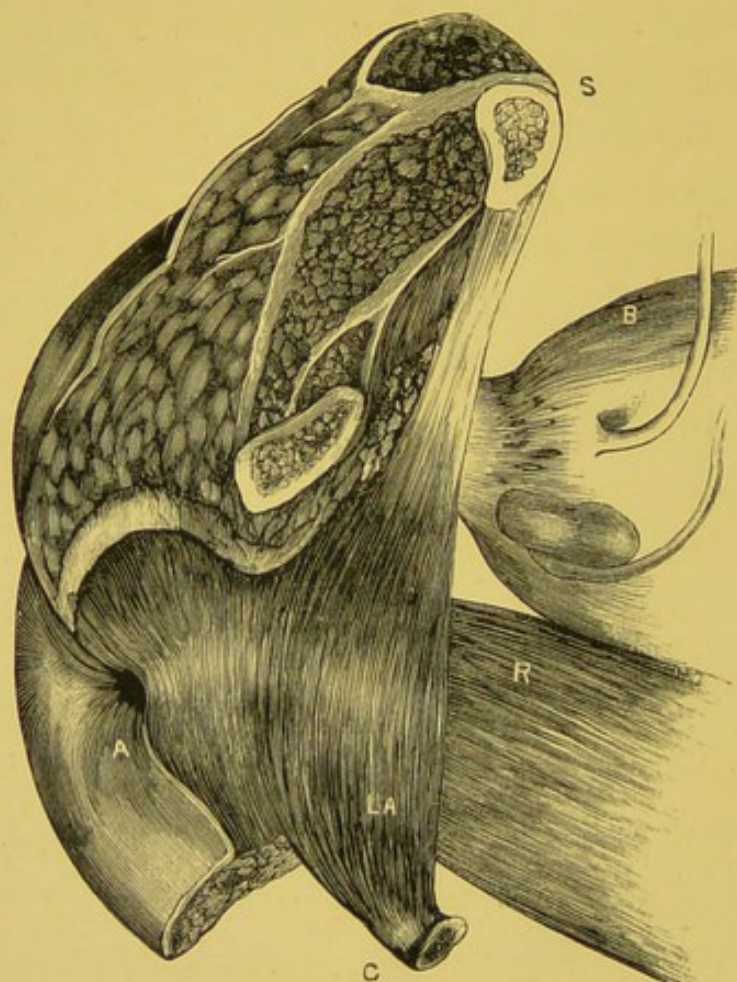
Levatores Ani.—I would wish to call special attention to the anatomy of these muscles, as having an important bearing on the mechanism of rectal stricture. With the valuable assistance of my colleague, Mr. Lockwood, I made a careful examination and dissection of these muscles, and found that the origin and insertion of the fibres do not correspond with the descriptions given in the ordinary text-books of anatomy.

Quain, Gray, and Ellis give almost identical descriptions of these muscles, of which the following, from Quain,¹ is an example :—

“ The levator ani arises in front from the posterior surface of the pubes, near the symphysis, and midway between its upper and lower borders ; behind, from the spine of the ischium, and between those points from the pelvic fascia along the line of attachment of the obturator fascia. Some of its fibres are also traceable upwards in the substance of the pelvic fascia above the level of the obturator. From this extensive origin the fibres of the levator proceed downwards and inwards towards the middle line of the floor of the pelvis. Its posterior fasciculi are inserted upon the side of the lower end of the coccyx ; the bundles immediately in front of the coccyx unite in a median raphé with those of the opposite side as far forward as the margin of the

¹ Quain's Anatomy, 7th edition, vol. i. p. 262.

FIG. 1.



SIDE VIEW OF THE LEVATOR ANI.

A, anus ; B, bladder ; C, coccyx ; R, rectum ; L A, levator ani muscle ; S, pubic bone sawn through external to symphysis. The fibres of the levator ani are seen arising by a tendinous attachment from the pubic bone, the posterior fibres then cross the rectum at nearly right angles, two inches from the anus, to be inserted into the coccyx.—Drawn from a Dissection by William Pearson at the Royal College of Surgeons.

anus ; the middle and larger portion of the muscle is prolonged upon the lower part of the rectum, where it is connected with the fibres of the external sphincter, and slightly with those of the internal ; and, lastly, the anterior muscular bundles pass between the rectum and the genito-urinary passage, and, descending from the side of the prostate unite beneath the neck of the bladder the prostate and the neighbouring part of the urethra, with corresponding fibres from the muscle of the opposite side, and blend also with those of the external sphincter, and deep transverse peritoneal muscles."

With the greatest respect to the authorities quoted, I venture to assert that the description is inaccurate, and the following account I believe will be found to correspond to what may be seen in the dissected body.

In proof of the accuracy of my observations, I would refer my readers to two of Mr. Pearson's specimens at the College of Surgeons. One of these is a side view of the parts, and is used as one of the dissections at the primary anatomical examinations. The other is in the museum, and shows both the levatores ani in position as dissected from behind.

If a side view of the pelvis be made, and the part dissected in such a way as to expose the whole of the outer surface of the levator ani, it will be seen that a large portion of the fibres arising from the inner surface of the symphysis and from half an inch of the anterior portion of the white line pass obliquely downwards and backwards, to be inserted on the sides of the coccyx. The upper half of the muscle is ten-

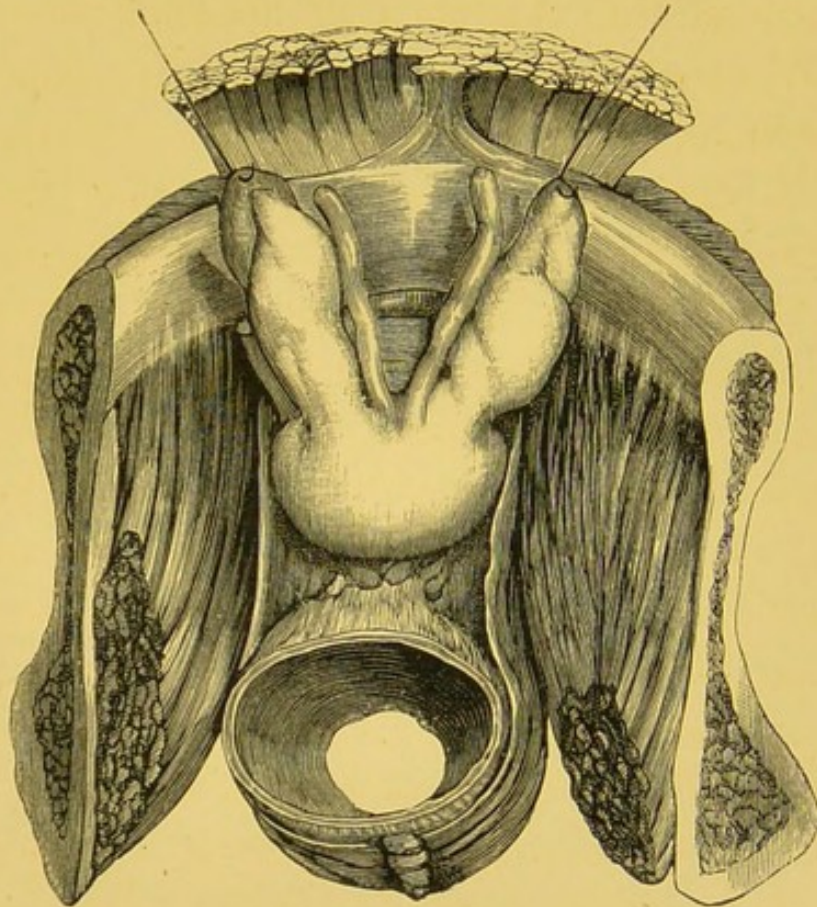
dinous, while the lower half, or that attached to the coccyx, is muscular. The posterior edge of the muscle is somewhat thicker, and forms a distinct and free border, which crosses the rectum at very nearly right angles: the point of bisection being an inch and a half to two inches from the anus. In the specimen referred to in the College of Surgeons there is a particularly thick band of fibres thus passing from the inner surface of the symphysis to the sides of the coccyx. (See fig. 1.)

Again, by referring to the drawing (fig. 2), in which both muscles are seen *in situ* from behind, it will become obvious what must be the action of the levatores ani when they both contract simultaneously. So far as the coccyx is movable, they will tend to draw that bone upwards towards the symphysis, but, since in most bodies the coccyx scarcely moves, they will act powerfully as compressors of the rectum, squeezing the sides of the canal together as it passes between their two inner surfaces. In fact, when contracted, owing to their insertion near the middle line, they assume a shape like the letter V, the arms of which only diverge about an inch from each other at their attachment to the symphysis.

On passing the finger into the bowel of a dissected specimen, and then drawing on the origin of the muscles, the sensation is communicated to the finger as if a cord or narrow piece of tape were encircling the bowel on its outer surface.

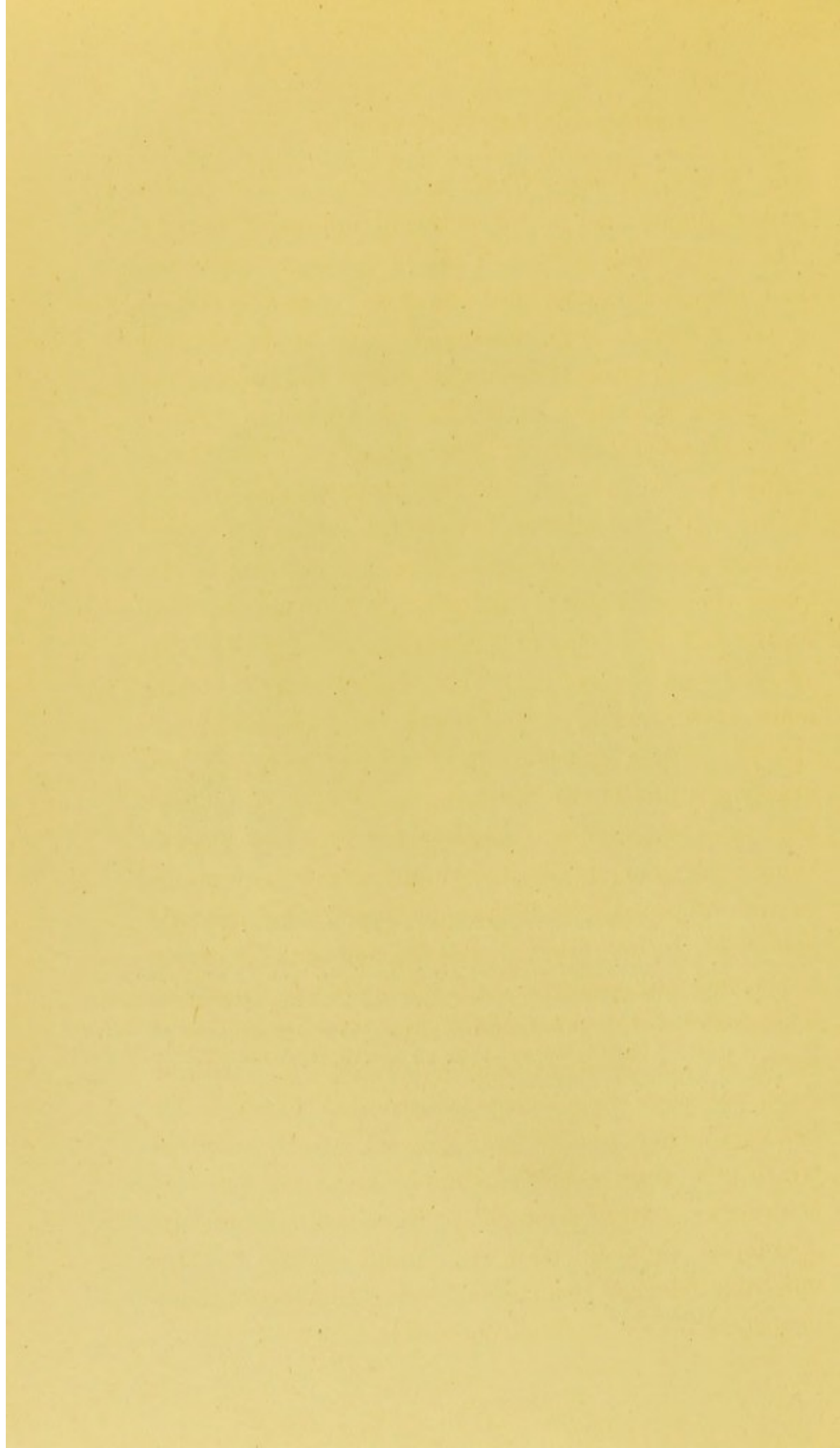
Now, if the finger be passed into a healthy bowel, a momentary grip will be felt as it passes through

FIG. 2.



LEVATORES ANI SEEN FROM BEHIND.

The prostate and vesiculæ seminales have been drawn upwards by hooks. The free posterior borders of the levatores ani are seen passing downwards from near the symphysis to the coccyx, partially encircling the rectum in their course.—From a Dissection by William Pearson at the Royal College of Surgeons.



the lower portion. This, no doubt, is due to the reflex contraction of the internal sphincter muscle. The contracting portion of the bowel is generally the last inch, but sometimes, however, the contraction extends further up, a discrepancy due to the varying width of the internal sphincter fibres. If the patient be now told to draw up the bowel as much as possible by voluntary movement, the finger will be found again to be grasped by the lower portion of the bowel. The amount of bowel thus voluntarily contracted varies greatly in different individuals. In some the contracted portion ends at least an inch and a half from the anus, corresponding to the tip or sides of the coccyx. The upper margin of the contracted portion ends abruptly, and gives a sensation of a broad muscular band round the bowel, not crossing it exactly at right angles to its axis, but set slightly obliquely as if sloping towards the coccyx. Since this contraction is brought about and maintained voluntarily it cannot be due to the internal sphincter, an involuntary muscle, neither is it owing to the external sphincter, which merely surrounds the anal outlet. But by remembering the dissection I have already described of the levator ani, it will at once be seen that these contracting fibres really belong to that muscle, and especially to those fibres which pass from near the symphysis to the sides of the coccyx. In women these fibres are more highly developed than in men, no doubt owing to the muscular floor of the pelvis having to support more important organs than in the male.

Some of the fibres of the levator ani, or, at any rate, some of the fascia to which they are attached, pass over the rectum blending with the fibres of the opposite side, which helps to explain the sphincter-like action that can be exerted by these muscles on contracting, and throws much light, as will be subsequently explained, on the pathology of rectal stricture.

The **Rectal Walls** consist of four coats—mucous, submucous, internal muscular, and external muscular. These coats can be readily separated the one from the other by dissection. From the mucous and submucous tissue many fibrous bands run down perpendicularly between the bundles of muscle, and these fibres becoming slightly thicker form a septum between the muscular bands (figs. 1 and 2, Plate I.). Upon reaching the plane between the external and internal muscular coats a large number of the fibres assume a horizontal direction, while others pass vertically into the external coat, where they again form the septa between the bundles of muscle. Some fibres pass quite through the external coat and blend with the fibrous stroma of the surrounding fatty tissue. From the perpendicular septa dividing the larger muscular bundles numerous fine processes pass off between the muscular fibres; these again subdividing form the ultimate sheaths of the individual fibres of muscle. It will be thus seen that the connection between the various coats is formed by portions of fibrous tissue being directly continuous from one to the other, and also by the continuity of the blood and lymph-vessels. The total thickness of

these coats collectively varies greatly in different subjects. The variation is found chiefly in the muscular coats, the other two coats remaining pretty constantly of the same thickness.

At three to four inches from the anus in a healthy rectum the thickness of the mucous membrane, that is, from base to apex of a follicle, is millimètre 0.4.

Mucous Membrane.—This consists of Lieberkühn's follicles and the intervening tissue. The follicles are tubular depressions arranged with great regularity; they are set so close together that the width of the intervening tissue is, on the average, about one-sixth the diameter of the follicle. (See fig. 2, Plate I.) The length of the tubes is about four or five times their diameter, the respective measurements being—length, millimètre 0.35; diameter, millimètre 0.08. These tubular depressions are lined with epithelial cells arranged with their long axes at right angles to the cavity. The apices of these cells look into the cavity of the follicle, while their bases rest upon the adjacent retiform tissue. On cross section it is seen that from fifteen to twenty cells are required to complete the circular lining. While from above downwards their number amounts to forty or fifty. Taking the higher figures in each case, $20 \times 50 = 1000$ will represent the number of individual cells in each tubular depression. In each square inch of the large intestine there are about 57,000 follicles—the number of cells $57,000 \times 1000 = 57,000,000$ —in each square inch. These cells are directly continuous with those lining the surface of the mucous

membrane, and are, therefore, continuous from one follicle to another.

The length of the individual cells varies greatly, but have an average length of about $\frac{1}{600}$ th of an inch, with a diameter of $\frac{1}{2000}$ th. The lumen of the follicle occupies one-third of its diameter.

The appearance of the cells is analogous to the bee's honeycomb—that is to say, that the intervening wall is common to two cells, or has become common by fusion with its neighbour. This appearance is seen in fig. 20, Plate II., the pressure of cells one upon another causing them to take a well-marked hexagonal form. The cell boundary is a structureless material formed by a condensation of the peripheral portion of the cell substance. The interior of the cell contains a semi-transparent material more or less granular. One or more nuclei are contained within the cell, situated nearer the base than the free end.

The intertubular tissue consists of a fine trabecular network, the meshes of which are very long in the vertical direction, looking, as is probably the case, like narrow lymph-paths running in a direction parallel to the follicles. These meshes are filled with small cells (leucocytes). Perhaps, however, it is hardly right in health to describe the interfollicular tissue as a network, since it is often not more than a single channel. Lymphoid tissue also forms the bed upon which the tubular glands rest. This tissue is well supplied with blood-vessels.

The submucous coat is chiefly composed of a

network of retiform tissue, in which blood-vessels ramify freely. The whole of this network of spaces gradually converges towards the thin straight lymph-paths which run horizontally both in the submucous tissue and between the layers of muscular fibre.

Since, however, the whole of my sections showing the commencement of the lymph-spaces have been taken from morbid specimens, a detailed description of these spaces will be found further on.

The principal office of the mucous membrane of the rectum is absorption, although, at the same time, its surface supplies the lubricating mucus for the fæces. Proof of its absorbing function is supplied by positive evidence. A few ounces of beef-tea injected up the rectum rapidly disappear. Narcotics, especially opium and its preparations, are absorbed as quickly by the rectum as by the stomach. Sometimes the absorption by the rectum is more rapid than by the stomach. The injection of strychnia may be taken as an example.

Without such positive proof the identity of structure between the rectum and the small intestines would afford strong presumptive evidence that they had similarity of function. A careful examination proves the analogy between the villi and follicles, for it can be demonstrated that the follicles are nothing more than what may be described as inverted villi. A glance at the drawing (fig. 2, Plate I.) will show the alternating arrangement of the follicles and villi. It would appear as if every

endeavour had been made to make available the largest possible surface upon which to spread out epithelium.

Supposing for a moment that it was possible to stretch and spread out a portion of the intestinal mucous membrane in such a way that both the follicles and villi became flat, that is, on the same level, a surface would be formed of columnar epithelium resting on a bed of lymphoid tissue, in which lymph-ducts would be ramifying together with the small blood-vessels, and the surface corresponding to the villi or follicles would lie on the same level and be identical in structure. The surface occupied by the spread-out membrane would cover many times the area of the same membrane when corrugated into the projections of villi or the depressions of follicles.

Another proof that the villi are nothing more than the growing up of the interfollicular retiform tissue is to be found in the morbid growth of the rectum, known as villous tumour, in which form of growth it can be clearly seen that the villi are produced in this manner. Again, it would be mechanically impossible to have a villous arrangement of the mucous membrane without corresponding follicular depressions.

Seeing the structure is identical and the position merely altered by necessity, it is difficult to conceive that the two have distinct functions. In the large intestine it is possible that the absence of villi is on account of the increasing firmness of the fæces and

the diminution of the amount of digested material requiring absorption, the surface lining the depressions being sufficient for purposes of absorption, without the villous projections, which would be liable to injury from the hardened fæces.¹

The whole surface of mucous membrane being lined by epithelium, it is clear that absorption must take place through the epithelium, or through the substance between the individual cells.

It appears, however, highly probable that this so-called intercellular substance (or spaces) is nothing more than the blended outline of two adjacent cells, on the grounds given on a subsequent page, in which case absorption would really take place through the epithelial cells themselves.

Possibly the nuclei of the columnar epithelium may be the means of taking nourishment into the body by escaping into the retiform tissue between the glands, and thus becoming lymphoid cells. According to this view, the columnar epithelial cells lining the rectal follicles have a far higher function than that generally assigned to them by physiologists, and, instead of being employed in a simple secretion of mucus, they are in reality the parents of the leucocytes of the body. They might thus be regarded as representing so many points of individual life, absorbing their nourishment from the intestinal contents, and multiplying by the division of their

¹ As an instance of this, a specimen of the College of Surgeons (No. 1,288), in which colotomy had been performed twenty years before death may be taken as an example. The whole mucous membrane below the opening in the colon is thickly covered with villi.

nuclei, which are passed into the subjacent retiform tissue. The network of retiform tissue underlying the epithelium must be regarded as the dilated commencement of the intestinal lymph system, spread out so as to receive the nuclei from the superjacent epithelium, and to convey them along the lymph-channels to the circulation. It is perhaps dangerous to argue from morbid specimens that a similar process takes place in health. Nevertheless, microscopic evidence afforded by some of my specimens is very suggestive of the theory propounded. One of my specimens, shown at the Pathological Society in 1881, represents an appearance so clear and remarkable that it may be well to give the history of the specimen.

Although I have some thousands of sections cut from many different specimens, the specimen exhibited, together with two or three imperfect slices from the same growth, are the only ones in my possession which show, with anything like similar distinctness, the appearances about to be described.

The section in question was taken from a recurrent nodule, or more probably from a portion of growth which had escaped removal at the first operation. A portion of growth, about the size of a small hazel-nut, was, at the instant of removal, placed in weak chromic acid solution, being subsequently transferred to spirit and dyed with logwood in the usual manner. It would seem, therefore, that the exceptional clearness of the specimen was possibly due to its rapid transfer to the hardening fluid. (Fig. 1, Plate X.)

In this specimen the nucleus-like bodies towards the base of the cylindrical epithelial cells forming the surface of the hypertrophied mucous membrane are remarkably clearly defined owing to the intensity by which they have taken the staining. In the sub-epithelial retiform tissue a considerable number of lymphoid cells are similarly darkly stained. In form, size, and the extent to which they have taken the dye, there is no perceptible difference between the bodies (nuclei?) within the epithelial cells and the bodies (leucocytes?) within the retiform tissue.

It is scarcely possible not to believe but that they are identical the one with the other. The difference of situation alone remains, and even this in portions is no longer noticeable, for here and there the bodies can be seen so close upon the boundary line between the epithelial and the retiform tissue that it would not be possible positively to state whether the body should still be regarded as a nucleus within the epithelium or as a lymphoid cell in the retiform tissue.

In other specimens suggestive appearances may be seen as to the identity of leucocytes and epithelial cells; if, for instance, the apex of a growing epithelial bud, such as can be seen in Plate VII., be examined, the young cells which first appear have no visible features by which they can be distinguished from the leucocytes or granulating tissue. This gradual conversion of the lymphoid into the epithelial type can also be well studied when these morbid growths are extending into adipose tissue. Plate XI. is a section

of some fatty tissue lying external to the rectal wall, into which the new growth is gradually penetrating. In some portions of the specimen the fat cells are normal ; in others they are completely replaced by the growth.

The first appearance of morbid infection consists in the infiltration of a single layer of leucocytes between the walls of the individual fat cells in such a way that they (the fat cells) become completely surrounded by a one-celled layer of leucocytes. It can next be observed that these leucocytes, surrounding themselves with protoplasm, gradually increase in size, and, in so doing, compress the fat cells between whose walls they lie, so that after a time the outline of the original fat cell is represented by a ring of new growth, a small cavity only remaining to mark the spot of its existence. This, too, in its turn, often becomes completely obliterated by its walls being compressed into apposition, so that all that remains of what once was the cavity of a fat cell is a double line of fine fibrous tissue, the compressed walls of the original cell.

In the meanwhile the invading growth, which was primarily represented by a layer of leucocytes, is now represented by epithelial cells into which the leucocytes have changed, arranged in a circular manner (Plate XII.). It is upon this evidence and that of the growing epithelial buds that the possibility of the development of the lymphoid into epithelial cells is based.

If we now refer to the specimen described on p. 18,

and figured in Plate X., and consider what evidence can be adduced to establish that the lymphoid bodies are rather travelling from than towards the epithelium, it must be remembered that the argument is that a lymphoid cell can develop into an epithelial cell, and that an epithelial cell can produce a lymphoid cell.

If the bodies were travelling into the epithelium they must be disposed of in one of the following ways:—They must either accumulate within the epithelial cells, or pass out of the free extremity, or be dissolved and disappear within the original protoplasm of the epithelium; or develop into an epithelial cell, so that they can be no longer separately recognized. That they neither accumulate nor pass out of the free extremities can be proved, nor does it appear that they are supplying the place of epithelium that has been shed, for the line remains unbroken. It is not, of course, possible to prove that they do not disappear by absorption. On the other hand, there is some strong indirect evidence that these lymphoid bodies have been derived from the epithelium, for it is in their collection immediately beneath the hypertrophied epithelium that the first evidence of the tumour formation is evinced, and, as will be subsequently shown, they invariably form the advance guard of extending adenoid tissue. At first sight it must be admitted that this accumulation of leucocytes on the outskirts of the growing tumour would as easily admit of the interpretation that they had come from distant parts, as that they had been developed

from the local cells. Moxon, and other observers of high repute, state that not infrequently they have noticed in nodules in the liver secondary to rectal cancer, not merely columnar epithelial cells, but a structure actually identical with Lieberkühn's follicles. The deduction to be drawn from these secondary deposits is that they grow from cells originally derived from the rectum. Now, it is scarcely possible to conceive that the large columnar-shaped epithelial cell of the rectum can be transmitted, in the bulk of its complete form, through the intricate lymph-paths between the rectum and the liver; but no such mechanical difficulty lies in the path of the smaller lymphoid cell, which, when arrested in the liver, grows to the likeness of its epithelial parent.

I claim on the foregoing evidence that there is some support to the theory I have advanced as to the formation of leucocytes by the epithelium. Although, of course, it falls short of actual demonstration, I believe it to be worthy of some further attention.

CHAPTER II.

CANCER OF THE RECTUM.—ETIOLOGY.

THERE is no reason for supposing that cancer when situated in the rectum differs in its nature from the same disease in other parts of the body. It may be well, therefore, to take a brief glance at the general character of the disorder.

So much ambiguity has arisen as to the meaning of the word cancer, that I will define the sense in which the term is used in this chapter. The modern school of pathologists limit the term to express a group of tumours presenting certain definite structures under the microscope. In this group are included scirrhus, medullary, colloid, and epithelial growths, but the various forms of sarcoma are excluded. The older surgeons, on the other hand, consider the expression cancer as synonymous with the term malignant. It therefore included all varieties of growth that have a tendency to recur after removal, to infect neighbouring glands, or to become generally disseminated about the body. When the Council of the College of Surgeons set the subject for the Jacksonian Prize Essay for 1875, on "Cancer of the Rectum considered with regard to the possibility of Cure by Extirpation," it was in the latter sense that the term was used. I shall, therefore,

use the word cancer as equivalent to malignant growth.

The death-rate from cancer has shown a pretty steady relative increase during the whole period of which we have accurate returns. The following Table, compiled from the Registrar-General's Reports shows the proportion of deaths from this disease, compared with those from other causes, during each of the thirty-six years from 1851 to 1886:—

TABLE.

1851, 1 in 73	...	1863, 1 in 62	...	1875, 1 in 47
1852 „ 72	...	1864 „ 60	...	1876 „ 44
1853 „ 72	...	1865 „ 60	...	1877 „ 42
1854 „ 73	...	1866 „ 59	...	1878 „ 43
1855 „ 69	...	1867 „ 54	...	1879 „ 42
1856 „ 64	...	1868 „ 53	...	1880 „ 40
1857 „ 69	...	1869 „ 52	...	1881 „ 36
1858 „ 68	...	1870 „ 52	...	1882 „ 37
1859 „ 64	...	1871 „ 52	...	1883 „ 36
1860 „ 60	...	1872 „ 48	...	1884 „ 35
1861 „ 58	...	1873 „ 46	...	1885 „ 34
1862 „ 58	...	1874 „ 47	...	1886 „ 33

Or if we compare the death-rate with the number of persons living, it will be found that whereas in the ten years, from 1851 to 1860, it averaged annually one death from cancer in every 3150 persons living, in the next ten years, 1861 to 1871, the proportion had increased to one in 2570. The mortality from the disease varies widely in the different districts of England. Nor is it only in different parts of the country that this variation is marked, for even in the subdivisions of the metropolitan districts there is a

considerable divergence in the rate of cancer mortality. For instance, in Marylebone, St. George's, Hanover Square, and West London, the rate is 80 in 100,000, while it is less than half this in St. Luke's, Bethnal Green, and Rotherhithe. In forming these tables, deaths amongst women have alone been included; for cancer is not only more than twice as frequent amongst females as it is amongst males, but the occupation of men in the London districts often takes them away from their homes for at least half the twenty-four hours, and would thus bring them under different influences from those to which they would be subject at home; while, on the other hand, women generally pass the greater portion of their day in the same locality.

Upon reflection, there are many causes which might invalidate the statistics showing this apparent increase in the cancer mortality, and amongst these, the most important is the progressive improvement in diagnosis, so that many deaths which are now properly assigned to cancer, would formerly have come under various symptomatic headings, such as "marasmus," "abdominal obstruction," "gout," &c. For instance, how many cases of cancer of the larynx, ovaries, or rectum were diagnosed thirty years ago? But, notwithstanding the wide margin that must be allowed for these cases, it is more than probable that there is an actual increase in the amount of cancer amongst the population.

Modern surgeons differ materially in their views as to the origin of cancer. The widest divergence in opinion lies between those who consider that the origin of the disease is to be sought in purely local

causes, and those who deem that it is rather to be found in some deep-seated condition of the constitution. Those who consider that the constitution is in fault, believe that there is a condition of the body generally, which renders it liable to burst into cancer with some slight accidental irritation, or even without any apparent irritation at all. In fact, they consider that there is a predisposition or liability to the disease, found only in a certain proportion of human beings, and the tumour is looked upon as merely the expression of a previously morbid condition of the body in general, analogous to the sudden outbreak of inflammation in the joint of a gouty person, or the development of bony growths about the joints of a rheumatic sufferer. Dr. Payne¹ expresses the meaning of the word "constitutional" as a "lesion or change in which the general disposition of the body has a very large share, and the influence of external causes—injury, irritation, and so on, has a comparatively small share." As opposed to these views, those who think that the disease is purely local in its origin, contend that the tumour is due to some cause acting locally on a particular part, and that this is the starting-point of the cancer, there being no previous disposition of the body to the disease, but that it only becomes secondarily affected from this original centre.

Many facts and arguments have been brought forward to support either view of the origin of the disease. The chief arguments in favour of the constitutional origin are, firstly, the hereditary nature

¹ Path. Soc. Trans., vol. xxv p. 338.

of cancer; secondly, its almost inevitable return after removal; thirdly, its production in certain persons as the result of injury.

The transmission of cancer by inheritance, or the particular condition of body liable to be attacked by the disease, has been taught from the earliest times, and is, perhaps, the strongest argument in favour of the constitutional view. Indeed, it cannot be regarded as other than certain proof that a tendency at least to the disease has been directly transmitted. Sir James Paget,¹ a high authority on the subject, goes so far as to state that "he is disposed to hold that it is not possible to conceive the origin of cancer, or any disease of the kind, except by inheritance." Instead of elaborating ingenious theories, such as the localists employ to get over the difficulties of inheritance, or the still more complicated excuses which the constitutionalists find for cancer skipping a generation or two, it may be well carefully to weigh the facts upon which the doctrine of inheritance is founded.

I have published elsewhere² a short paper on this subject, from which I give the following extract :—

The hereditary nature of cancer is based upon evidence derived from the following sources :

1st. That it is a matter of common notoriety that cancer runs in certain families.

2nd. Evidence founded upon certain statistical facts.

Now, in dealing with the former statement, such

¹ Path. Soc. Trans., vol. xxv. p. 317. ² St. Bart. Hosp. Reps., vol. xiv.

evidence is wholly inadmissible from a scientific point of view without the positive facts upon which it is based. General impressions are often the result of hasty generalization upon imperfect observations.

From time to time isolated instances may occur of an amount of cancer in a particular family in excess of the average to be expected. Such, for instance, as the case narrated by Sir James Paget,¹ in which a lady died of cancer, two of her daughters died of cancer, and eight of her grandchildren; however, the number of her children and grandchildren who did not die of cancer is not mentioned.

The rareness of such an instance is proved by finding that, out of nearly 300 cases of cancer at St. Bartholomew's Hospital, nothing in the least approaching this history is to be found.

The evidence derived from statistics will now be examined.

In an article by Mr. Baker² will be found a table of cases from the practice of Sir James Paget. Mr. Baker makes the statement that 22.4 per cent. of the cancerous patients were aware of one or more relatives with the same disease. He then gives a table of 103 cases in which one or more relatives were affected. These 103 cases representing only 22.4 of the total number of cases examined, the whole number of cases investigated must have been 460. In these 103 cases amongst the relatives are included aunts, uncles, cousins—first, second, and third—great-aunts, and a great-uncle. But since it

¹ Path. Soc. Trans., vol. xxv. p. 318. ² St. Bart. Hosp. Reps., vol. ii.

is impossible to conceive how a man can inherit cancer from his uncles, aunts, or cousins, the necessity for excluding these is obvious. Further than this, the impossibility of knowing the number of these distant relatives, in order to form a table for comparison between a cancerous and a non-cancerous family, renders them useless for our present purpose.

This objection cannot apply to a man's parents or grandparents; two of the former and four of the latter must be the invariable amount. Now, it is not within the range of ordinary observation that an individual, especially of the hospital class, could even with approximate accuracy assign the cause of death in his four grandparents. The cause of death in the parent is, however, commonly known, especially if the deaths were from cancer. On these grounds, therefore, will be considered the relative frequency with which malignant disease is found in the direct offspring of a cancerous or non-cancerous parent.

Referring to the 460 patients mentioned by Mr. Baker, these must have had 920 parents, unless brothers and sisters belonged to the same family. This was so in four instances; the number of parents will thus be reduced to 916. Amongst these 916 parents cancer occurred 30 times in the mother, 7 times in the father, or a total of 37 times.

This gives 1 death from cancer in every 24.8 among the parents of cancerous patients.

Two objections to these facts might well be raised:

1st. That it is assumed that all the parents of the cancerous patients were dead; but this would not be the case, and that those still living might

eventually die of cancer, thus swelling the cancer mortality.

2nd. That they might have died of an unknown cancer.

Now, the first objection must readily be admitted, but taking into consideration that in a vast majority of instances cancer is a disease of advanced middle life, it would be in only a small number of instances that the parents, if living, would eventually die of the disease.

As a proof of this, it will be found that in the whole series of Sir James Paget's cases only three instances are recorded in which a parent has succumbed to cancer subsequent to an offspring dying of the same disease; this amounts to less than 1 per cent. in the whole number of cases. The objection that the disease might have been an unknown cause of death would apply equally to the Registrar-General's returns, to be presently alluded to.

The figures given in Mr. Baker's table of Sir James Paget's cases will now be compared with those derived from the Register of St. Bartholomew's Hospital. From June 1869 (the first commencement of registration), till October 1878, 280¹ cases of cancer were under treatment in the female surgical wards. Of these 280 cases in 111 no family history of any kind is recorded; in the remaining 169 cases a special record is made as to the family history. In these 169 cases no cancer was known in the parents in 156 instances; in 11 cases either the father or

¹ Cases entered in the hospital index under the head of "Cancer" are alone included.

mother had cancer; in 2 cases it was doubtful whether or not one of the parents had the disease, one of these being so doubtful that I have thought fit to exclude it. There will remain, then, 12 cases among 336 parents, or 1 case in 28.

As Mr. Baker very properly observes, in speaking of Sir James Paget's cases, these statistics in themselves do not prove in any way the inheritance of cancer, and this question can only be finally answered by discovering the proportion of cancerous relatives belonging to those not cancerous, and comparing the two sets of figures.

What we have to do is to compare the death-rate from cancer in the parents of cancerous patients with the death-rate from cancer amongst adults generally. Fortunately, in the Registrar-General's returns we have a means of making this comparison.

It would not be right in this calculation simply to take the whole number of deaths in the community and find out how many of these deaths were due to cancer, for the parents of cancerous patients must certainly have been adults at the time of their deaths.

The total number of marriages below the age of 20 only amounts to 8 per cent., and the proportion of these who both become parents and die below the age of 20 is so small a percentage that it can be fairly ignored. Thus, then, we will compare the death-rate from cancer in the parents of cancer patients with the death-rate from the same disease in all persons in the kingdom dying above the age of 20 years.

In the ten years, 1861 to 1870, in England and Wales—

1,185,189 men died above the age of 20 years.

1,194,433 women died above the age of 20 years.

24,845 men died of cancer.

56,854 women died of cancer.

The addition of these figures gives 81,699 deaths from cancer out of 2,379,622, or 1 death in every 29.1 from cancer.

By comparing these figures with the figures given in the previous page, the following result is arrived at :

Amongst the parents of cancerous patients the death-rate from cancer amounts—

According to Sir James Paget, to 1 in 24.8.

„ St. Bartholomew's Register, to 1 in 28.

Amongst the whole community over 20 years of age—

According to the Registrar-General, to 1 in 29.

The relative frequency of cancer in these two sets of cases differs so slightly that this difference may well be looked upon as accidental, in which case the figures given in the paper bear proof that cancer in the parent does not increase the liability of the offspring to suffer from the same disease.

Statistics collected by other observers might lead to different conclusions. I have made every endeavour, however, to make the foregoing figures accurate, and until more evidence is adduced than is now accessible to prove the inheritance of cancer, I do not feel justified in admitting the doctrine as evidence of the constitutional origin of the disease.

Recurrence after Removal.—This, not merely *in situ*, but disseminated about the body, has been regarded as evidence of the part played by the con-

stitution in the production of the disease. In speaking of this argument, Sir James Paget states: "I would hold that the constitutional element in the origin of cancer is strongly marked in the constancy and in the method of its recurrence after operations—recurrence after complete excision. . . . You may cut out little cancerous tubercles here and there from some old person three, four, five, or six times over, but that is a different disease. You cannot find an instance of rapidly growing, soft-textured, vascular cancer of any form which can be removed three, four, six, eight, ten, or twenty times without recurrence, not in the place of growth alone, but in distant organs; and I believe it is vain to attempt to explain this difference of the recurrence in distant and dissimilar parts which we find in recurrent tumours, or occasionally, in the more ordinary kinds, upon any facts of difference of physical constitution. I observe it is referred to the mobility of cells, to their readiness to travel, that now and then these tumours pass from one part to the other. Now, really there are cancers that multiply themselves in dissimilar parts whose physical condition looks as unfit for travelling as any that could be named. If I could name any kind of cancer which propagates itself more widely and readily than another, it would be osteoid, a mass as hard as any mass of fibrous tissue you ever found in the uterus. I know no fibrous tumour which is so hard as the fibrous mass, to say nothing of the bony structure, of an osteoid cancer, yet it propagates itself speedily everywhere. Ordinary scirrhus cancer of the breast is at least as hard as an ordinary fibrous tumour; but the one

does what the other does not—propagate itself. The recurrent fibroid, or recurrent cartilaginous growths, are just as soft, and are composed of cells and free nuclei as little held together as in any of the soft forms of cancer. They do not, except in rare cases, propagate themselves. Cancers do not fail, except in rare cases, to propagate themselves, so that I must maintain that, whichever way we look at them, the facts of the method of propagation to distant and dissimilar parts are so strong, and so characteristic on the side of cancers, that we must assume an essential difference between them and any other tumours that we can name.”

But yet this argument, when considered, amounts to no more than stating that there is a marked difference in the physical character of cancer and that of the innocent tumours, a fact readily admitted. If, however, it can be shown, as I will endeavour to show subsequently, that all the particles of the disease found disseminated about the body are the results of the primary tumour, and started from it, then, instead of the dissemination being an argument in favour of the part played by the constitution, it appears to point in an exactly opposite direction.

Cancer following an Injury.—In a certain number of instances the actual starting-point of cancerous growth appears to follow more or less directly an injury of the tissue, and this outbreak, known under the name of “traumatic malignancy,” results from injury of a peculiar nature and in certain parts. The form of injury that apparently starts the disease is not an incised, lacerated, or punctured

wound, but rather that form of injury known as "contusion," and this, too, often of a trivial nature. Again, the parts in which a malignant tumour follows a blow is generally glandular tissue, as shown in my notes of a case which was under the care of Mr. T. Smith, at St. Bartholomew's.¹

In this case the constitutionalists would see evidence of a constitutional tendency excited to activity from the injury, for they would say, and probably with truth, that ninety-nine such blows might be struck on as many individuals, without producing a similar result, and from this they would argue that there must be a second factor besides the blow to produce such an exceptional phenomenon, and in this factor they recognize a peculiar disposition in the constitution. If such an hypothesis be correct, it would seem that any blow struck on a patient with such a diathesis should be followed by tumour formation; but yet this is not the case, for wounds or contusions of innumerable kinds have, from time to time, occurred to persons who are actually suffering

¹ E. R., police constable, aged fifty in June 1878, while arresting a prisoner, received a kick on the left breast; it was not very severe but caused him some pain at the time, and did not prevent his being on duty the following day. Twenty-four hours after the injury there was a bruise the size of a florin around the nipple. The marks of this remained for some weeks and then disappeared. Ten weeks afterwards he noticed for the first time some hardness round the nipple, about the size of a small marble. He treated this by fomentations and poultices, but it continued steadily to increase. On entering the hospital, rather more than a year after first noticing the growth, there was a large projecting tumour, the size of a foetal head; the skin over it was dusky in colour and firmly adherent, while in the axilla were two large glands the size of walnuts. He was a strong burly man, no family history of cancer, and had got rather stouter than thinner during the last six months, since he had been off duty. The tumour was malignant.

from cancer, yet, save in the rarest instance, no cancerous growth has resulted, unless the injury has occurred in the immediate neighbourhood of a primary disease. The late Mr. De Morgan narrates a case¹ which admirably illustrates this fact.

Now, I will readily admit that, seeing the exceptional nature of the constable's case, there must have been some condition in addition to the mere blow, to produce so untoward a result ; but what I do deny is, that it is necessary to assume that the additional factor should lie in the patient's constitution at large, rather than in some local condition excited to activity by the injury to the tissue.

Having mentioned some of the chief arguments used by the constitutionalists to support their view of the origin of the disease, I will glance at those

¹ A man was brought into the Middlesex hospital with a compound fracture of the radius, which had occurred four or five days previously. The whole arm was enormously swollen and in a condition of what may be called putrescent cellulitis. There was putrid pus and serum distending the cellular tissue up to the middle of the arm. The general appearance of the man, notwithstanding this, was regularly healthy. His pulse was 84, he had a clean tongue, and ate and slept well. I contented myself by making incisions, expecting that amputation might soon be necessary ; by-and-by the carpal bones and the head of the radius became carious, many of the former were removed, the head of the ulna exfoliated. There was copious suppuration, at first foul but afterwards becoming healthy. During all this time, a period of a couple of months, he retained his health, eating, drinking, and sleeping well, with a good colour and slow pulse. I determined to let Nature have her course. All at once he was seized with peritonitis. I feared it was pyæmic peritonitis, and that I had carried the experiment too far. He died, and it was found that the peritonitis was due to a portion of the gut having got entangled in a band, the result of a peritonitis which he had told us he had previously suffered from. But in addition to this there was found in the pelvis and lower part of the abdomen, a mass of colloid cancer, while the omentum and intestines were throughout studded with nodules of the disease of various sizes. There was no sign of cancer about the injured arm.—*Path. Soc. Trans.*, vol. xxv. p. 391.

features which appear to me to supply the strongest evidence of its local origin, the constitution only becoming secondarily tainted.

First. Amongst these we have the evidence of the tumour itself, a single spot being alone affected, the rest of the body being in perfect health. In fact, the first indication of the disease is its local manifestation. As an instance, I will take a case¹ which was under my care at the Royal Free Hospital, as being fairly representative of what is commonly observed.

When the patient was first seen her health was good, but anxiety of mind, sleepless nights, and pain soon told their tale, and accounted for the so-called cachexia. After the removal of the local disease she regained to a great extent her former health, only to be lost when the disease returned. Such a history is common in cancer, all

¹ A woman, aged forty-five, had enjoyed thoroughly good health since she was a child. A few months ago she began to feel slight discomfort in the right breast. This came on so gradually that she could fix no exact date for its commencement. A week ago she noticed for the first time a hardness in part of the right breast. She is still in perfect health and has no pain to speak of. On examination a hard nodule is felt deep in the breast, but no perceptible glandular enlargement. An operation was advised but declined. She again applied to the hospital four months later; her condition was then much altered, the tumour was larger and very painful, and in the axilla was a gland as large as a pigeon's egg; she had lost appetite and her nights were often sleepless. She had quite lost her good looks and complexion, her face being thin and careworn; she was very considerably thinner. Being very anxious for an operation the breast was completely removed, together with the axillary gland; the wound healed rapidly. She left the hospital in good spirits, and during the next few months she regained her appetite and once more looked fairly healthy; unfortunately six months after the operation the disease returned *in situ*, she became rapidly cachectic, and, I believe, died eight months later.

the constitutional symptoms being consecutive to the tumour.

Second. The manner in which cancer spreads and propagates itself. There are four methods by which the disease extends. Three of these methods of extension are as clearly recognized, and as universally allowed, as any fact in pathology—viz., growth from the periphery; extension by the lymphatics, and dissemination in the course of the blood-stream. The fourth method is by auto-inoculation, but notwithstanding the utmost importance that should be attached to this method of extension, it is practically ignored by the majority of authors on the subject, although it has not escaped the observation of such accurate pathologists as the late Dr. Moxon, Dr. Goodhart, and the late Mr. De Morgan. Many museums afford specimens of malignant ulceration of the stomach with patches of cancer scattered here and there along the small intestines and colon. The appearance of these specimens combined with their clinical history leaves little doubt but that these deposits were secondary to the gastric disease. In the Middlesex museum is a cancerous ulcer in the stomach of a boy who had previously suffered from the same disease in the mouth. In the Pathological Society's Transactions it will be found recorded, and specimens have been exhibited showing how the uterus has become inoculated with cancer through the Fallopian tubes from a diseased ovary, how the lungs and bronchi have become infected from a primary cancer of the larynx, and how the skin of the abdomen has become cancerous from contact with a pendulous breast already diseased.

I have myself recorded¹ a very remarkable case of this auto-inoculation of cancer. The patient was a woman in St. Bartholomew's Hospital, who had a cancerous ulceration involving the breast and skin of the thorax. For two months, being unable to put on any dress, she had kept her arm bent at right angles in constant contact with the disease: the result of this contact being that the skin in the neighbourhood of the elbow became the seat of a cancerous ulcer several inches in diameter.

As regards these four methods of extension, the first and last—viz., growths from the periphery and from auto-inoculation—afford positive evidence of extension by direct local infection, while the manner of extension by the lymphatic glands, and of dissemination about the body, leaves little question that these secondary points of disease are propagated from the primary tumour. The parts in which these secondary deposits first appear are almost invariably structures in direct communication with the primary growths, by means of the lymphatics and blood-vessels; thus, for instance, the glands of the axilla are first affected in cancer of the breast, the sub-maxillary in cancer of the tongue, and the liver-substance after disease of the intestine. Moreover, when it is remembered that one of the functions of both lymphatic glands and liver is to act the part of a filter—the one to the lymph, the other to the blood—it would be expected that these would be the organs in which morbid material would first become arrested. But after a while, the glands and the liver becoming

¹ Path. Trans., vol. ii. 1881.

disorganized, they are no longer able to filter out the obnoxious particles, and thus, eventually, general dissemination occurs by the blood-stream.

The whole course and progress of these secondary growths can at times be as clearly traced from the primary tumour as can the abscesses of pyæmia from the original scratch on the finger.¹

When we see the manner in which malignant disease spreads, it is impossible not to be struck with the close analogy it bears to any poison introduced into the body locally, such, for instance, as the poison of septicæmia, glanders, or syphilis. The constitutionalists, admitting the extension of cancer by the channels mentioned, see in it only another proof of a "predisposition;" they say that a something is absorbed that irritates a gland, and this irritation, instead of subsiding or going on to the formation of an abscess as it would in an ordinary case, excites the formation of cancer owing to the predisposition to that disease inherent in the patient. Sir W.

¹ A patient, a healthy woman, aged twenty-seven, had upon her right leg a small dark-coloured mole which had been there since her birth. A year previous to admission into the hospital a small warty excrescence appeared on one part of the mole. This she treated with caustic, which in a few days was followed by some tenderness of the groin below Poupart's ligament. In the course of a few weeks a tumour made its appearance in the groin, at first no larger than a nut; other swellings soon appeared both above and below Poupart's ligament, and also in the popliteal space. Each of these soon developed into well-marked tumours. After the lapse of nine months from the first application of caustic, tumours had appeared over the clavicle, sternum and abdomen, while there were obvious symptoms of tumours in many internal organs. She was removed by her husband from the hospital in a dying state, eleven months after the application of the caustic. No opportunity was afforded for a post-mortem examination.—Sitwell Ward Register, St. Bartholomew's, vol. vi. (Notes by T. Butlin and Author,)

Jenner expresses this by saying that¹ "something is absorbed, it is not necessarily pus, there is a disposition in every part to burst forth into cancer, when an exciting cause is applied; something is absorbed from the part which irritates a gland, and in the constitutional state of the patient, cancer is produced instead of abscess or extravasation of blood, or thickening of a tissue. Whether it goes by the lymphatics or the veins is a matter of insignificance; it would not develop into cancer unless you had a primary condition in the patient—viz., a disposition under irritation to form cancer."

Yet it would seem to me as reasonable to hold that the disseminated abscesses of pyæmia or the tertiary gumma in syphilis were due to predisposition in the constitution of certain individuals to form such masses "under irritation." But no one for a moment doubts that the characters of the secondary effects of pyæmia and syphilis are stamped not by the constitution of the patient, but by the specific nature of the original poison.

Again, if further proof of the direct relationship of the secondary deposit to the primary tumour were necessary, it is afforded by microscopic examination from such deposits, for the peculiarities of their structure often admit of their being identified as starting from the primary tumour. If, for instance, the primary tumour have cartilaginous nodules in its substance, portions of cartilage may frequently be found in the secondary deposits, while in cancer of the liver, secondary to the same disease in the

¹ Path. Soc. Trans., vol. xxv.

rectum, not only can the large epithelial cells of the rectum be recognized, but they actually attempt to develop into an adenoid growth, having all the characteristics of Lieberkühn's follicles.

Certain local applications have the undoubted property of exciting malignant growth; the example of this is to be found in chimney-sweep's cancer of the scrotum.

It can scarcely be contended that sweeps have a special constitutional tendency to cancer. It must, therefore, be acknowledged that it is due to an irritant locally applied. The question would further arise as to whether this cancer of the scrotum is caused by any specific irritation inherent to soot, or whether any irritation constantly applied to the skin of the scrotum will produce similar results. Now, seeing that there are many forms of manual labour by which the parts in question are kept constantly irritated by dirt, yet the impunity from cancer in these circumstances points rather to some specific irritation due to soot; possibly the exceeding fineness of the particles may afford an explanation, but I will not venture at present to speculate on this matter. The fact, however, and that too of the greatest importance, remains, that a local irritant can produce what is at first certainly a true local disease. In this form of cancer the commencement of the disease is almost obvious, its gradual progress can be traced until neighbouring glands become implicated, and the patient ultimately dies of the disease. It is too in this class of case that the sufferer, being aware of the nature of his malady, applies for advice at an early stage, and the surgeon

operates with a fair hope that the cure may be permanent.

When there is such positive evidence that the disease is local in a particular case, and when there is no proof that it is due to a constitutional origin, it is more logical to assume that the disease always has a local though unknown cause than to regard as of an exceptional nature the cases in which local origin is obvious.

Taking into consideration the points in the history of cancer upon which we have already touched, it would seem that the preponderance of evidence is strongly in favour of the view that the origin of cancer lies in some local condition of the part attacked. With a view to ascertain the cause of the disease, it is natural that pathologists should have paid considerable attention to the structure of the growth itself; but yet, in studying the histology of the tumour, we are rather examining the product of the disease than investigating its cause. What the surgeon removes, and the microscopist cuts into sections, cannot be the cancer, that is to say, the whole cancer, seems pretty evident by the disease remaining in the patient and ultimately causing his death. What has been removed consists of a mass of hypertrophied tissue and cellular element formed as the result of a disease, portions of which have most certainly been left behind. No doubt that part which appeared to be acting most violently had been removed with the tumour, but what remained behind only required time to increase and to become as active as the part already removed.

The careful study of the tumour itself by the

microscope has in a way greatly increased our knowledge of the disease, and supplied us with a vast amount of valuable facts; but yet I doubt whether, by the study of the tumour alone, the true cause of its growth will be eventually established; certainly, if for our knowledge of pyæmia we had been dependent upon the microscopic examination of the secondary abscess, we should never have attained to the knowledge which is now so successfully employed in guarding against the disease.

If the tumour be cut into sections and examined, it will be found that there is nothing mysterious in the elements of which it is composed. The cells which represent the growing part of its structure are similar to those naturally existing in the part affected, and moreover often have a tendency to form themselves into glandular tissue, with a structure more or less in imitation of the healthy glands in the immediate neighbourhood. The source from which the cells forming the tumour are derived would seem to be almost certainly the pre-existing cells of the part, and are the result of a proliferation of the lymphoid and epithelial cells previously existing in the healthy tissue. Since it is the accumulation of these cells that forms the tumour, it is to the cause of this accumulation that attention should be directed. In searching for this we will briefly consider what causes are already known as leading to unnatural cell aggregation.

Simple mechanical irritation, such as results from friction or intermittent pressure, will lead to cell growth; and of this we have a typical example in the formation of corns and bunions.

Again, the presence of a foreign body in the tissue will lead to a local hyperplasia, such as is seen in the hypertrophy of bone, when a sequestrum long remains enclosed in its cavity.

Lymphatic obstruction is considered by some to be a cause of cell overgrowth.¹

Another group of causes is to be sought in certain specific inoculations; for instance, vaccine lymph will in a few days lead to an extensive effusion of leucocytes. Here the manifestation is local, so far as the cell collection is concerned. In the same category may be included the poison in pyæmia; but this not only produces a primary abscess (cell collection), but also by means of the lymph and blood-channels will cause secondary formations of pus wherever arrested. Other instances, such as inoculation in small-pox, might be cited, but sufficient have been mentioned for purposes of illustration. Such causes, moreover, act more or less acutely, and the cellular product takes the form of pus, being formed too quickly to become organized into fixed tissue.

Such an accumulation is like a quickly collected, unorganized mob, the individuals of which act independently. In the haste of their collection the commissariat has been neglected. The capillary blood-vessels, which should supply the lymphoid cells with food, have had no time for development. The collected cells are consequently short-lived, and soon become little more than dead refuse. Regarding pyæmia and small-pox then as examples of rapid

¹ Holmes's *System of Surgery*, third edition, vol iii. p. 579.

cell effusion from a specific cause, we will pass on to some specific poison, which both locally and secondarily will produce a cell formation, having sufficient vitality and blood supply to allow of its formation into cohesive tissue. Of this we have an admirable example in syphilis.

In descending the scale of creation we find the vegetable kingdom rich in examples of cell formation due to specific irritation. Those who have studied the formation of galls, will know how these bodies are produced by such irritants.¹

Here we have a tumour formation, the individual cells of which are derived from the bark or leaf on which it is placed, and can be easily identified with the cells of the neighbouring normal tissue; but yet it is established beyond doubt that this extraordinary behaviour of a portion of a tree is the result of a specific irritation, which in the case of the oak-tree is an insect (the *Sineps quercus folii*).

In considering whether any of the causes just mentioned bear upon the question of malignant tumour, the "mechanical irritation" will first come under consideration. It has frequently been sought to prove that mechanical irritation is the source of cancer, but as yet with entirely negative results.

Patients with cancerous ulcerations on the lips or tongue are invariably questioned as to smoking, or as to the existence of broken teeth. Affirmative replies are considered evidence of a connection between the irritatives and the morbid growths.

¹ Sections of Galls, Path. Soc. Trans., London, vol. xxxv. (Paper by Author.)

If these relations be regarded as cause and effect, why should the cause be at work in 1000 cases, the effect following in one only? Instead, therefore, of such irritations being the cause of morbid growths, we have overwhelming evidence that they are not so, save in the rarest instances.

Without denying the connection that occasionally exists between injuries and malignant growths, it is evident that the determining cause must lie in some factor beyond mere irritation, and, as already mentioned, the constitutionalists with unscientific vagueness regard this factor as a "constitutional predisposition," so that, instead of the irritated part producing a simple hypertrophy or abscess, a malignant tumour results.

Simple mechanical lymphatic obstruction might account for the formation of a local tumour, the cells formed in a given part being unable to pass away, but such obstruction must either lie between the tumour and the nearest glands, or beyond the glands. In the former case the glands could never become diseased, in the latter it should be the primary seat: both of which are contrary to fact.

Lastly, we will consider specific infections as a cause for cell accumulation, and herein we find an analogy closely resembling what is seen in malignant disease. The poison of small-pox or glanders not only produces the cell accumulation at the seat of the inoculation, but passing by the lymphatics and blood-stream causes secondary accumulations in various parts of the body. Syphilis runs a similar course, merely differing from its action being slower. In these instances the medium by which the poison

travels from the seat of inoculation is not determined; it may be that the germs (*Bacteriæ*) are simply washed along the channels, or they may be carried along in the interior of the leucocytes coming from the infected part.

In cancer, however, we can go further, and can prove almost certainly that the infection, whatever its nature, is carried by, or resides in, cells derived from the neighbourhood of the original disease. It is found, for instance, that the secondary deposits in the liver, when following rectal disease, cannot merely be identified as consisting of the columnar cells of the rectum, but that they actually in the liver grow into a gland tissue identical with Lieberkühn's follicles of the rectum.

Accepting it then as a fact that the secondary deposits found in the liver after rectal cancer are formed from cells originally derived from the rectum, what a field for inquiry is immediately opened. Is it to be supposed that it is only in disease that cells derived from the intestinal glands find their way to the liver? or is it but part of a normal physiological process that cells should thus migrate? This question is more fully considered on page 16, and, as the result of the microscopic examinations there described, I venture to suggest that each of the epithelial cells of the intestine represents an individual life; requires nourishment, grows, and multiplies by the division of its nucleus, which nuclei from time to time find their way into the subjacent retiform tissue, pass hence through the lymphatics to the blood-stream, where they become identical with the leucocytes. Should this view be correct,

or even partially so, we have a solution to the surprise that is first experienced on recognizing a structure peculiar to the rectum transplanted to the liver.

Such cells, unable from their altered form, due to a diseased condition, to pass readily along the usual channels, collect first in the sub-mucous tissue, and subsequently in the liver or lymphatics, thus producing tumours, while at the same time it is more than probable that they may infect the cell elements of the part in which they are arrested. Let us for a moment compare this theory with the interpretation of facts suggested in the study of primary rectal growth. Lymphoid cells, offspring of the glandular epithelium of the intestine, are born with the disease. The function of such embryonic cells, if healthy, would have been to have passed through the lymph channels into the blood, and there to have circulated until required by some particular portion needing their assistance for repair, but owing to their alteration by disease they not only have great difficulty in passing along the lymph paths, but when they succeed in doing so have a tendency again to become arrested in the fine structures of the glands. In the first instance their undue sojourn in the lymphatics in the immediate neighbourhood of their birthplace gives them time to develop into the more perfect type of cell, or even to a tissue similar to that formed by their parents, and the same development taking place when arrested in distant parts causes the formation of secondary growths.

The nature of the irritant infecting the cells is unknown, but seeing the increased prevalence of

malignant disease in certain districts, it would appear to be from some cause originating external to the body, and to have a special affinity for certain structures, such as gland tissue, in the same way as particular galls only infect the leaves, bark, or root of the plant, according to their special variety.

The undoubted starting-point of malignant growths, especially in glandular structures, can from time to time be directly traced to some blow or injury, yet, as a rule, thousands of such blows or injuries may occur without being followed by any such result. But we can study an almost analogous process in the acute necrosis affecting the bones of children.

Hundreds of slight contusions of the periosteum may occur without producing acute pyæmic necrosis, but yet the starting-point of this grave disease can at times be clearly traced to such an accident. If the product of one of these acute abscesses be examined it will be found crowded with organisms, notwithstanding that no communication with the air previously existed.

Such a phenomenon can, I think, only be explained upon one hypothesis—viz., that such organisms, by absorption, find their way into the blood, and whilst still circulating within the healthy tissue are incapable of multiplying or doing harm, but when in damaged tissue they become stationary by extravasation as the result of a blow, they immediately become active, and produce the phenomenon of sub-periosteal abscess or pyæmia.¹

¹ Some time after advancing the above theory as to the cause of pyæmic abscesses occasionally following blows, the view has been confirmed by

In cancer no parasite has been discovered by the microscope, but this is no evidence whatever of its non-existence, for it must be borne in mind that it is only within the last few years that even the larger microscopic organisms have been detected, and some of these would never have been suspected had not their movements attracted attention in recent specimens. The myriads of minute specks of granular material seen by the microscope, when examining a section of malignant disease, might contain any amount of organisms which, at present, are incapable of recognition.

Since writing the foregoing in 1880, some most valuable investigations¹ with a view to the discovery of the cancer organism have been carried out by Messrs. Ballance & Shattock. At present their experiments have led to a merely negative result, but such accurate and patient work will doubtless clear the way for future investigation.

If cancer could be propagated from one person to another, it would support the view that one of its causes may lie in some specific contagion. Hitherto, all direct experiments with a view to inoculation have failed; but yet, when we read the accounts of these experiments, they merely prove that when a portion of a tumour, or of its secretion, is inserted

actual experiment. Kocher performed the following experiment. Healthy dogs were fed on the flesh of animals dying from septicæmia, with no apparent deleterious effect. The periosteum in some of these animals was subjected to contusion without any skin wound being made. Abscesses of a pyæmic nature rapidly developed at the site of injury, the animal dying subsequently of general septicæmia, the original abscess being crowded with bacteriæ.

¹ Pathological Soc. Trans., London, vols. xxxviii. and xxxix.

beneath the skin of an animal, the results are negative. If portions of the disease could be kept sufficiently long in contact with an *epithelial* structure, there is reason to suppose that inoculation would take place. Such an experiment is occasionally carried out by Nature, as in the instance narrated on page 38. The fact that when sound epithelial tissue is kept in constant contact with malignant disease, it becomes infected, lends no small support to the view that the poison in at least some cases of cancer may prove to be of a parasitic nature.

CHAPTER III.

PATHOLOGY OF RECTAL CANCER.

I NOW pass away with some satisfaction from the unsafe region of theory ; for I feel that this problem of cancer is not to be solved by speculation on ill-considered hypotheses. Physicians from the earliest dawn of medical science have been busied in speculating on this problem, and yet have scarcely advanced a step in its solution. In recent years some progress has been made in our knowledge of the structure of the tumour, but such knowledge has only been arrived at by the aid of microscopic examination. If knowledge of the disease is to advance, it will be by the continuation of this process of investigation, aided by clinical observations and accurate experimental research. With this view, in the following pages I will give the results as briefly as possible of the histological characters of malignant growth as found in the rectum. The observations made are fragmentary and imperfect, but I venture to give them in order to compare notes with other workers in the same field.

Malignant disease of the rectum has enjoyed its full share of classification. Its nature has been described under the heads of scirrhus, medullary, and epithelial cancers, sarcomas, round and spindle-

celled, myxomas, adenomas, &c. ; while the innocent tumours have been described as villous growths, papillomata, and polypi.

The older writers founded a simple classification, according to their clinical experience, of these growths, and were content with two varieties—cancer (malignant growth) and polypus (an innocent formation). This classification into simple or malignant growths is of considerable clinical value, but it assumes too much, and draws too hard a line between the two varieties of tumour. For, notwithstanding that, in a large number of cases, the future of the disease can be certainly predicted, there remain a certain number of growths whose malignancy is of such a modified type that it is impossible accurately to forecast their future behaviour. They form, as it were, the connecting link between the malignant and innocent disease, but yet are not provided for in either nomenclature.

Recent attempts to define these growths according to their minute anatomical structure are certainly more scientific, and, if only accurate, would form no cause of complaint. In the rectum, however, to which the present observations are confined, I have failed to discover any growths or tumours consisting entirely of the characteristic structure which pathologists designate as scirrhus or medullary cancers, or as belonging to the different varieties of sarcoma. Considering the eminence of many careful observers¹

¹ Dr. Ball, of Dublin, in his work, *Diseases of the Rectum*, p. 219, states that, in the Museum of the College of Surgeons of Ireland, are two specimens of sarcoma of the rectum. He also records an interesting case of melanotic sarcoma under his care.

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 unable myself to discover tumours composed entirely of the distinctive features appertaining to these diseases.

It must not be supposed that all these growths have a similar structure. On the contrary, it is seldom that any two accurately correspond in their construction, but such differences as exist depend rather upon the details of the growth than on any difference in the general plan on which it is formed. The length of time that the tumour has existed, the particular tunic which it has invaded, or the portion of growth from which the section has been cut, are sufficient to account for the varying appearances obtained by the microscope without the assumption that different types of the disease exist. For instance, I have seen growths which, while confined to the mucous membrane, displayed the most typical microscopic characteristics of adenoid or cylindrical cancer, yet, when they had spread to the skin of the anal margin, they gradually and imperceptibly changed their characters into perfect examples of epithelioma as it ordinarily affects the skin (see Plate XIII.). It not uncommonly occurs that the particular features supposed to be characteristic of each type may be observed in the several portions of the same specimen, or that a tumour which, on its original removal, presented one variety, will on its recurrence present another.

Excluding the form of cancer known as colloid, as to the nature of which I am not altogether satisfied, it will be found that there is one characteristic structure common to almost all morbid growths in the rectum. This structure consists of gland tissue similar to Lieberkühn's follicles. By careful examination this tissue can be demonstrated in almost every specimen, but yet now and again search fails to disclose this gland tissue. These exceptional specimens usually present dense fibrous tissue, with only a small amount of cell element; but a considerable amount of such structure is always found in the older parts of typical glandular growths, where it can be demonstrated to be in direct continuity with, and to be formed from, the adenoid tissue. It is probable, therefore, that in the exceptional specimens either glandular growth existed in other portions of the specimen, but escaped detection, or that it had been present in an earlier stage of the growth, but had passed away before the specimen came under examination.

If these growths are to be named according to their anatomical structure, the term adenoid will appear to be the most applicable.

Such expressions as malignant, semi-malignant, or simple adenoid, would, moreover, be sufficiently distinctive for surgical purposes, and at least have the merit of being in accordance with clinical and histological observation.

It is generally easy for a surgeon of experience to determine, as the result of clinical observation, whether a growth in the rectum be of an innocent or of a malignant nature. Occasionally, however,

the characters of the disease are not sufficiently marked to admit of a positive prognosis. The quickly growing tumours, or those which have deeply eaten into the surrounding texture, are almost certainly malignant, while the more slowly developed growths projecting into the rectum, without extending into the deeper tissues, are generally innocent.

Growths will be found occupying, as it were, a position in regard to their clinical features midway between the extremes mentioned. Such growths admit only of approximate prognosis, as their features tend more or less in the direction of the innocent or malignant type.

Seeing thus, that from clinical observation it is possible to speak with considerable certainty as to the future of rectal growths, the question naturally arises whether the anatomical structure when examined by the microscope presents any constant appearances by which a malignant may be distinguished from an innocent tumour.

Although, as before stated, these growths are all constructed upon the plan of glandular tissue, yet I have no hesitation in affirming that it is generally possible to find appearances presented under the microscope by which the innocent or malignant nature of the growth can be established. However, just as in clinical observation so under the microscope, there will still remain specimens in which the structure presented lacks the distinctive feature common to both of the pronounced types.

In commencing a description of these growths it may be well briefly to call attention to the typical

appearance both of an innocent and malignant specimen without attempting to describe intermediate links.

The innocent growth forms a soft tumour projecting into the cavity of the bowel. It sometimes has a fairly marked pedicle, especially if the growth has existed any length of time, but this pedunculated appearance is generally produced by the mass being constantly dragged upon during efforts of defecation, and thus drawing down the healthy mucous membrane around the base of the growth so as to produce the appearance described. These growths have already been described in the chapters on Polypus and Villous Tumour.

The malignant growths present two well-marked varieties, the chief characteristic of the one being its tendency to spread as a thin layer between the mucous and muscular coats of the bowel, while that of the other is to increase more uniformly in all directions, thus producing a distinct tumour.

The laminar form of disease is the commoner, and when well marked exists as a thin layer of adenoid growth spreading in a horizontal plane between the mucous and muscular coats. The thickness of the growth is often not more than a quarter of an inch, while its area may extend over several square inches. At an early stage it feels like a flat foreign body between the mucous and muscular coats, slightly more raised at the centre than towards the circumference. The mucous membrane is firmly attached to the subjacent growth, while this in its turn is adherent to the muscular coat; it appears, in fact, as if the inter-fibrous bands naturally running from

one coat to the other, had been rendered tight by the deposit of new growth between the fibres. The diseased portion of bowel is, as a whole, at first fairly movable upon the surrounding structures.

As the layer of the disease spreads it is not always in a regular manner; it usually extends more rapidly laterally than in the direction of the long axis of the bowel, a course which corresponds somewhat with the distribution of the lymphatics and vessels of the part. The result of this lateral extension is often seen by the whole circumference of the bowel being affected, while the width of the ring of disease is less than an inch. It is this form of disease which constitutes the annular malignant stricture so common in the large intestine, and most pathological museums afford specimens of this annular form of cancer.¹

The deposit having existed a certain length of time ulceration of the mucous membrane over its centre takes place, and the membrane is generally slowly destroyed from the centre towards the circumference. Sometimes the ulceration of the mucous membrane commences at many points at once, so as to give it a honeycombed appearance, and the growth can be seen projecting through these holes in the mucous membrane (see fig. 3, p. 62), but this is not common. After a while, instead of the centre of the growth being its most prominent part, it becomes excavated and depressed by the ulcerative action that commences in the mucous

¹ In the Middlesex Museum will be found two beautiful specimens; they stand side by side, and are numbered 116 and 117, Series 8.

covering and extends to the disease, which in its turn becomes eaten away. At first the base of the ulcer will consist of the adenoid growth; as this gets completely destroyed the base of the ulcer is formed by the remains of the muscular coat, generally blended into a firm, hard cicatricial tissue. The dense mass thus formed appears to be in great measure due to inflammation set up beneath the ulcerated surface, for under the microscope it resembles an inflammatory rather than a malignant deposit. Towards the edge of the ulcer the new growth, with the hypertrophied disintegrating mucous membrane lying over it, is apparent. The edge of the ulceration is hard and raised, and often overlaps the healthy mucous membrane. It sometimes happens that after the destruction of the mucous membrane, instead of the subjacent adenoid growth sharing the same fate, it continues to increase, especially at certain points, and projects as a fungoid mass into the bowel cavity.

On section the borders of the diseased patches will be found raised a quarter of an inch above the level of the neighbouring bowel, overlapping the surrounding healthy membrane to a considerable extent. This heaping-up is caused by a soft, flocculent-looking growth in the submucous tissue.

The portions of the muscular coats subjacent to the diseased mass are considerably altered. They appear at first sight to be greatly thickened and intersected by dense, glistening, fibrous bands. These bands blend in a dense mass of cicatricial-looking fibrous tissue, situated external to the muscular coat, and thick bands again pass out from

this and are continued into the surrounding fat, being imperceptibly lost by a gradual blending with the natural fibrous stroma of that tissue.

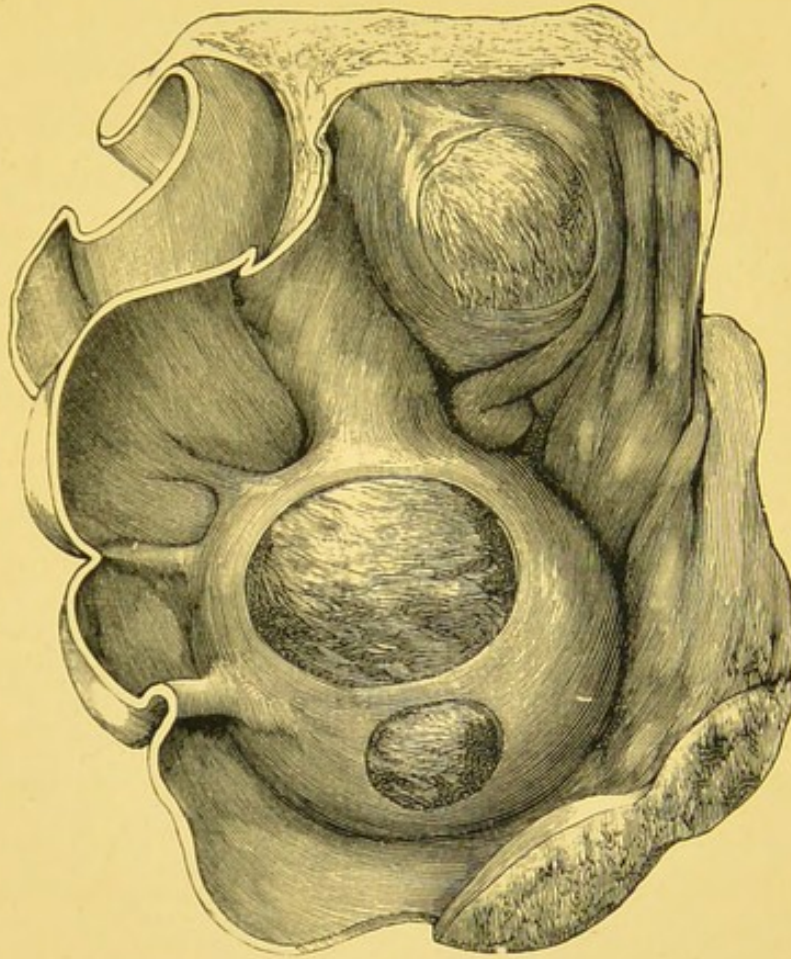
On a more minute examination the mucous membrane bordering on the portion destroyed by ulceration is found thickened by a large accumulation of hypertrophied papillæ, looking much like the circumvallate papillæ of the tongue, giving a villous velvety appearance to the membrane. Beneath this hypertrophied membrane is a large quantity of retiform tissue, in the deeper portion of which is found the new adenoid growth, consisting of a soft, caseous material, dipping down here and there a considerable distance towards, and even between, the muscular fibres (see Plate I. fig. 4). The portions that dip down are seen to lie between the glistening white fibres already alluded to as intersecting the muscular coat. These dipping portions sometimes expand at their extremities so as to have the appearance of inverted flasks, and in places are distinctly lobulated. The little masses are only loosely adherent to the walls of the spaces in which they lie, and when picked out with the point of a needle the cavities in which they were contained are smooth. The boundaries of these cavities are the glistening fibrous tissue before mentioned (Plate VIII. fig. 1).

As the adenoid growth extends downwards, it takes the place, and causes the absorption, of the bundles of muscular fibres lying between the fibrous trabeculæ; the trabeculæ themselves, however, instead of being destroyed, appear to become greatly thickened.

Beneath the central or older portions of the growth, the muscular coats are replaced by dense white fibrous tissue, the result of enormous thickening of the natural fibrous tissue between the muscular fibres. The thickened fibrous tissue extends beyond the muscular plane, and branching into the surrounding fat blends with its fibrous stroma. These branching fibres undergoing contraction draw the fat and neighbouring tissues towards the diseased portions. If an attempt be made to dissect the coats of the rectum, the one from the other, in the neighbourhood of the disease it will be found scarcely possible to do so, for each coat seems firmly blended to its neighbour by the great thickening of the connecting fibrous bands.

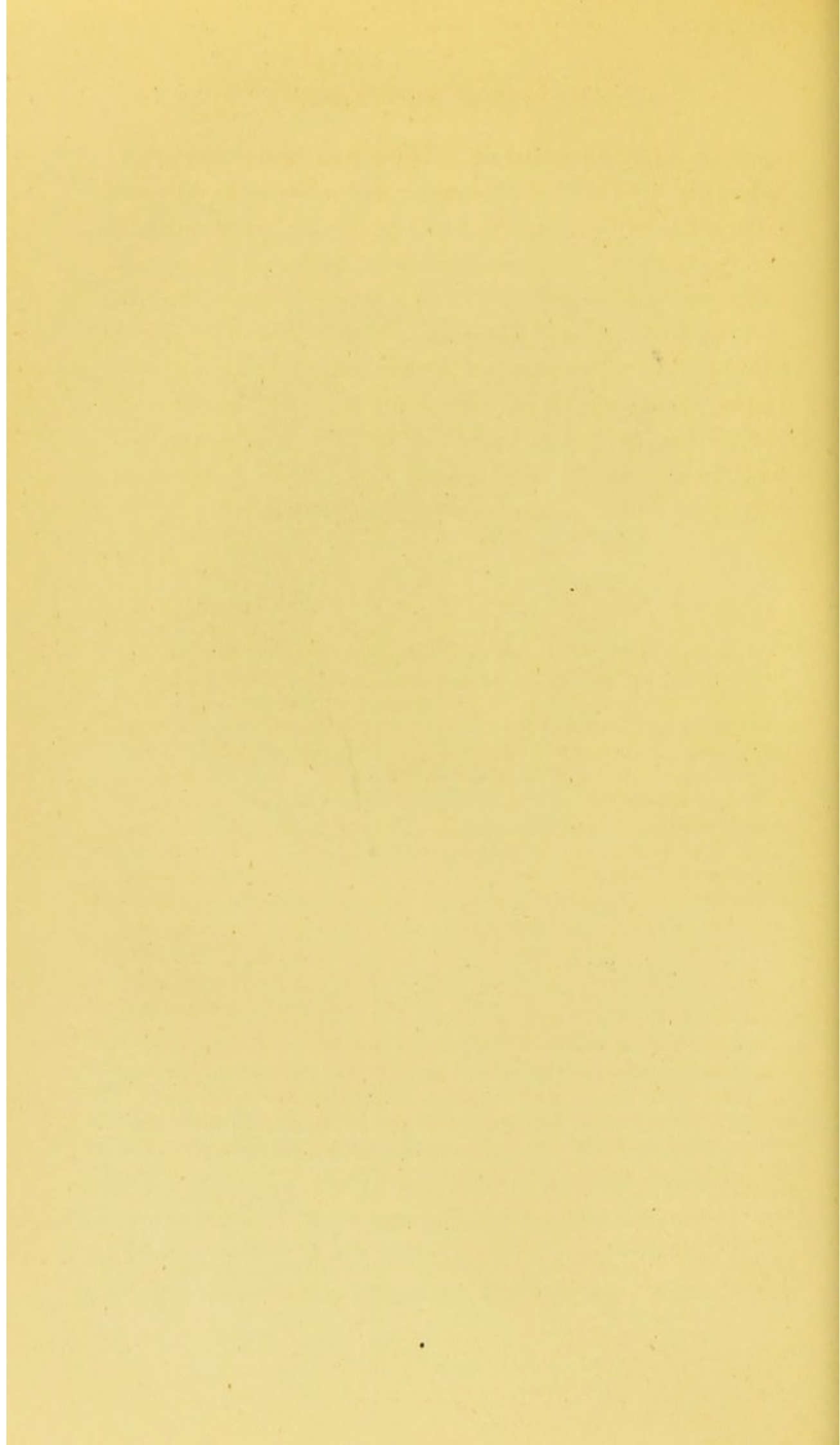
What has just been described is the appearance seen on section of that form of disease which tends to spread horizontally. We will now consider the disease when it forms more or less a distinct tumour. This second variety commences in a similar manner to the one just described, that is, as a deposit between the mucous and muscular coats. The deposit is generally at a single spot, but there may be several nodules sprinkled over a considerable area. Instead of the growth extending in a thin layer between the coats it increases in size pretty regularly in all directions, and forms a distinct oval or circular tumour projecting into the bowel cavity. Such a nodule may attain the size of a pigeon's egg, or even larger, yet still retain an intact mucous membrane over its surface. But the mucous membrane will, after a while, give way (see woodcut), and the growth, released from pressure, quickly forms a fungating mass pro-

FIG. 3.



MALIGNANT TUMOUR OF THE INTESTINE.

A malignant tumour, which has raised the mucous membrane and projects into the cavity as a nodule the size of a pigeon's egg. On the surface of this nodule the mucous membrane has been destroyed in two small circular patches, one the size of a sixpence, the other about a quarter as large. At these spots the growth, relieved from pressure, slightly projects but is rather smooth than fungating. There are two smaller nodules in this specimen about half the size of the one described; over these the mucous membrane is still intact.—Drawn from a Specimen in the Royal College of Surgeons' Museum.



jecting into the rectum.¹ These tumours vary considerably in their consistency, some being so soft as to break down on the slightest pressure, while others are fairly firm. It will generally be found that the firmness of the tumour is in inverse proportion to the rapidity of its growth. Some of the rapidly growing tumours are so fragile that they fall to pieces on the slightest manipulation. On section of the firmer growths, bands of fibrous tissue can be distinctly seen by the naked eye. Such bands are scarcely visible in the softer growths.

¹ Specimen 1217, Royal College of Surgeons, is a good example of this form of growth at the time when the mucous membrane is just giving way. There is a tumour, which has raised the mucous membrane and projects into the cavity as a nodule, the size of a pigeon's egg. On the surface of this nodule the mucous membrane has been destroyed in two small circular patches, one the size of a sixpence, the other about a quarter as large. At these spots the growth, relieved from pressure, slightly projects, but is rather smooth than fungating. There are two smaller nodules in this specimen about half the size of the one described; over these the mucous membrane is still intact. In the same museum will be found a specimen, No. 1221. This specimen (or rather specimens, for there are two in the bottle, the second and most interesting being placed at the back, so that it cannot be seen without turning the bottle round) shows two forms of the disease in the same intestine. It is described in the catalogue as "a portion of the jejunum, on the inner surface of which is a flat tumour, superficially lobulated, occupying the whole circumference of the intestine for about two inches wide. The tumour has a soft obscurely fibrous structure, and part of the surface is ulcerated. On another portion of the same intestine a smaller nodule has been cut through, and its section presents a soft surface with long threads hanging from it." This nodule, which is as large as a plover's egg, projects into the bowel cavity like the half of a sphere. The peritoneal surface of the bowel is quite level and not pushed out by the growth. The mucous membrane is perfectly intact over the tumour: on section it looks like a collection of exceedingly fine vermicelli crowded and squeezed together; here and there a loop or end of one of these has been drawn out from the cut surface and hangs down like a fine coil of thread over an inch in length. Upon further examination they are apparently enormously lengthened villi crowded and pressed together, but not adherent. Some of these are two inches in length, but retain a uniform thickness throughout.

It may be gathered from this sketch of the naked-eye appearances of adenoid rectal disease how different the appearance under the microscope would be according to the portion of the growth examined and the length of time it had been growing. Sections involving the older portions of the disease, and in which the adenoid growth has been destroyed by ulceration, would show little more than dense fibrous tissue, the result of a preceding active condition of disease, while sections from the margin would show the cellular growth, in varying stages of development towards adenoid structure, according to the rapidity of the growth.

In order to understand the appearances found in the morbid bowel it is desirable to trace the disease from its very commencement, and follow its progress step by step.

Unfortunately the cases are rare in which the growth can be discovered at an early stage, and rarer still that opportunity is afforded for microscopic examination. There is no reason, however, to doubt but that the condition of the tissue found towards the advancing margin of the disease would supply good evidence of the condition we should have expected to have found at the precise spot where the disease commenced. In support of this view I have by me a specimen in which the disease had only existed a few weeks, and its section has much the same appearance as seen in sections cut near the border of more advanced disease. In this specimen the disease had not advanced farther than the development of a portion of mucous membrane, a quarter of an inch in diameter, into a villous-like

structure, while the subjacent retiform tissue was considerably thickened and crowded with lymphoid cells the muscular coat being normal. The evidence afforded by this specimen, together with others at a more advanced stage, shows that the morbid action commences in an increased activity of growth in a portion of the mucous membrane.

Having briefly considered the naked-eye appearance of the growth, the use of the microscope is necessary for its further elucidation. The powers I have found most convenient in examining sections under the microscope are a 1-inch for a general view of the section, and $\frac{1}{8}$ for studying the same in detail. Satisfactorily to understand the position of the growth relative to the natural structures of the part, the composition of its elements, and its method of extension, it is necessary to examine many sections cut from different portions of the morbid mass. The appearances presented by such sections will vary greatly, not only according to the portion of the growth from which the section has been cut, but also according to the variety of adenoid disease from which it has been selected.

The drawings illustrative of this portion of the subject are from sections chosen from many thousands cut from different portions of sixty separate specimens. I have taken every care to draw the specimens exactly as they appeared in the field of the microscope; and the lithographs are exact copies of my drawings.

Plate IV. represents a section of the laminar form of disease. It has been cut at right angles to the bowel cavity, close to the margin of the

growth, before the superjacent mucous membrane had been destroyed by ulceration. The section displays the mucous membrane and the new adenoid growth in the submucous tissue. The follicles in this portion of mucous membrane are three or four times their normal length. Their diameter, however, is but slightly increased, their lining epithelium is large, the boundary line between the cells being very clearly defined. The bed of retiform tissue upon which the blind extremities of the follicles rest is enormously increased in thickness, and it is in this bed of tissue that the new adenoid growth is apparent, but, as seen in the figure, there is considerable distance between the bases of the normal follicles and the new glandular growth, the intervening space being crowded with a mass of small cells. There is no clear line of demarcation between the lymphoid cells of the submucous tissue and the new adenoid growth. At the upper portion of the section the submucous tissue appears crowded with the simple lymphoid cells; in the lower portion most beautiful glandular tissue can be seen almost as perfect in its formation as the normal Lieberkühn's follicles. The change from the lymphoid cells to the gland tissue is by imperceptible degrees. If the lymphoid cells be followed downwards towards the growth, they appear as if they slowly change their character from a simple lymphoid into an epithelial type of cell. It looks, indeed, very much as if the small lymph-cells gradually surrounded themselves with protoplasm, and thus became the nuclei of epithelial cells. Anyhow, the more nearly they approach the growth the more epithelial is their

character. Almost immediately after the epithelial type of cell can be recognized small embryonic-looking portions of gland tissue can be seen. These little bits often consist of four or five embryonic-looking epithelial cells arranged in a cluster. At first the acini are difficult to make out, owing to their being irregularly and indistinctly marked, but they gradually merge into the perfect and regular adenoid structure seen in the plate.

This adenoid tissue, as seen on section (Plate VIII. fig. 1), consists of a series of cavities divided from one another by fibrous tissue. In some places the fibres of this tissue are close together, forming dense bands. In other places they open out, forming a loose retiform network. The cavities vary in shape from perfect circles to long irregular channels with various inlets. These spaces are lined with a single layer of epithelial cells. The bases of these cells rest upon the fibrous or retiform tissue before mentioned, while their apices look into the cavity. Cavities, however, do not always exist; they are exceptional, for it seems that the apices of the cells covering one wall of the cavity are in contact with the apices of those of the opposite side. In some instances the cavities are obliterated by the opposite walls coming into contact as if from external pressure; in others they become filled by offshoots growing from the epithelial boundary of their walls.

These offshoots frequently show a beautiful tree-like arrangement, the original stalk throwing off secondary and tertiary branches. The stalk and branches consist of retiform tissue, the surface of

which is covered with epithelium (Plates V. and VII.). In this way the interior of many of these cavities is completely filled with adenoid tissue. However complicated be the pattern formed by the crowding together of these branches or convolutions, every branch, whether it be primary, secondary, or tertiary, will consist of its central stalk of retiform tissue, upon which the epithelium is arranged in a bipenniform manner—*i.e.*, bipenniform as seen on section, for if the whole thickness of the branch could be seen it would, of course, be entirely covered by epithelium. In examining the tumour as it extends into the deeper tissues, it must be remembered that it is not merely the new growth that is seen, but it is the new growth *plus* the remains of the old normal structures into which it is growing, and partially displacing. Thus the growth has not the same regularity of structure as when growing unimpeded on the surface. Here and there bands of thickened fibrous tissue can be seen, which represent the connecting links which normally exist between the muscular and mucous coats. These bands seem to have offered obstruction to the advancing growth, which has insinuated itself around or between them, and thus become very irregular.

In order to understand the true arrangement of tissue belonging to the new growth, a specimen must be selected which is growing unimpeded into the cavity of the bowel. Before, however, cutting such a specimen into sections, the free surface immersed in spirit should be carefully examined with direct light by a two-inch power. The surface of some of the tumours thus viewed has a very remarkable appear-

ance, resembling an ant-hill thickly studded with fungi. Upon closer inspection these bodies are seen to be projections from the surface of the tumour. Some are mere asparagus-looking spikes, while others are thin broad leaves arranged like those of an artichoke.

On cutting the tumour into fine sections, the appearance presented beneath the microscope will depend upon whether the section has been made parallel with or at right angles to the growing surface. If cut in the first direction, a beautiful network of circular, oblong, or irregular cavities will be seen. Some are open, lined by a single layer of epithelium; others are filled by secondary offshoots. The groundwork between the spaces consists either of a delicate open tissue filled with leucocytes, or of fine bands of fibrous tissue (Plate VIII.).

In viewing such a section it must be remembered that it represents but an isolated slice from a beautiful and complete structure, in order to understand which sections must be made so as to include the free or growing margins.

If such a section be made and examined by the microscope, it shows very clearly the structure of the projections already mentioned as growing on the surface.

The degree to which these projections are developed varies enormously in different tumours. In some they are so highly developed as to cover the whole surface of the tumour with an infinite number of almost tree-like projections, in which central stalks of fibrous or retiform tissue can be seen shooting upwards and sending off lateral offshoots on which the columnar epithelium is arranged in a bipenniform

manner (figs. 1 and 2, Plate V.) ; while in others, the projections are much more simple, amounting to little more than the raising of the epithelium into undulating ridges (fig. 2, Plate VI.). Some of these projections, as shown in section, look like villous spikes, but it must be borne in mind that this appearance is produced by the specimens being thin slices, and therefore many of these spikes are but broad processes or leaves seen in section (fig. 1, Plate VI.).

Both surfaces of each leaf consist of a layer of columnar epithelium, between which lies the retiform tissue forming the central portion of the leaf. In some places these leaf-like processes have a tendency to bend over towards each other at their margins ; in others, the leaves curl upon themselves, their opposite borders coming into contact. Sometimes, however, each border curls upon itself like a dried-up leaf. In some, at one or more points along their surface, little ridges appear, which in time become secondary leaves, and after a while behave in a similar manner to the primary ones. These secondary processes always appear on the concave surface of the parent leaf, so that they often become enclosed by its advancing border. The secondary offshoots, just mentioned, throw off tertiary projections, so that ultimately an exceedingly intricate pattern is produced.

To understand the relation of the epithelium to the fibrous tissue we may regard the growth in the following light. A central stalk of fibrous tissue exists. This gives off secondary branches ; these, again, sending off tertiary branches, and so on,

till the ultimate fibres expand into a delicate retiform tissue on the surface of which a single layer of columnar epithelium is arranged, and thus the growth resembles a tree or any other complex form of plant life.

By reference to Plate VI, fig. 1, the explanation of the cavities previously described, whether lying near the surface or far away in the substance of the tumour, and lined with epithelium, is apparent; for it will be at once seen that such epithelium was at a previous stage a portion of the surface of the tumour.

In a previous publication on this subject I stated my belief that these cavities were actually cut off from the surface by the arching over and subsequent coalescing of the cells forming the epithelial margin. As the result of further observation, I do not now believe that such spaces are in reality actually cut off by such coalescing, nor is it necessary that this should be the case to account for these cavities. It is probable that the epithelial lining of such a cavity is still in continuity with that on the surface through intricate and convoluted folds. These cavities in the tumour, far away from the surface, become filled with secondary growths by a means precisely similar to the extension of the growth on the surface.

The method by which the free epithelial border extends should be studied under a high power. The process is as follows:—At one or more points along the border the epithelial cells increase in length, so that they stand out like a small bud beyond the heads of their neighbours.

If such a bud be closely examined it will be seen that the two central cells forming the group act as the leaders of the growing branch. At the same time it is seen that these lengthened cells are in an active state of generation, and appear as if multiplying by cleavage of their extremities (Plate VII.). As new cells are progressively formed they bend over and gradually assume a direction at right angles to the line between the primary cells. The line of junction between the walls of the two original cells, which at first was barely visible, becomes more strongly marked, assuming a distinctly fibrous character, and increases in thickness at the expense of the cell contents. After a while small dark cells appear in the very centre of this line, as if they were again separating the bond of union by which the two contiguous cell walls had united to form the original fibre.

Such cells become vacuolated, and the central line becomes a channel. In time a considerable amount of retiform tissue is formed in the centre of the growing leaf. It would appear as if the fibres of this tissue were formed from what is left behind of the walls of the epithelial cells, that is to say, if the line of junction between any two of the contiguous cells forming the surface of the branch were followed inwards it would be continuous with the fibres of the retiform tissue (Plates II. and X.).

The formation of fibrous tissue has long been a vexed question with physiologists, the prevalent opinion being that it is a formation from connective-tissue corpuscles, and that when found in new growths it is an extension upwards from pre-existing

connective tissue. Its formation in health will not be here considered, but in the morbid tissues under consideration I believe that it admits of positive demonstration that it is in great measure derived from the walls of the epithelial cells.

The connection between the fibrous and the cellular elements in any given portion of a morbid growth is not easily traced. The stages of the transformation of the one into the other have passed away, leaving a more or less perfectly formed tissue as a result.

On the margin of a growing tumour, or in the normal tissue, increasing more actively than usual in its immediate neighbourhood, a definite relation can be traced between the cell growth and the fibrous tissue formation; and it is a fair inference to assume that the fibrous tissue of the deeper portions has been produced by a similar process.

The large and clearly defined columnar cells found lining the acini of adenoid growths in the rectum afford singular facilities for tracing the formation of intercellular fibrous tissue.

Almost every writer upon gland structure has assumed the existence of "basement membrane," upon one surface of which are the epithelial cells, and upon the other the retiform tissue, the cells being kept in position by the adhesion of their bases to the membrane. Granting for a moment that a clearly defined line can be seen in some sections lying between the epithelial cells and the subjacent tissue, it does not necessarily follow that such a line is a section of a thin membrane independent of the cells. Such an appearance may be produced by the bases of the cells resting

on the same level and being cut on the same plane. If a section be made of a portion of a bee's honeycomb an analogous line can be seen running down its centre, marking the boundary between the cells of opposite sides, but yet it admits of clear proof that such a line belongs to no independent structure, but is produced by the bases of contiguous cells, each of which participates in its formation.

Now, this fibrous line, supposed to mark the existence of "basement membrane," is frequently absent if the section be cut exceedingly fine in a direction parallel with the long axis of the cells, and direct continuity can be traced between the fibres of the retiform tissue and the lines between the epithelial cells.

In Plate VII. and in fig. 2, Plate X. such continuity is seen. It remains, however, to be shown that the fibres are formed from the cell wall rather than by an extension upwards of pre-existing fibrous tissue.

If sections be made in such a way as to cut the growing cells across close to their apices, the lines marking the contact of the cells with one another will show as a fine hexagonal network. This hexagonal network must inevitably be the form taken by soft cylinders in contact with each other (fig. 20, Plate II.). If a second section be made, nearer the bases of the cells, the hexagonal network will have assumed a circular form, the lines forming it being considerably thicker than those of the first section, the cavities being correspondingly smaller (figs. 21 and 22, Plate II.).

It is impossible to doubt that the fine lines

described in the first section are due to the thickened outline of the protoplasm of the cells, for the same appearance is produced in every cellular effusion.

It can, moreover, be shown by vertical sections (fig. 4, Plate III.) that the fine network just described, formed by the apices of the epithelial cells, is in direct continuity with the thicker lines seen in the second section, and beyond these with the subjacent fibres of the retiform tissue. If, therefore, it be accepted that the epithelial cell wall and terminal fibre of the retiform tissue be one and the same structure, it would be a fair inference to draw that the deeper part of the same fibres had a similar cellular origin.

In examining various cross-sections of epithelial cells, it will be seen that the original fine hexagonal network does not undergo an equal thickening in all its parts, for it is at the angle of the hexagons that the greatest thickening takes place, and on this account the circular form of the spaces is gradually assumed.

The hexagonal or circular outlines are often very irregular, as the result of unequal pressure from various quarters. In some sections, such a network has an appearance strongly suggesting the idea of a series of stellate cells, anastomosing by their processes. This delusive appearance is occasioned by the processes of the supposed stellate cell, being in fact portions of the circumference of pre-existing cells; the body of the supposed stellate cell being the point of greater thickening, where four or more ordinary secreting cells come into contact (figs. 24 and 25, Plate II.).

I must confess to some difficulty in understanding the existence of stellate cells. I have never seen one isolated, and it is difficult to conceive that, if the fine lines radiating from such cells be in reality hair-like processes, how it comes to pass that a razor should happen exactly to catch many such processes on a plane so precisely parallel as to show them on section anastomosing across from one to the other. On the other hand, if these supposed processes were membranous walls of other cells, they would always show like fibrous lines in whatever direction the section was cut.

Believing the fibrous tissue to be the permanent refuse, so to speak, of pre-existing cells, the appearance it presents in these morbid growths will be briefly described.

It is first clearly recognized as an open network at the bases of the epithelial cells under the name of retiform tissue.

If the fibres of this tissue be traced downwards from the surface to the deeper parts, it will be observed that the majority of the fibres gradually converge, and coming in contact form bands of fibrous tissue of greater or less thickness. All the fibres, however, do not thus converge, for occasionally, instead of coming in contact, they form boundaries to well-marked spaces or channels.

Now and again, fibres, forming a bundle, once more spread out in an open network.

Bearing in mind that the examination of this retiform tissue is by thin slices only, it is at once suggested that the appearance presented is not the result of a simple network of fibres, but may be due

to a series of convoluted channels, the fine walls of which, on irregular section, give the appearance of a fibrous network. The convolutions of such channels would in great measure account for their not looking like tubes on section. Occasionally, however, a very suggestive appearance is produced in the retiform tissue lying between two adjacent follicles, and instead of a haphazard-looking network, the fibres are arranged in two or three concentric circles, between the lines of which a single layer of lymphoid cells lying in contact with each other can be seen as if contained in a definite canal.

If the retiform tissue is really a series of channels, each channel would appear to commence at the base of a glandular epithelial cell, and such a cell must be regarded as the active living root of the lymph system. If the retiform tissue is really a tubular structure, some of the channels become obliterated by their opposite walls coming in contact, as if by stretching, while others dilate into large lymph spaces.

I will now glance briefly at some of the leading characteristics of the cell elements found in these growths. These cells represent extraordinary variations (see figs. 1 to 12, Plate II.).

One of the most prominent features of these morbid cells is their large size. Whereas the normal glandular epithelium is seldom more than $\frac{1}{1000}$ th of an inch in length, many of the cells in question are at least ten times as long, some of them of such a size, in fact, as to be almost visible to the naked eye.

On the surface some of these cells resemble tubes

$\frac{1}{100}$ th of an inch in length, but not wider than the $\frac{1}{800}$ th of an inch. The line of contact between the adjacent cells is very clearly marked. In some parts, these tubular cells are filled with a faintly staining, homogeneous, granular material, without the slightest trace of nuclei. They appear, in fact, to be barren cells, like pods without peas. In others, again, all the cells are nucleated. Some contain two or three nuclei arranged equidistant apart between the summit and base of the cell. In these circumstances the cell wall bulges opposite the nuclei, with corresponding hour-glass constriction between the nuclei.

The nuclei in these multi-nucleated cells are so arranged that the bulging portion of one cell fits into the hour-glass constriction of its neighbour, so that every alternate nucleus only is on the same level.

Another form of cell, especially in the growing buds, is where the lower or attached half of the cell is narrowed to the finest tube or line, but its outer half forms an oval bulb, which contains the nucleus. Sometimes the condition is reversed, the outer portion of the cell being reduced to a narrow tube, the nuclei being contained in the bulging portion at its base.

The tubular cells just described are met with in the chronic forms of adenoid tumour. In the more rapid growths the cells are of a more spheroidal shape and more irregular, presenting every grade of variation between a lymphoid and an epithelial type.

On page 72 the development of the leaf-like

offshoots by the progressive formation of epithelial cells has been described. If, however, we more closely examine the club-like extremities of these growing buds, it will be seen that the young epithelium is first represented by a little projecting mass of protoplasm closely resembling a leucocyte (Plate VII.), and that the epithelial type of cell is subsequently assumed by this little mass remaining as a nucleus, and surrounding itself with a material staining more faintly. It thus appears that a young columnar epithelial cell on its first emerging into distinctive life bears a closer resemblance to a simple leucocyte than to its own epithelial parent.

The method has already been described by which the tumour extends on its free surface, and it has been shown that it does so by a progressive development of its epithelial border.

The view is commonly held that the growth advances into the deeper tissues by a similar process, and that it is by a downward prolongation and branching of the follicular crypts that the epithelial growths are formed in the deeper parts.

That this is one method by which the tumour extends into the deeper portions I admit, but that it is the only, or even the commoner, method of extension is doubtful. Until quite recently, I had never been able directly to trace this downward extension, but a specimen has recently come under observation in which something like direct continuity can be traced between the surface follicles of the mucous membrane and those in the body of the tumour. As a rule, however, careful search fails to show any such connection.

Notwithstanding the inability to trace this downward growth from the surface, such continuity might have existed, but yet have remained undiscovered in the sections. It is possible that such a downward dipping might have begun at a single point and then have spread horizontally like an inverted mushroom. In such a case the connection could not have been demonstrated save in a fortunate section through the connecting pedicle itself. Seeing the destructive process which occurs in the older portions of these growths, such a pedicle would probably have disappeared before the specimen came under observation.

It is certain that these growths must have other means of development in addition to direct extension by continuity of their epithelial element, otherwise the development of morbid adenoid tissue in isolated patches on the peritoneal coat of the bowel, or in the internal organs, could not be accounted for. It admits of demonstration that these separate points of disease are not directly connected by continuity of epithelial tissue with the primary growth.

Again, when we come to examine under the microscope the line of demarcation between the morbid growth and the tissue which it is invading, we generally fail to find a clear epithelial border marking the boundary. In the more chronic growths a line of fairly formed epithelium may occasionally be seen marking the boundary, but this is not generally the case. For if a section be cut through the new growth, extending into the healthy submucous

tissue, it will be seen that there is a kind of no man's land intervening between the growth and the normal tissue. This is infiltrated with a cloud of cells.

The cells forming the extreme border of this infiltration differ in no way from ordinary lymphoid cells, but as they are traced towards the growth they are seen gradually to become larger, and to assume a distinctly epithelial type. These in their turn gradually assume the appearance of an ill-marked adenoid tissue, which in time assumes a more definite type.

In short, the appearances suggest that the growth increases by the gradual conversion of the lymphoid cells on its border into adenoid tissue, and that the source from which these lymphoid cells are derived is the epithelium of the growing tumour, a portion of them gradually developing into the likeness of their parents causing the extension of the growth.

I have already described, on page 19, how the growth invades fatty tissue—viz., by the infiltration of a layer of leucocytes between the fat cells, and by these leucocytes gradually assuming an epithelial appearance.

It may be asked whether the foregoing description applies equally to the rapid-growing malignant disease, which runs its course in a few months, as to the more chronic form, which may be some three or four years in progress before producing a fatal result. A further question also arises as to whether the microscope will afford evidence whereby the slow-

growing malignant adenoid tumours can be distinguished from the innocent forms of villous tumour and polypi.

In answer to the first question, I would state that the plan and structure of the growth is similar, but the more rapid and malignant is the growth the less perfect and complete is its structure. If, for instance, under a low power, we examine a section, such as is seen in Plate IX. fig. 1 (which was a rapidly recurrent tumour that had attained a considerable size in a few weeks), we can there trace the whole outline of an adenoid growth; the various convolutions can be made out, the epithelial, fibrous, and retiform tissues can all be seen in their relative situations; but yet nothing is distinct or clearly defined, and it looks as if the specimen was seen through a thin veil. Upon examining the minute structure under a higher power, the want of definite formation becomes still more apparent, for, instead of the epithelial lining showing well-marked cells, it has rather the appearance of a band of darkly stained protoplasm, indistinctly striated at right angles to its length, and well sprinkled with nuclei (Plate IX. fig. 2). If we examine the tissue lying between these vaguely marked epithelial cells, instead of the retiform and fibrous tissue of the more chronic growth, we find embryonic-looking oat-shaped fibrous tissue cells with little or no definitely formed fibrous tissue. An appearance exactly similar to the so-called spindle-cell sarcoma is produced, but the identity of this sarcomatous-looking material with true retiform or fibrous tissue is established, beyond doubt, by following a track of it in the direction of

the base of the growth, where its real nature gradually becomes apparent as it merges into well-marked fibrous tissue.

Not uncommonly in a single growth may various degrees of development of the adenoid tissue be found, from portions so embryonic as scarcely to be recognizable, to others in which well-marked glandular tissue is apparent. Again, a growth which upon its first removal showed well-formed glandular structure, upon its recurrence often shows a tissue of a much more embryonic character.

When embryonic adenoid growth can be recognized under the microscope, it invariably means that the disease will be rapid in its progress.

In answer to the question as to the difference between the slow-growing adenoid cancer and innocent tumours, I have no hesitation in saying, notwithstanding the close resemblance between the two, that they admit of differentiation by the microscope. In innocent growths the arrangement of the branches is far more regular (see Plate V.) than in adenoid cancer; while, at the same time, both the fibrous tissue and epithelial cells are more clearly defined.

If a section can be obtained extending through the base of the growth into the rectal tissues, all doubt can be set at rest. In innocent disease the muscular tissues of the bowel are *never* invaded, while in cancer the adenoid structure can be seen spreading into and between the layers of the muscular coats of the bowel. Indeed, I consider the essential difference between the two consists in the fact that the one grows outwards into the lumen of

the bowel, while the other extends inwards into the coats of the intestine, or, in other words, that adenoid cancer is a polypus growing upside down (see Case page 116). If, under the microscope, the muscular coats of the bowel can be seen incorporated into the growth, it is certainly malignant (see fig. 4, Plate I. and Plates IV. and VIII.).

CHAPTER IV.

SYMPTOMS OF RECTAL CANCER.

FEW diseases commence in a more insidious manner than malignant disease of the rectum. It is always difficult, and in many instances quite impossible, to obtain exact data as to the duration of the symptoms; nor is this a matter of surprise if the nature of the disease be considered. At one time a patient is absolutely healthy, at a later period as certainly diseased; the gradations between the two are by exceedingly fine degrees.

The earliest symptom of malignant, as of many other diseases of the rectum, is the consciousness of the patient that he possesses such a portion of the body. There is just sufficient uneasiness about the part to excite the imagination from time to time, this uneasiness seldom at first amounting to such distinct pain as to make the patient aware that there is anything actually wrong; sometimes there is merely a sensation of itching about the anus. As the disease advances symptoms of a more definite character make their appearance; these symptoms are very varied. Speaking generally, and in typical cases, the discomfort gradually increases to a dull, heavy pain, especially noticed after exercise and at night. The fæces become streaked with blood or covered with a

white slimy matter. As time goes on the symptoms of stricture appear, and the motions can only be passed by much straining, when they come away in fragments, or, if cohesive, are small in diameter, and more or less flattened, and sometimes they are distinctly grooved. At this period constipation often alternates with diarrhoea. The anus becomes excoriated, although not always so, and the linen is stained with a dark, offensive discharge. The patient has a constant feeling of the bowels being full and requiring evacuation. At times there is considerable tenesmus, the frequent calls to stool resulting in a blood-stained purulent discharge. The patient begins now rapidly to emaciate, the pain becomes more constant and severe, and he is much troubled with wind. Sleep is only obtained by opiates. Secondary symptoms begin to develop, the digestion is impaired, the legs swell, the liver, perhaps, becomes large and nodular from secondary affection. The patient gets worse, and gradually dies of exhaustion, worn out by pain and bleeding, or the fatal termination may be more abrupt by an attack of acute peritonitis, or of complete intestinal obstruction. From the commencement of the symptoms to a fatal termination, the time depends partly on the nature of the cancer, and partly on the age of the patient. When soft and fungating, its course is more rapid than when spreading as a superficial ulcerating layer, while the younger the patient the more quickly does the disease run its course. Thus, the most rapidly fatal case of which I have any notes was that of a lad, aged 17, seen in consultation with Dr. Forbes, of Rock Ferry. The progress of the disease

was so rapid in this case, that the period from the onset of the symptoms to the date of death was only eight months. As a rule, however, the disease destroys life between the second and third year after the onset of the symptoms, though occasionally life is extended to a longer period.

A gentleman aged 60 consulted me in 1886 who two years previously, whilst staying at Leeds, had an attack of complete obstruction, and lumbar colotomy was performed by Mr. Pridgin Teale. A few weeks afterwards the motions again commenced to pass the right way, and the colotomy opening was allowed to close, and he remained in what he described as good health and little discomfort till about six months before seeing me. Since that time he has had an intermittent dull aching pain in the lumbar and sacral regions. He has also had a considerable amount of mucoid discharge occasionally stained with blood. On examination I found nothing left of the colotomy wound with the exception of a sinus which would just admit a slender probe.

On rectal examination a cancerous mass could be felt high up the bowel. After consultation with Mr. Teale I performed colotomy, and the patient lived in comfort for another two years, the date of his death being four and half years after the first symptoms of obstruction.

To illustrate the general symptoms of rectal cancer I have selected the three following cases from my note-book.

The first illustrates a somewhat rare form, for the amount of disease in the bowel itself was very small, compared to that in the surrounding tissues; the

second and third cases represent very common forms of the disease.

A. H. (for the notes of whose case I am indebted to Mr. Gillam, our late house-surgeon) was admitted into the Great Northern Hospital early in 1877. No family history of phthisis or tumours. He had been a healthy man up to two years ago. At that time he first noticed an uneasy sensation about the rectum. This sensation scarcely amounted to pain, except occasionally on the passage of a constipated motion. After these sensations had existed some months, the patient noticed for the first time a little blood in the fæces. His linen, also, was occasionally blood-stained. At this time he consulted a doctor, and was treated for piles, but the symptoms remained nearly the same during the next twelve months. He then thinks that he caught cold; anyhow, the symptoms became, on a sudden, considerably aggravated. He suffered so much pain as to be kept awake at night, and had a good deal of diarrhœa. About a week after this attack he had a good deal of offensive blood-stained mucous discharge, but with this discharge the pain became less. The discharge has continued ever since, but only in moderate quantity. For the last six months he has had considerable trouble with his motions, and has taken much purgative medicine. The motions have been getting smaller, being scarcely thicker than the little finger, and always passed with difficulty. On admission into the hospital he was weak and much emaciated, with a sallow, jaundiced appearance. He complained much of a burning pain in the region of the coccyx; this was always worse at night, depriving

him of sleep. There was only a small amount of discharge from the anus. For two or three consecutive days he would complain little of pain during the day. At other times he would suffer more, and be much tormented with a constant desire to stool. The pain was not aggravated on passing a motion, after which, indeed, he often obtained relief.

Upon examination a considerable amount of œdema existed over the sacral region, and pressure on this spot caused pain. The liver was not noticed to be enlarged, nor did it feel nodular, but three months later it could be distinctly felt to be both enlarged and nodular. There were two very small, slightly œdematous folds of skin about the anus, otherwise it appeared healthy. On passing the finger into the bowel it felt healthy for about an inch and a half, then became harder than natural, and a distinct lump could be felt projecting under the mucous membrane of the posterior wall. It appeared at first as if at about three and a half inches from the anus the bowel ended in a cul-de-sac, but upon a little manipulation the tip of the finger could just enter a tight annular stricture, which appeared to extend upward some distance. The bowel was evidently firmly adherent to the surrounding tissues; the tip of the finger in the stricture was unable to move it. The patient lingered at the hospital for some months, gradually growing weaker. He was one night seized with sudden severe abdominal pain, which in a few hours terminated in fatal collapse.

The post-mortem was performed forty-eight hours after death. The body was thin and emaciated, the blood in the vessels was not coagulated, the belly was

much enlarged and tympanitic. Upon opening the abdominal cavity a large quantity of purulent fluid escaped ; the whole of the right and left hypochondriac regions were occupied by the liver, which presented a mottled appearance, being thickly studded over the surface with hard white masses about the size of threepenny-pieces. Upon the liver being removed and cut into, nodules were seen pretty equally distributed over the left side, each being about the size of a pea or bean. On the opposite or right side were three large white patches instead of the smaller deposits found on the left, the largest patch being two and a half inches in diameter. These had at their margins a stellate appearance, due to white bands radiating a short distance into the healthy structure ; the centre of these masses was of a soft consistency, the interior of the larger patch being like thick cream. The liver weighed seven and a half pounds, it was in no place adherent to the parietal layer of the peritoneum, and it appeared as if this membrane had resisted the advance of the disease. The gall-bladder was distended with bile, the spleen and kidneys were free from disease, but the pancreas was affected with nodules much in the same manner as the liver. The whole chain of lumbar glands was infected, many of them being the size of a hen's egg. The intestines were apparently free from disease, except at a spot situated four inches from the anus : at this point the intestine became quite suddenly constricted. This constriction felt like a tight ring outside the mucous membrane ; this was the stricture felt during life.

The bowel was greatly distended above the

strictured portion and full of soft fæces, but no ulceration could be detected in it. A further examination of the seat of stricture showed that the constriction was caused by a deposit of cancerous material, one-eighth of an inch thick and a quarter of an inch broad, just at the line of the rectovesicular fold of the peritoneum. This band extended half round the bowel. A tight portion of fibrous tissue occupied the remaining half of the bowel circumference, and was continuous at each end with the line of cancer. Indeed, it appeared as if some of the fibres of the fibrous tissue that here encircle the bowel were continued into the cancer line, and that the contraction of the cancerous portion had caused the tightening of the fibrous band.

The deposit of cancer was beneath the mucous coat of the bowel, involving the submucous and muscular coats. Upon putting the finger into the cul-de-sac between the rectum and bladder from the opened abdomen, the peritoneum passed over the deposit just described with quite a smooth surface. Behind the rectum, between it and the sacrum, but not adherent to the wall of the bowel, was a mass of cancer as large as an orange, softened in the centre to almost creamy consistency. This mass had caused the absorption of a considerable portion of the coccyx and lower part of the sacrum. It appeared as if this mass sprang from one of the lower coccygeal glands.

J. W., aged forty-two, a well-developed, tall woman, with a good family history. She had the appearance in the face of some suffering, but was not much emaciated. Eighteen months ago she

noticed pain in the back about the lumbar region. She had no other symptom until a year ago, when she first noticed a slight discharge of blood, but she suffered no pain or uneasiness. Seven months ago she first had local pain, but this only during and after defecation. After a few weeks the pain became continuous, especially bad at nights, compelling her to walk about the room for hours. Three months ago a fetid, sanguineous, purulent discharge came on. After the onset of this discharge the pain became a great deal less. She has lost blood for six months from the rectum; slight at first, more of late, but never profuse. Has had little diarrhoea. The purulent discharge, which soon after its first onset was very diffuse, has been much less of late.

Upon examination, a growth of firm consistency, the size of a large nut, was seen springing from the mucous membrane just within the anus. Upon introducing the finger within the bowel, the rectal wall, especially the anterior portion, felt hard and irregular, with some ulceration in places, and was more like a semi-rigid tube than a contractile canal. As far as the finger could reach, the bowel was thickly sprinkled over with hard nodules, from a sixth to a quarter of an inch in diameter.

The rectum, notwithstanding its nodular, rigid condition, was fairly movable upon the surrounding parts. On a further careful examination under chloroform, it was found impossible to ascertain the limits of the disease; no operation was thought advisable. She continued to attend as an out-patient for the next two months, obtaining great

relief by using, night and morning, warm injections of starch and opium (thin fluid starch \mathfrak{zj} , liq. opii sed. \mathfrak{mxx}). The patient became gradually weaker, and died, I believe, about four months after she was first examined at the hospital.

In 1882 a medical practitioner at Manchester, aged 56, consulted me for the following symptoms. His attention was first called to the bowel by a sudden attack of diarrhœa seven months previously. The diarrhœa passed off in a few days. For nearly a year before this attack he had felt from time to time a slight sensation of the bowel not being completely empty, but he never had the slightest pain or inconvenience, and never passed any blood. Since the attack of diarrhœa, however, he has on three or four occasions noticed the fæces stained with blood. He has also noticed that when the fæces are soft they are distinctly grooved on one side. He has some discomfort about the bowel, but nothing like pain. He feels well and strong and is able to play golf, but, somewhat to his surprise, he finds that he has lost a stone in weight during the last three months. Upon examination, I found the anus quite healthy with a normal sphincter, and there was no excoriation and no discharge. The first inch and a half of the bowel was also natural, but the finger then came into contact with a series of hard, nodular projections, most marked over the prostate, but extending all round the bowel. On further examination these projections proved to be the margins of a considerable mass of malignant deposit.

This patient persevered for some time with the Chian turpentine, but without the least benefit,

and died twenty-two months after my examination.

Perhaps it will be well to consider in a little more detail the various symptoms mentioned.

Pain is of such common occurrence in all rectal disorders that it only becomes a valuable adjunct to the diagnosis when in conjunction with more definite symptoms. It is seldom an early symptom, being commonly the result of the morbid changes in an advanced stage of the disease, for at first discomfort merely is experienced, especially after walking or sitting long in a constrained position. There is often an uncomfortable feeling of wanting to stool, yet upon trial nothing but a little mucus is passed. As the disease advances the pain increases. So far as my experience goes the amount of pain greatly depends upon the situation of the disease. When situated at the anal margin or opposite the prostate the suffering is much greater than when situated higher up the bowel, in which situation the tissues have more room to expand. Sometimes when situated high up the bowel scarcely any pain is felt until quite late in the disease. The sharp, burning pain complained of during and after the passage of a motion is due to the irritation of the tender ulcerated surface. Not infrequently a dull, aching pain, more or less constant, is referred to the lumbar or sacral region. This pain is often rather relieved than aggravated by the passage of fæces. It is due to the direct pressure by the disease on the nerves lying between it and the sacrum, or to the accumulation of fæces above the narrow part. As already noticed, the onset of pain is generally gradual, but it

not infrequently happens that a somewhat sudden aggravation of the pain occurs, followed in a few days by a copious muco-purulent discharge which somewhat relieves the patient. There can be no doubt that this acceleration is due to accidental inflammation of the parts in the neighbourhood of the disease, and is often accompanied by a rise in the temperature and the formation of an abscess. On the whole I am inclined to believe that the accounts given of the pain suffered in rectal cancer are much exaggerated, and that it is not more severe than is often suffered in fissure or inflamed piles. I have more than once found considerable masses of cancer in patients who were quite unaware of the disease owing to their having suffered scarcely any discomfort. If there is any tendency to inflammation about the growth the pain undoubtedly becomes severe. Under these circumstances the patient can scarcely bear examination. Some patients, again, seem to have a natural anæsthetic condition of their whole nervous system, while others are morbidly sensitive. Indeed, it is a fact constantly observed by all surgeons that no two patients appear to suffer in the same degree from similar diseases or injury.

Bleeding from the bowel is almost sure to take place at some period of the disease; it appears to depend upon two causes. In the early stage, the blood comes from the congested mucous membrane lying over the disease, and is much increased by constipation, which retards the free return of venous blood. At a later period it may not only be due to this cause, but to actual ulceration of one of the hæmorrhoidal vessels. Cases are recorded in which

the bleeding has been so alarmingly persistent as in itself to cause the death of the patient. Bleeding from the bowel, when copious and persistent, and when not dependent upon hæmorrhoids, should always be looked upon with some suspicion. There are, however, many other conditions besides malignant disease which may give rise to the bleeding. As an instance, it may not be out of place to mention an interesting case, for the details of which I am indebted to my friend Mr. Edwards, of St. Mark's Hospital.

A young woman was admitted into St. Mark's on account of hæmorrhage from the rectum. She had been very unwell, with vague pains about the abdomen, for some months. During the last few days she has had violent bleeding from the bowel. Soon after admission she had another violent attack of bleeding, from which she never rallied, and died in a few hours. A post-mortem examination showed a small deep ulcer of the stomach, which had opened into the gastric artery. She had vomited no blood, nor could any other lesion be found in the alimentary canal.

A somewhat similar case of very profuse hæmorrhage from the bowel, the result of gastric ulceration, is mentioned in the catalogue of the Middlesex Hospital (Series 8, No. 33), but in this case there was also hæmatemesis.

Discharge of a muco-purulent nature is seldom absent if the disease has existed any length of time. At first this is simple mucus, but becomes purulent after ulceration has taken place, while at a further stage of the disease it may become dark, forming

the "coffee-ground discharge" so often described. From time to time this discharge is considerably augmented in quantity, while at the same time it is more purulent in its nature. A day or two prior to this increase the patient will complain of intense pain, which is greatly relieved by the discharge. The explanation of this has been already mentioned. The discharge has a highly offensive odour, the peculiar odour being considered by some surgeons pathognomonic of the disease. Personally I must confess to be unable to verify these assertions beyond the fact that all discharges from this neighbourhood are very offensive.

The examination of this discharge under the microscope may be a considerable aid to the diagnosis in those cases in which the disease is beyond reach of the finger. The bulk of the solid particles found in the discharge consists of lymph or pus-cells with fæcal débris, but not infrequently little masses of the growth may be detected here and there, especially if it be of a soft, friable nature. Such little portions can of course only be observed in a comparatively advanced stage of the disease after ulceration of the mucous membrane. I attended, with Dr. Norman Moore, a case in which there were obvious symptoms of stricture, beyond the reach of the finger, so that there was considerable doubt as to its nature, until one day a fragment the size of a hazel-nut was discovered in the discharge, which, on examination under the microscope, proved a beautiful specimen of adenoid cancer.

Diarrhœa is an intermittent symptom during the course of the disease. The sufferer often has a sen-

sation as if he required to go to stool, especially in the morning, and, after a little straining, passes a small quantity of fæces, as well as some mucopurulent material. He does not feel, however, as if the bowel had been emptied, and may have recourse to the closet many times. On these occasions the discharge is more of a mucopurulent material than any true fæcal evacuation. The desire for a motion in some patients quickly follows taking anything to eat or drink, especially if very hot or cold. When the large intestine is in an irritable condition, the taking of food appears at once to start peristaltic action in the colon, causing the expulsion of any fluid it may contain.

In using the word diarrhœa, the surgeon must be careful not to be misled by regarding it in all cases as resulting from simple looseness of the bowels. Indeed, when there is any stricture present, the so-called diarrhœa is often but a symptom of extensive fæcal collection behind the stricture. What the patient passes in these cases is a purulent mucoid discharge, stained by small particles of fæces washed from the surface of the collected mass.

Many of these patients fancy they are suffering from "chronic dysentery," and have undergone prolonged treatment for the supposed disorder without benefit.

This spurious diarrhœa is often one of the most marked features of the disease, and when the cancerous stricture is too high to admit of being felt by the finger, is perhaps the most important and reliable of all the symptoms.

I give below an exact copy of some notes sent to

me by a patient six months before his death from malignant disease of the upper part of the rectum. The record shows how the diarrhoea may vary from day to day, and how at times well-formed motions may be passed.

June 9, 8 A.M.—Blood and mucus.

„ 9 A.M.—Blood with little solid motions.

„ 10.50 A.M.—Blood with little solid motions.

„ 11 A.M. to 3.30 P.M.—Three very small, well-formed motions.

„ 4.45 P.M.—Blood and mucus.

„ 5.30 P.M.—Blood and mucus.

„ 6.40 P.M.—Blood and mucus.

„ 10 P.M.—Blood and mucus.

„ 10.45 P.M.—Blood and mucus.

Up five times in night, blood and mucus, some dull aching pain in the back most of the day.

June 10, 9 A.M.—One small thin action.

Nothing else all day. Only up once in night, passing a little blood and mucus, quite free from pain.

June 11, 8 A.M.—Blood and mucus.

„ 9 A.M.—Blood and mucus.

„ 12.30 A.M.—A large full-sized motion quite free from blood.

„ 5 P.M.—Blood and mucus.

„ 6 P.M.—Blood and mucus.

„ 9.30 P.M.—Blood and mucus.

„ 10 P.M.—Blood and mucus.

Up four times in night. When blood and mucus is passed, it comes quite suddenly.

Constipation is a symptom of importance as a means of diagnosis, if the disease is too high for digital detection. It is generally an earlier sign than diarrhoea, but not unfrequently intermits with

it. It may exist to almost any extent, from a slight trouble at the commencement of the disease to a grave complication as it advances. Complete intestinal obstruction, a frequent complication of intestinal cancer, sometimes results from the blocking up of the intestinal canal by the gradual encroachment of the growth into its calibre. It is not rare, however, to find that the earliest symptom causing a suspicion of cancer of the large intestine is the sudden onset of complete obstruction. (See page 106.)

The various symptoms just enumerated in detail are of the highest importance in calling attention to the probable existence of cancer, and have to be relied upon if the disease is in the sigmoid flexure or upper part of the rectum; but in the lower portion of the bowel the diagnosis can be made sure by an ocular and digital examination.

In order to make a satisfactory digital examination it is essential to have the bowel empty. With this object the rectum should be thoroughly washed out with a warm water enema. The best position for an examination is to have the patient lying on his side with the knees drawn up. From four to five inches of the rectum can be examined by the finger, and if the patient be directed to strain and bear down a further length of bowel is brought within reach. The margin of the anus should be carefully scrutinized for any portion of growth that may be in sight. It sometimes happens that a fungating projection from the anus at once declares the nature of the disease. More frequently, however, the anus is normal, or merely slightly œdematous and red from the irritation of the discharge. Upon introducing

the finger, the condition of the part will depend upon the length of time the disease has existed, the portion of the bowel implicated, and the physical character of the growth.

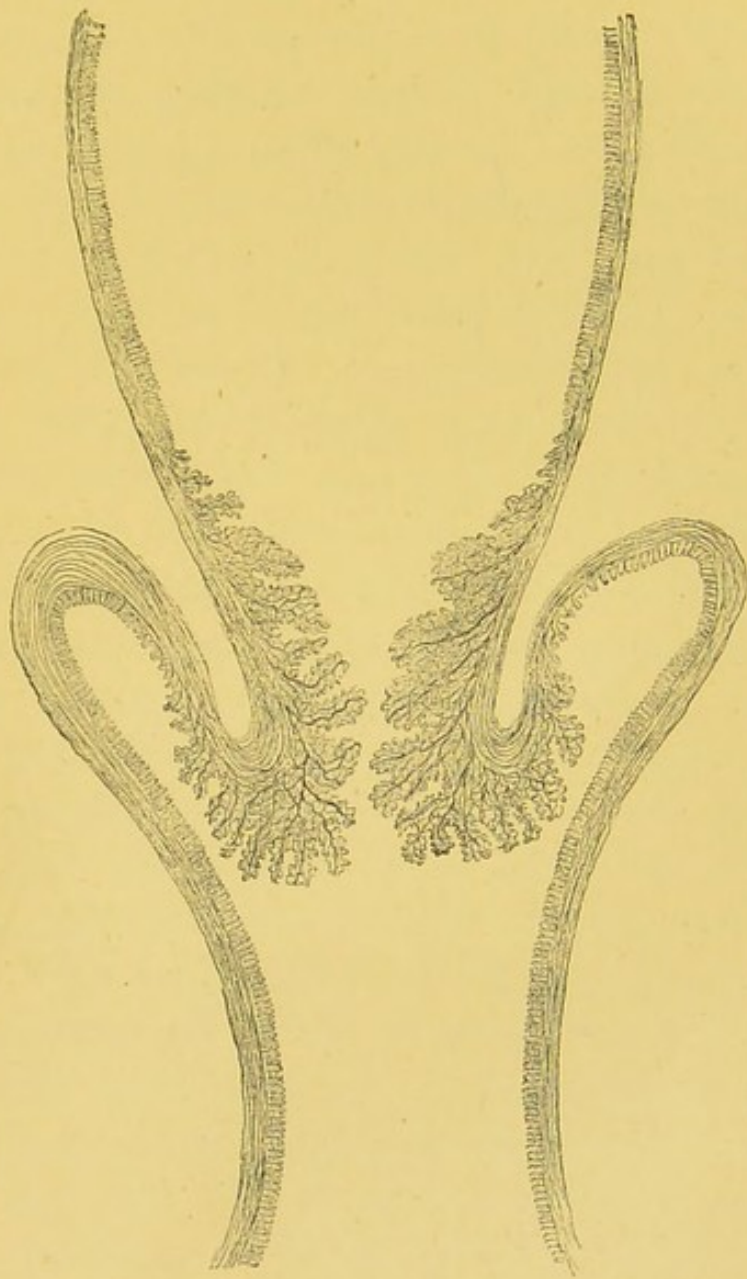
Commonly a certain interval of healthy bowel exists between the anal margin and the lower border of the disease. Perhaps the commonest point at which the disease is situated is at a distance of two and a half inches from the anus. After this the disease is more frequently found just below the sigmoid flexure. The amount of bowel diseased varies from the smallest patch to the whole calibre for several inches, the extent being in almost direct proportion to the duration of the growth. If the examination be made at an early period, an indurated portion of the bowel may be felt. This induration does not feel like a distinct tumour, but more like a thickening and hardening of the submucous tissue. The mucous membrane is generally pretty firmly adherent to the subjacent mass. The membrane is not ulcerated, but may feel somewhat irregular on its surface, being slightly raised in places while it is depressed in others. As a whole, however, the mucous membrane, pushed up by the growth, projects more or less into the bowel cavity. As explained in the chapter on Pathology, the disease appears to spread or extend after two different methods, the most frequent being its extension as a thin, firm layer between the muscular and mucous coats. By the time this laminar form of disease comes under clinical observation, more or less extensive ulceration has occurred, and the finger can distinctly feel the firm base of an ulcer with abrupt,

hard, raised overhanging margins, beyond which the disease apparently terminates somewhat abruptly in the healthy tissue. If the disease has extended so as to form a distinct tumour in the submucous tissue, the lump or lumps can be clearly felt projecting into the bowel cavity, or, again, a tight annular stricture, around which a hard deposit exists, indicates the disease. Sometimes, though more rarely, the rectum seems studded with hard, small nodules. If the disease be advanced, soft fungoid masses, blocking up the canal, may be felt; such masses bleed with the slightest irritation. When an annular stricture exists it is commonly just below the reflexion of the peritoneum.

I may here refer to a curious condition often present. On a hasty examination it may appear as if the disease were confined to the anterior or posterior wall only, while in reality it surrounds the bowel. The mistake arises from the tendency for that portion of the bowel in which the disease is situated to become invaginated from constant straining, so that there is a deep cul-de-sac of healthy bowel all round the growth. The finger passed into this cul-de-sac feels the growth lying in front or behind as the case may be. Of course, with a little further examination the condition of things may be ascertained, and the orifice of the intussuscepted bowel with the disease surrounding it can be felt not unlike an os uteri projecting downwards into the bowel cavity (see fig. 4).

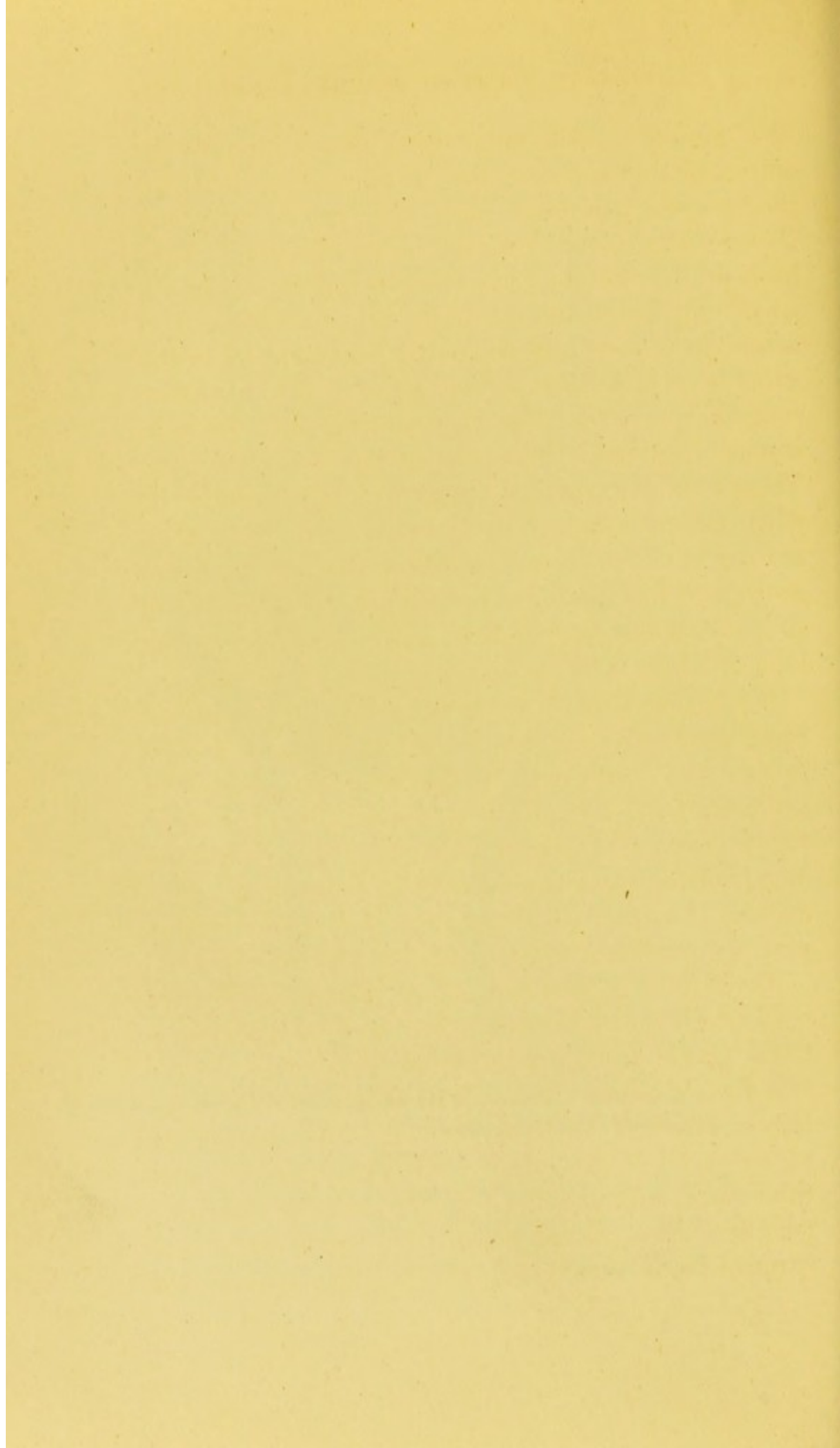
This annular stricture is so common in malignant rectal disease that its structure requires special consideration. Sometimes it is due to a deposit of

FIG. 4.



A diagrammatic illustration of the way in which the bowel at the site of the disease becomes invaginated.

To face page 102.



new growth in the submucous tissue around the entire circumference of the bowel. In such a case the mucous membrane may have given way and the growth protrude into the bowel all round. This, however, is not the common cause of the stricture, which appears to be generally due to a deposit of cancer at one spot of the bowel, commencing in the submucous tissue and extending into the muscular coat, and as it does so incorporating into its substance the fibrous trabeculæ of the muscular coat. These fibrous trabeculæ naturally extend round the whole circumference of the bowel, so that, when they are drawn upon at one spot by the action of the growth, it has much the same effect upon the bowel as if it had been surrounded by a piece of string, the knot of which is being continually drawn tighter.

If a stricture exist the greatest caution should be exercised in passing the finger through. It is surprising the ease with which such strictures will suddenly tear, and the rent extend into the peritoneal cavity. All temptation to forcibly thrust the finger into the stricture should be resisted as a proceeding fraught with danger. And the greatest possible gentleness must be used at the examination.

The following case will show the extreme ease with which a rent may be made, even by a comparatively gentle digital examination:—

A female patient was admitted into St. Bartholomew's Hospital with stricture of the rectum at $2\frac{1}{2}$ inches from the orifice. She was placed under chloroform, and examined in the lithotomy position for the purpose of diagnosis. On the finger of the surgeon being introduced, the tip just entered the

stricture, which, on gentle pressure, yielded slightly. On passing the finger a little further still, without using any force, the stricture suddenly split, the finger apparently passing into the peritoneal cavity. Further examination was at once desisted from, and the patient put back to bed and ordered opium. Within a couple of hours the patient was suffering intense abdominal pain, and by that night the belly was distended and the knees drawn up. The following day the face was pinched and hollow, the pulse hard and rapid, and after a day of intense suffering she became collapsed, and died within thirty-six hours of the examination. At the post-mortem, a stricture on the level of the peritoneum was found, the upper wall of which, from ulceration, was little thicker than blotting-paper. In the centre of the thin portion was a ragged rent, extending into the peritoneal cavity, which contained a considerable quantity of liquid fæces.

Such a case is sad beyond expression, for the mere attempt to ascertain what might be beneficial to the poor creature was followed by a sudden and violent death.

I was present at the examination in question, observed the patient carefully afterwards, and performed the post-mortem. I need not say that this accident strongly impressed me with the extreme care required in examining a patient with rectal stricture.

I also am aware of another case which occurred recently. A bougie had been passed twice for a gentleman without a mishap. On the third occasion a larger size was employed and some difficulty ex-

perienced in passing it through. Immediately afterwards the patient complained of great pain at the site of the stricture, which quickly extended to the whole of the abdomen, and he died on the third day with all the symptoms of acute general peritonitis. There can be no doubt that, in this case, the stricture had given way into the peritoneal cavity.

Diagnosis when beyond reach of the finger.—The symptoms already described as occurring when the stricture is in the lower part of the rectum, are in some measure present when the disease is situated higher up, but until complete obstruction occurs they are generally less severe and clearly marked.

The constant desire to defecate is not so prominent, neither is the same amount of pain and discomfort noticeable. This is what might be expected when the different functions and nerve-supply of the upper and lower part of the rectum are considered. The lower part is more sensitive, and even in health intolerant of the pressure of fæces which at once evoke the desire to defecate, while the descending colon and upper part of the rectum are comparatively tolerant of fæcal collections.

In cases of high obstruction the symptoms may consist of obstinate constipation, alternating with diarrhoea, while colicky, griping pains are of frequent occurrence. Occasionally even these symptoms may be absent, or not sufficiently marked to cause the patient to seek advice, the first indication of the danger being the sudden onset of complete obstruction.

The cause of this sudden onset is a matter of con-

siderable interest, for it seems difficult to understand how such could occur without previous symptoms, or with symptoms so slight as scarcely to have attracted the patient's notice. The following cases throw light on this point, and explain the occurrence, showing that it is the result of the sudden accidental blocking of a previously narrowed though pervious gut.

C.B.,¹ a woman, without having had previously any marked symptoms, was suddenly seized with obstruction of the large intestine. Colotomy was performed by one of my colleagues, but the patient died on the fifth day. The following were my notes of the post-mortem. The whole of the peritoneum showed signs of recent acute peritonitis, being every where matted together with large masses of yellow lymph. There was a small amount of fæcal extravasation in the neighbourhood of the colotomy wound, but owing to the state of the parts its source could not be easily ascertained. On tracing the descending colon downwards, it was much dilated. At a distance of five inches from the anus was an annular stricture not more than three-fourths of an inch in length, which would only admit a No. 12 catheter. The opening was completely blocked by a small oval piece of fæces of extreme hardness. In the Hospital Museum² (specimen 2017) is a very similar case, interesting not only as regards the cause of complete obstruction, but for the remarkable length of time the patient lived after the obstruction became complete.

¹ Henry Ward Register, St. Bartholomew's Hospital, vol. viii. p. 175.
(Notes by Author.)

² St. Bartholomew's Hospital.

In this case "The patient was a lady, 30 years old. She had been for three years subject to occasional attacks of obstinate constipation which were generally followed by diarrhoea. Four months before her death the obstruction of the intestine became complete, and after this time she had no fæcal evacuation. Death was eventually caused by the bursting of the intestine, which was enormously distended. The cause of the obstruction was found to be a cherry-stone, which had lodged above a stricture in the descending colon, and had completely closed the canal."

In Guy's Hospital Museum (Specimen No. 1887⁷⁵) is a specimen of adenoid cancer causing intussusception. In this instance a patch of adenoid disease affected a portion of the bowel, somewhat narrowing its calibre. The pressure of fæces above this had caused its invagination into the bowel immediately below, producing complete obstruction. Many such specimens have been shown at the Pathological Society, and such a condition readily explains the sudden onset of obstruction without previous warning.

A very slight amount of such intussusception is sufficient to cause obstruction.

A woman of middle age died after lumbar colotomy performed for sudden intestinal obstruction.¹ At the post-mortem was found a narrow ring of growth projected into the canal for about a quarter of an inch all round the circumference of the bowel. It looked like a diaphragm, the hole through its centre just admitting the little finger. The portion of bowel immediately below this diaphragm was

¹ St. Bartholomew's Hospital.

considerably contracted, so that when the growth was pressed upon from above it passed a short distance into the narrow portion below, the opening through its centre being completely obliterated.

Another, although perhaps rarer, condition is sometimes found, which will also account for sudden obstruction. In such a case a considerable dilatation forms above a slight annular stricture; after a time a pouch from this dilatation extends downwards below the level of the strictured portion of the gut. The collection of a hard lump of *fæces* in this pouch pressing upon a point below the stricture occludes the bowel, the margin of the strictured bowel being closed in a valve-like manner.

Breschet publishes the following interesting case, in which he describes such a condition causing obstruction in the body of Talma. In this case Nature had made a marvellous effort to remedy the defect. The dilated bowel above the contraction was put into connection with the part of the rectum situated below the contraction, a new canal having established itself between the two by the absorption of the adjoining walls, adhesions having formed between them.

If subjective symptoms be present, the bougie may be of value in confirming the diagnosis, although I believe from its use alone it would be rash to assume the existence of a stricture. The bougie best adapted for an examination is No. 6, which should be made hollow with a small pipe at its base, so that water may be injected through it at the time of examination. In passing a bougie it is very common to find an obstruction at five

or six inches from the orifice. This is either due to the bend of the sacrum, or to the bougie catching in one of the loose folds, but by a little very gentle manipulation the obstruction may be overcome. If caused by a fold of the mucous membrane, by injecting water through the hollow bougie the bowel will be distended and the fold obliterated. I have by these means on one or two occasions passed the bougie far up the bowel, when, prior to the injection of the water, it would only enter a few inches.

In the passage of the long bougie no force should on any account be used, for the bowel can be perforated with the greatest ease. In a case¹ at St. Bartholomew's Hospital, in which an injection was given by the long tube prior to an operation on the perinæum, the patient immediately after the injection became collapsed, and died of acute peritonitis, and it was found that the bowel had been perforated by the enema tube, and the whole of the soap and water thrown into the peritoneal cavity. Many similar cases have been recorded.

The question is sometimes raised as to whether in obscure cases of obstruction the whole hand might not be introduced within the bowel with a view to thorough examination. In eight consecutive cases, in the post-mortem room, I endeavoured to practise this manœuvre. In two I failed to get within the anus. In two of the remaining the rectum was extensively lacerated; in one the rent extended into the peritoneal cavity. In the remaining cases

¹ St. Bartholomew's Hospital Reports, Appendix, p. 88, 1883.

I was enabled by perseverance to get my hand as far as the sigmoid flexure, but the fingers were so tightly grasped that I doubt very much whether I could have made a diagnosis in the living body. My own hand is moderately small for a man ($7\frac{1}{2}$), but from my experience on the dead body I feel that it would be an extremely hazardous proceeding to attempt to pass my hand into the living body. Of course, if the surgeon should have an exceptionally small hand and wrist, it might be introduced with comparatively little risk, and I have seen my colleague, Mr. Walsham, with these physical advantages make an examination by this means. Nevertheless, I cannot but regard the procedure with an ordinary-sized hand as one of considerable danger, not to be counterbalanced by any advantages obtained. If cases pointed strongly to a stricture of the upper part of the rectum or sigmoid flexure, I should not hesitate to confirm the diagnosis by a small abdominal incision made in the inguinal region, so that if the diagnosis was confirmed, the operation of inguinal colotomy could be at once proceeded with, as in the case I have referred to in my practice, on page 187.

Colloid cancer in its physical characteristics differs in some respects from the foregoing description, owing to its soft semi-fluid consistency. This disease is stated by some authorities to be the commonest form of malignant rectal disease. This is entirely opposed to my experience, for I believe that this disease is rarely met with; nor do our pathological museums lead one to suppose that it was more common formerly than at the present time. A spe-

cimen in the Middlesex Museum, Series 8, No. 131, and another in the College of Surgeons, are described as examples of this disease. It appears in both these cases as if a fine transparent membrane had been spread over the mucous lining of the bowel, and this membrane had then been raised into a number of small vesicles containing the colloid material. Some of these excrescences are so minute as to be scarcely cognizable to the naked eye; others, again, are as big as large peas; the whole, in fact, strongly impresses one with the idea that a certain number of Lieberkühn's follicles had become obstructed by a thin membrane dilated into bladder-like excrescences by the mucoid secretion.

Cruveilhier¹ gives the following excellent description of a case of colloid cancer. It seems to be little more than an exaggeration of the condition just described:

“A case of colloid cancerous disease of the lower part of the rectum of an old woman. The gelatinous matter is contained in cysts of various sizes, pressed firmly one against the other, so that an appropriate name would be encysted gelatiniform cancer. The anus was surrounded by a number of different-sized swellings, several of the larger of which were surmounted by smaller swellings, in such a way that the anal opening occupied the bottom of an extremely deep cul-de-sac. Two ulcerations could be seen at the entrance of the anus. The rectum, at a little distance from the orifice, presented a zone-like ulceration; it was deep, and had destroyed all the thickness of the rectum in one part of its circumfer-

¹ Cruveilhier, *Traité d'Anatomie Path. Gén.*, tom. v.

ence and communicated with furrows, which penetrated to the diseased skin which was contiguous to the anus. The disease, which had given the rectum an enormous thickness, stopped suddenly about three inches from the anus. Immediately above the muscular coat was greatly thickened. This disease presented an appearance which I have never seen before. Imagine a multitude of acephalo-cysts of unequal size, of which some resembled pigeons' eggs, tightly pressed one against the other in a fibrous woof, and one would have a sufficiently exact idea of the disease. But these were not acephalo-cysts. The envelope of each cyst was fibrous, very dense, and very thin, and contained matter resembling apple jelly. On the surface was a cretaceous matter containing calcareous grains. In the centre of the gelatiniform matter were seen blood-vessels, resembling those formed in an egg, vessels without linings, terminating in a swelling of one of their extremities. The fibrous network, in the middle of which these cysts were situated, was evidently composed of the membranes of the rectum. I there recognized the longitudinal coat of the intestine. The external covering of the rectum had not the slightest vestiges of cysts, but was alveolar tissue of fibrous meshes, filled, like a sponge, with gelatinous matter, which was squeezed out with difficulty. This degeneration extended to the skin. An extremely thin pellicle, almost epidermic, had resisted and covered the swelling on its surface. Behind the rectum was a gelatiniform mass freely supplied with blood-vessels."

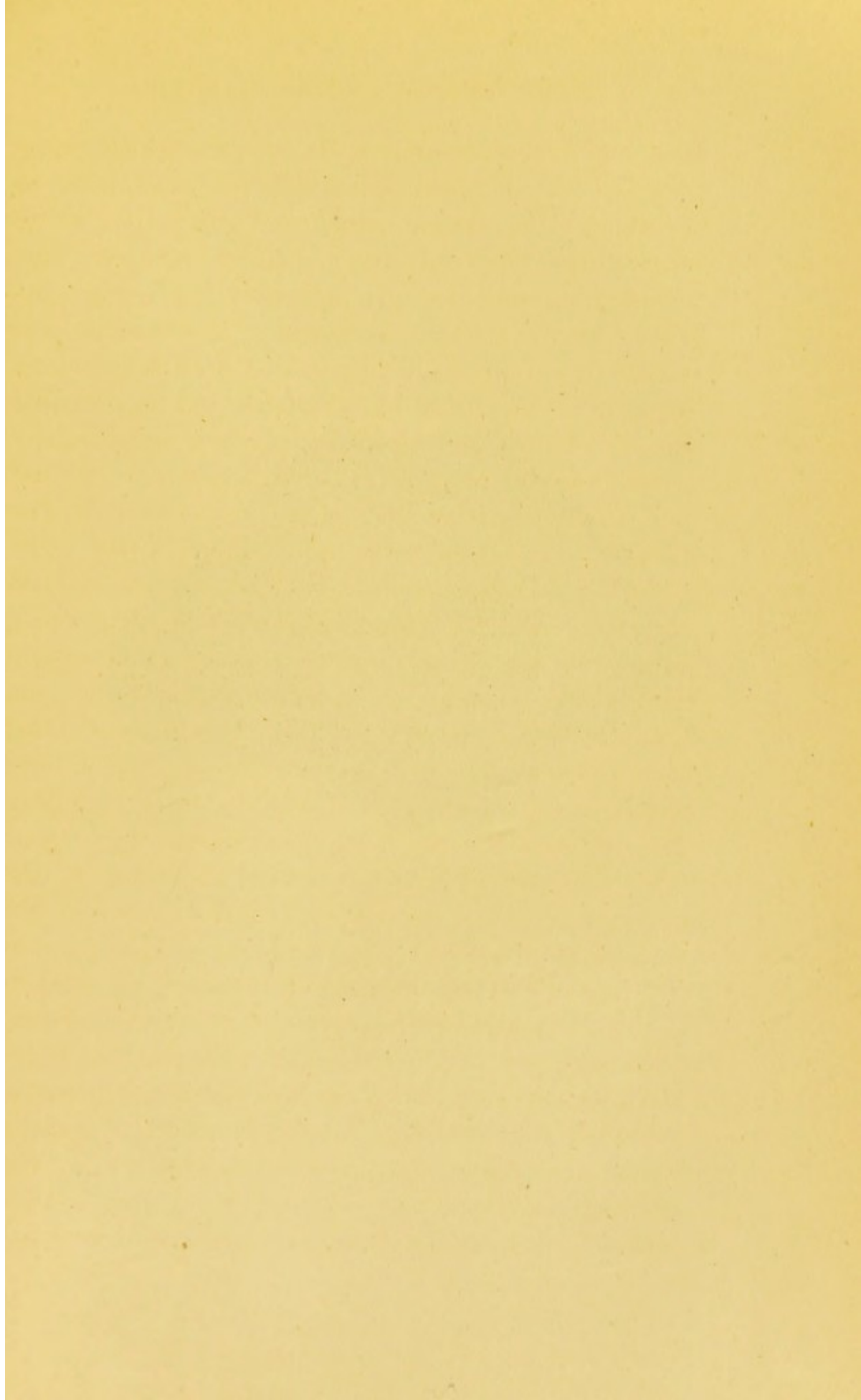
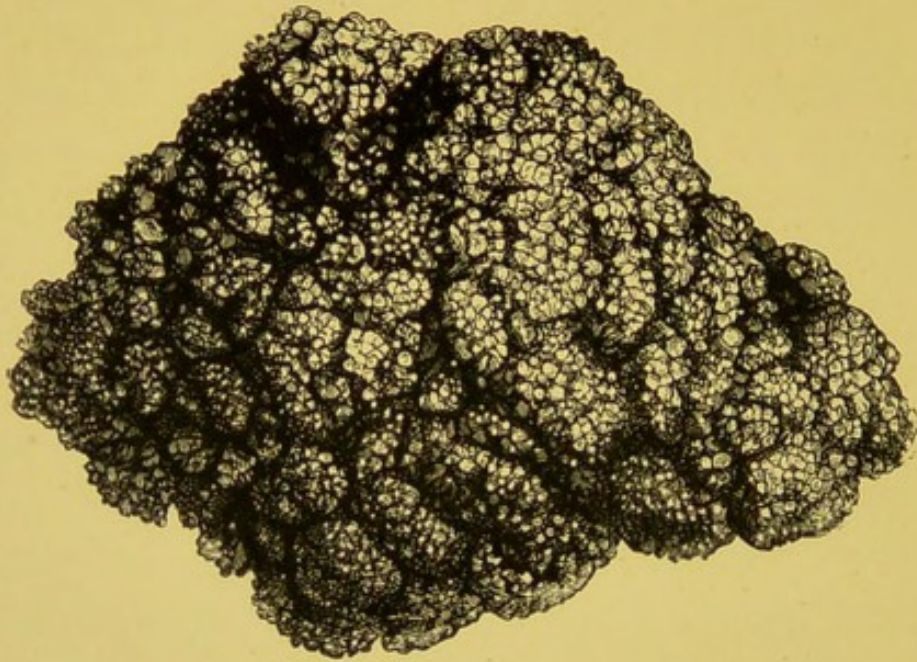


FIG. 5.



VILLOUS TUMOUR OF THE RECTUM.

The specimen measures about eight inches in circumference, and was removed during life; it was growing from the posterior wall four inches from the anus by a broad base.—From a Specimen in St. Bartholomew's Hospital Museum.

CHAPTER V.

RECTAL CANCER—DIFFERENTIAL DIAGNOSIS.

WITH an ordinary amount of experience in rectal examinations, and after a careful consideration of the history and symptoms, there are few disorders liable to be confounded with rectal cancer. Nevertheless, at times considerable difficulty may be experienced in forming an accurate diagnosis. Omitting rare and exceptional diseases, the following include the chief disorders liable to be mistaken for rectal cancer:—

- | | | |
|---|---|---|
| 1. New growths in rectum. | { | <i>a.</i> Villous tumour. |
| | | <i>b.</i> Disseminated polypi. |
| 2. New growths outside rectum | { | <i>a.</i> Tumours of prostate, bladder, and uterus. |
| | | <i>b.</i> Tumours of sacrum and pelvic bones. |
| 3. Inflammations | { | <i>a.</i> Abscess. |
| | | <i>b.</i> Fibrous stricture. |
| | | <i>c.</i> Tubercular ulceration. |
| 4. Misplaced uterus. | | |
| 5. Chronic enlargement of the prostate. | | |

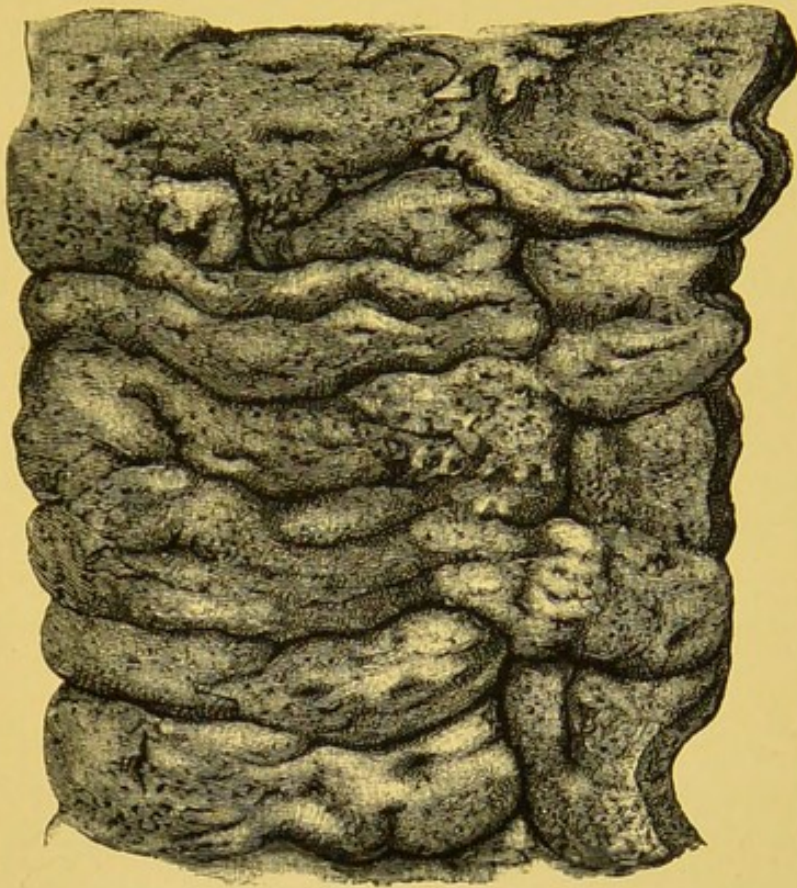
Diagnosis from Villous Tumour. — Villous tumour differs so entirely from the ordinary laminar form of malignant disease that it could not be mistaken for it, and it is in the somewhat rare form in which large fungating masses of cancer pro-

trude into the bowel that the difficulty of diagnosis arises. The duration of the disease is here of considerable importance. When true cancer produces a fungating tumour in the rectum, its course is always most rapid. On the other hand, a villous tumour may remain for months, or even years, with little change. Then the discharge differs materially in the two diseases. In villous tumour the discharge, though very free, resembles normal mucus, being viscid, but fairly clear, and as it dries on the linen faintly stains it, making it harsh, as if starched. The discharge may from time to time be blood-stained, but there are nearly always intervals when it is quite clear. On the other hand, in cancer it is generally darkly stained, being mixed with discoloured blood and fæcal débris.

On examination a very different sensation is conveyed to the finger by the two disorders. The villous tumour has a peculiarly soft velvety feel, while, at the same time, it gives the impression of being fairly tough and resistant. The fungoid cancer, on the other hand, though soft on the surface, is very friable, bits readily breaking off on pressure by the finger-nail, and the least touch producing hæmorrhage. The surface of the growth feels harsh to the finger, as if from an absence of mucoid secretion. In villous growth, not only is the surface soft, but the whole mass feels so also, while in cancer the deeper parts convey a hard rigid sensation.

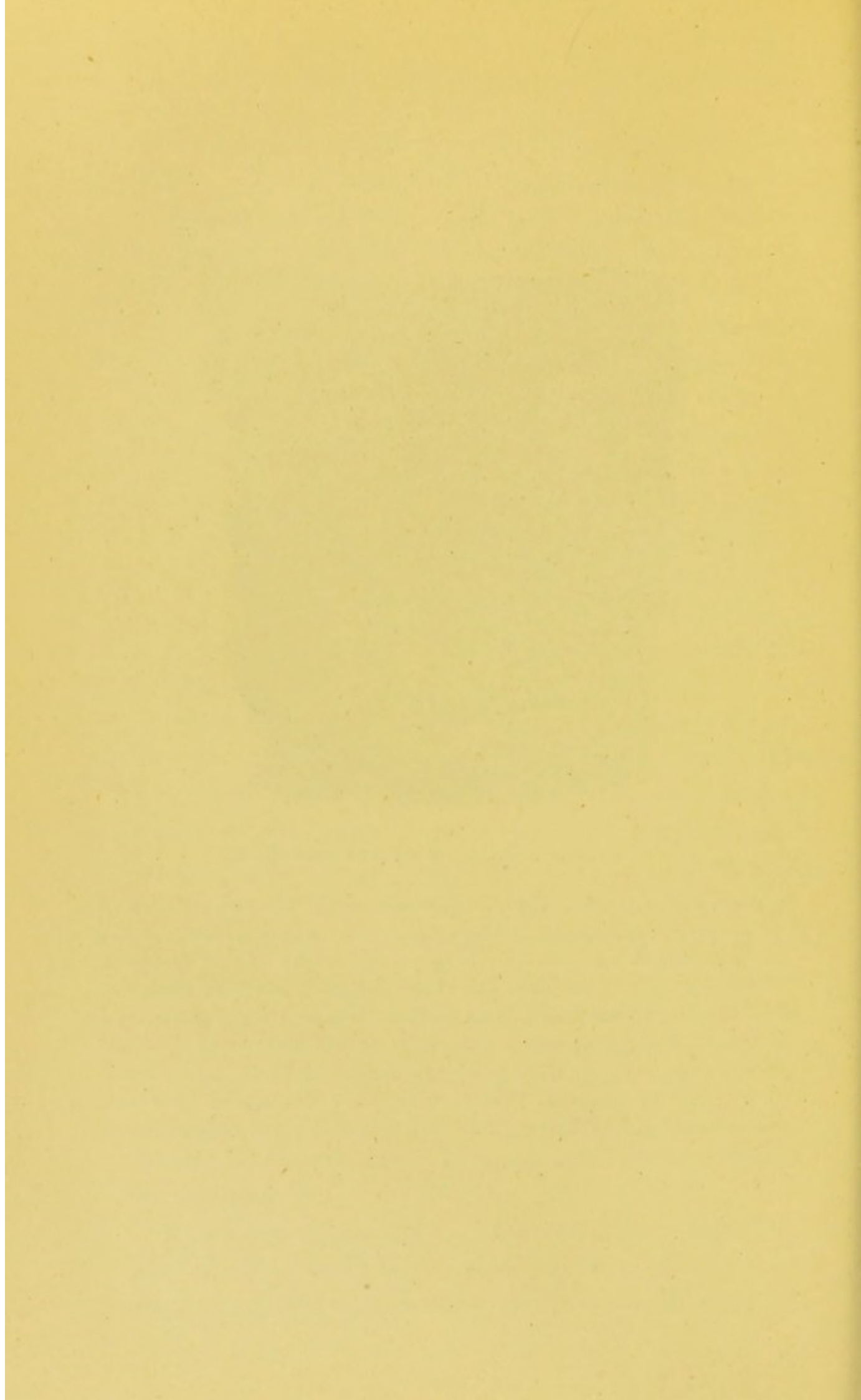
In villous tumour the bowel near the margin of the growth feels soft, and moves in a normal manner on the surrounding parts. On this account

FIG. 6.



VILLOUS CONDITION OF MUCOUS MEMBRANE.

From a colon in which the mucous membrane was extensively destroyed by ulceration; the remainder forms villous tufts, which thickly stud the surface, some in the form of velvety patches, others as long, branched, floccular processes; the lower part of one portion is free from ulceration, but here the entire mucous membrane is thickened and velvety as in woodcut. The patient was a man, aged 50, who died at the hospital February 20, 1855. In the preceding September he had a severe attack of cholera; he recovered from this, but died six months later with diarrhœa and bloody discharge.—From a Specimen in Middlesex Hospital Museum.



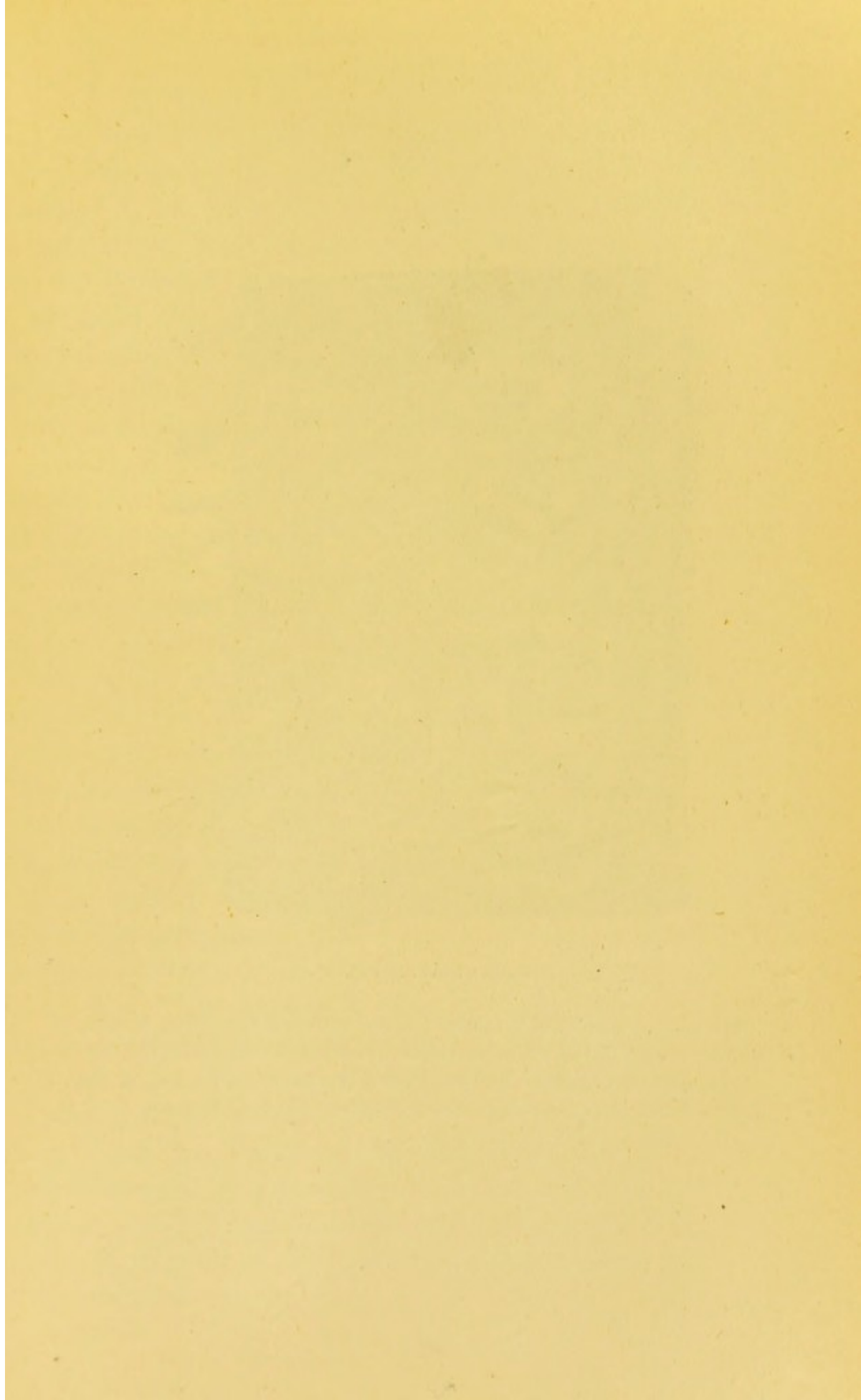
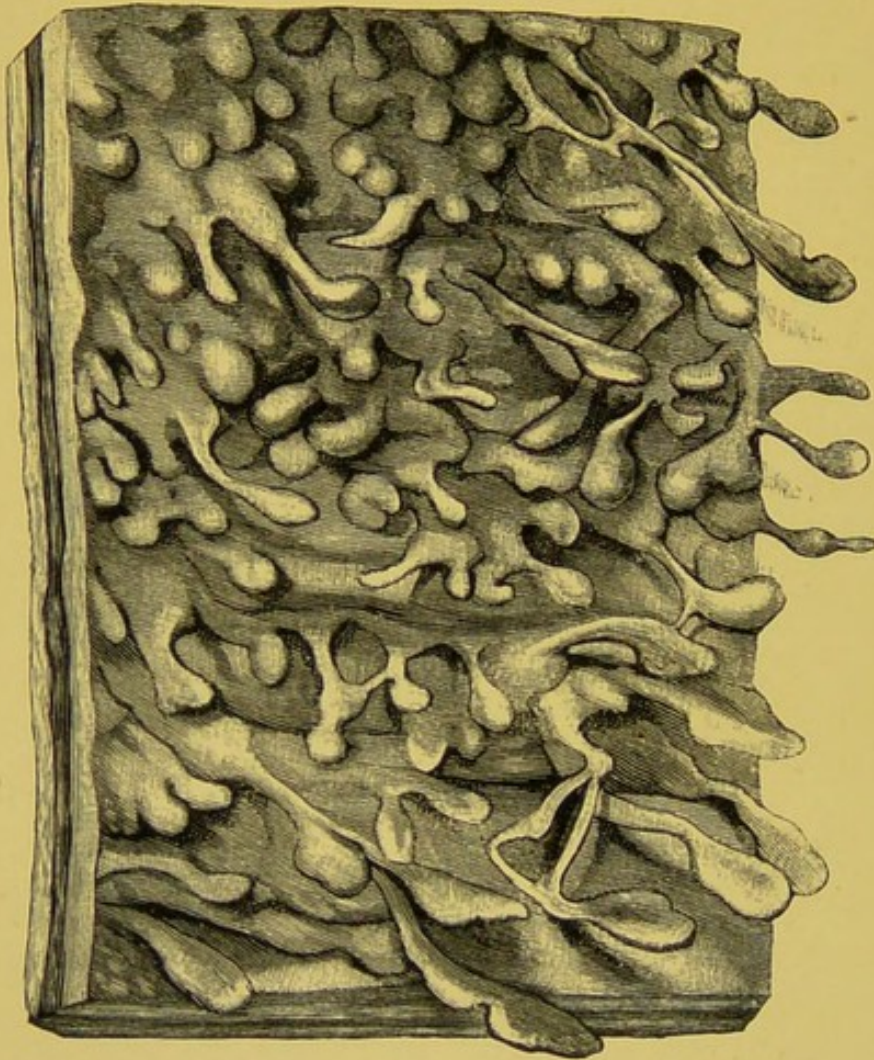


FIG. 7.



DISSEMINATED POLYPI.

The mucous membrane is thickly studded with growths—some forming simple rounded elevations, others stalked processes an inch in length. The disease extended from the ileo-cæcal valve to within three inches of the anus.—Drawn from a Specimen in the Middlesex Hospital Museum.

it can often be partially invaginated and drawn down nearer the anus. In cancer the bowel is hard at the margin of the growth, and is generally, at least to some extent, fixed to the surrounding parts, and cannot be drawn down.

A large villous growth may be present in the rectum with very little disturbance to the general health, while, in a cancerous tumour of this nature, there is much cachexia, and marked wasting.

Lastly, if a little portion be broken off with the finger, and submitted to the microscope, confirmatory evidence of the one or other form of growth can be obtained (see page 83).

Disseminated Polypi.—The symptoms often have a close resemblance to those accompanying cancer. Here, again, the duration of the disease becomes important, for the record of symptoms extends in polypi over many years. In disseminated polypi there is often a clear mucoid discharge similar to that in villous growth. There is frequently hæmorrhage, but the blood lost is generally pure and bright-red in colour, and has not the dark, treacle-like character, and free mixture with fæcal débris of that commonly observed in cancer. A digital examination shows the nature of the disease. The soft isolated growths with well-marked pedicles, and an absence of induration at their bases, disclose the nature of the disorder.

It must not, however, be forgotten that after many years of innocent life one of these polypi may take on malignant action and assume all the characteristics of adenoid cancer. The following case proves this point:—

A. C.,¹ a youth, aged 19, was admitted under the care of my colleague, Mr. T. Smith, in 1881. So far as was known, he was a healthy child until nine years of age. It was then noticed that, after being exposed to cold one day, he had considerable hæmorrhage from the rectum. Six months later a bleeding protrusion was occasionally observed after defecation. He was admitted into a hospital, and the protrusion removed when he was eleven years old. The symptoms were temporarily relieved, but returned again in a couple of years. He was again subjected to operation, with only slight relief. Since that time he has on three occasions, at St. Bartholomew's and other hospitals, had growths removed from the rectum, but without permanent benefit. When admitted into St. Bartholomew's he was extremely anæmic, having suffered severely from hæmorrhage for some months. His pulse was rapid, and he seemed scarcely in a condition to bear even an examination. After a few days' rest in bed he recovered from his collapsed condition, no more bleeding having occurred, but there was a free mucoid discharge. On examination under chloroform with the sphincter dilated, several mulberry-like growths were observed, varying in size from a pea to a filbert. Some of these had little or no pedicle, while others had well-marked stalks half an inch in length. The growths were soft, nor was there any induration about the mucous membrane from which they sprang. By the aid of a duck-bill speculum, from twenty to thirty distinct polypoid

¹ St. Bartholomew's Hospital Reports, vol. xxiii. I am indebted to Mr. T. Smith for permission to use these notes.

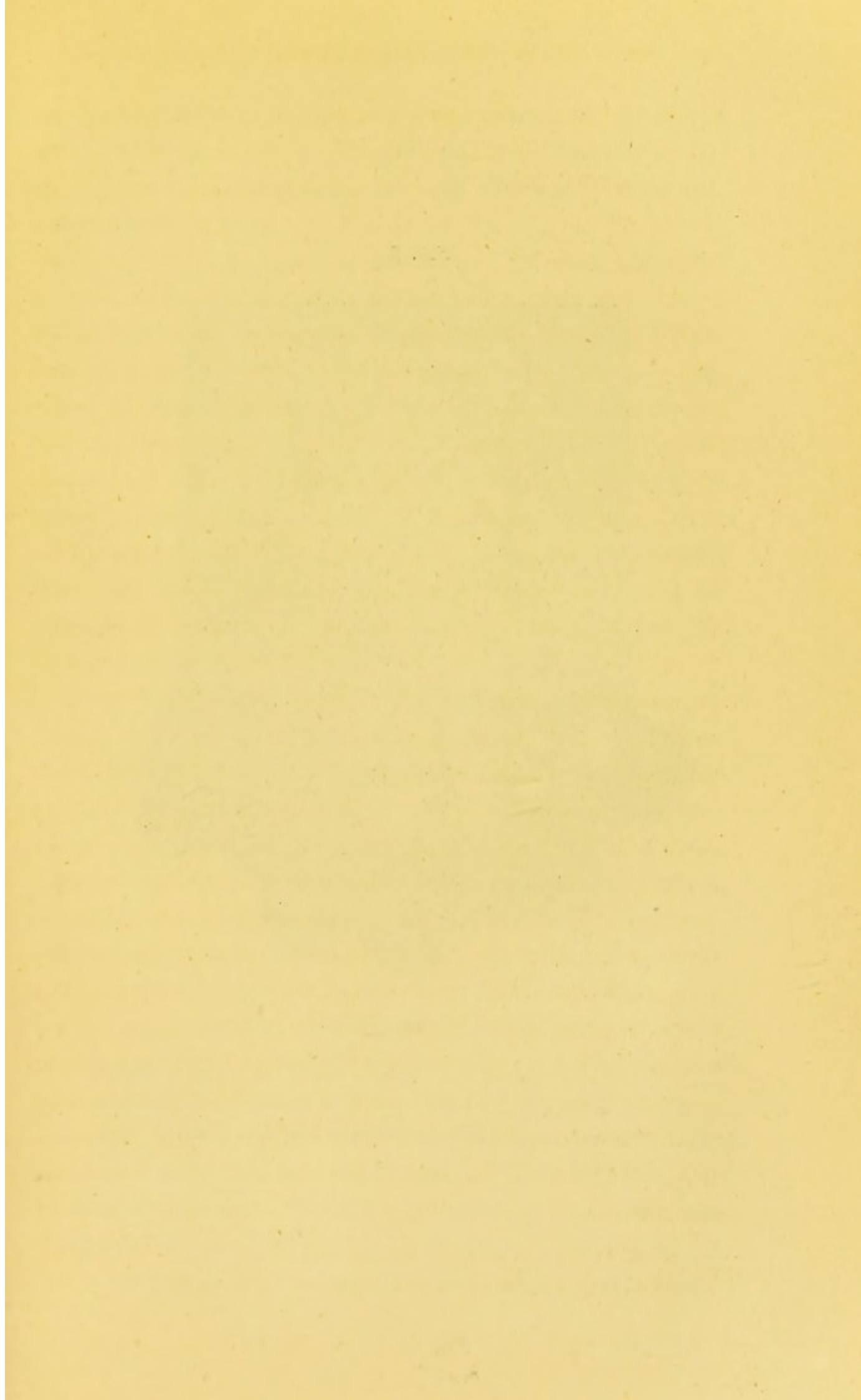
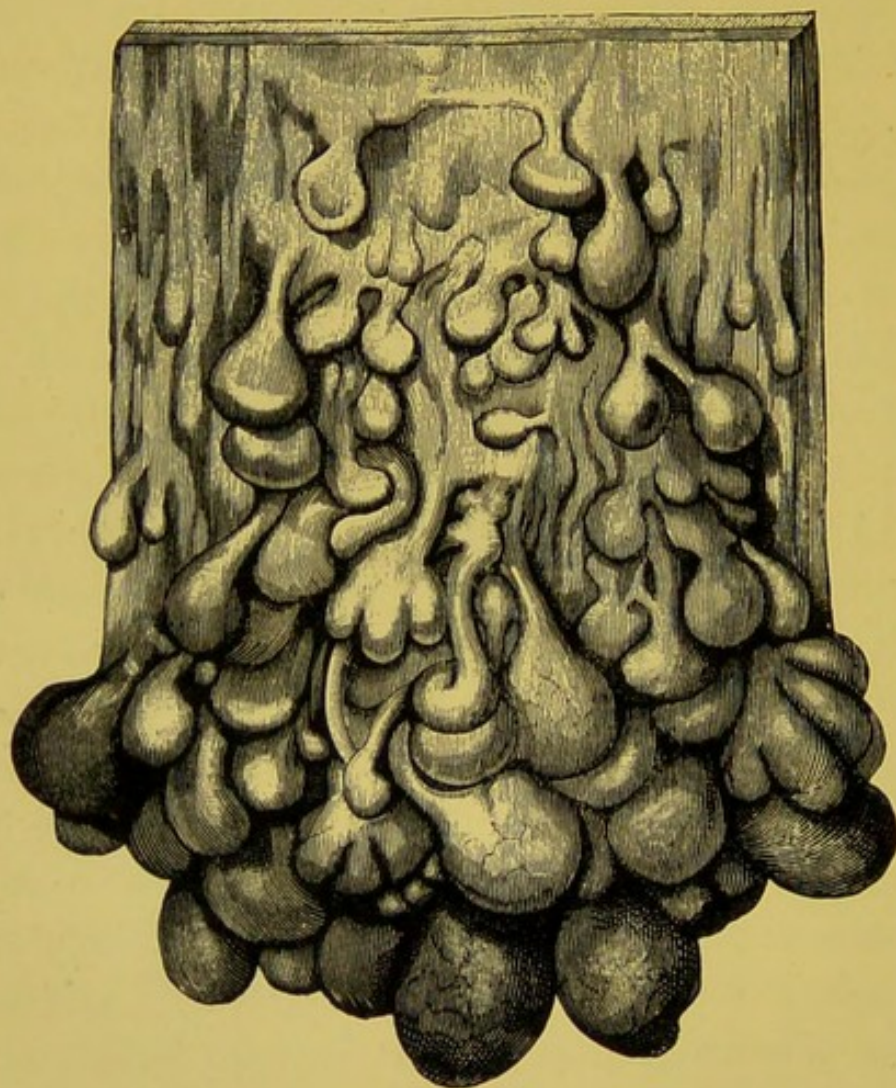


FIG. 8.



MULTIPLE POLYPI.

A mass of adenoid polypi the size of a cricket-ball. Each growth is pedunculated, varying in size from a pea to a hazel-nut.—Drawn from a Specimen of Mr. H. Smith's in King's College Museum, London.

growths could be seen ; besides which, others could be felt higher up the bowel by the finger, which failed to define any limit to the diseased condition of the bowel.

Sept. 1883.—Again admitted, and some of the larger and more accessible growths removed.

March 1885.—Re-admitted for severe hæmorrhage, when some more polypi were removed. At this time he complained of some pain in the left lumbar region, and a circumscribed area of dulness was detected in this part. There was also tenderness on deep pressure.

Jan. 1887.—Was admitted suffering great pain and frequent loss of blood. Several large growths were removed, and he left the hospital, free from his symptoms, to resume his work as a waiter.

March 15, 1887.—He was brought in in a moribund condition, his friends stating that since his last discharge from the hospital he had suffered dull, aching pain in the abdomen ; that two days since he was seized with violent cramping pain in the lower abdomen, and sickness. He had taken no food for two days. He had had constant hiccough. On examination, he was found to be moribund, with the signs of peritonitis, and he died next day.

On post-mortem examination, he was found to be suffering from adenoid cancer of the lower part of the sigmoid flexure, and there was at this point an almost impervious stricture of the bowel. The rectum below this contained a large number of polypoid growths similar to those that had been removed during the patient's lifetime ; above the seat of the cancer there were but few to be found, and in

the ascending and transverse colon not more than three or four, and these were small and rudimentary.

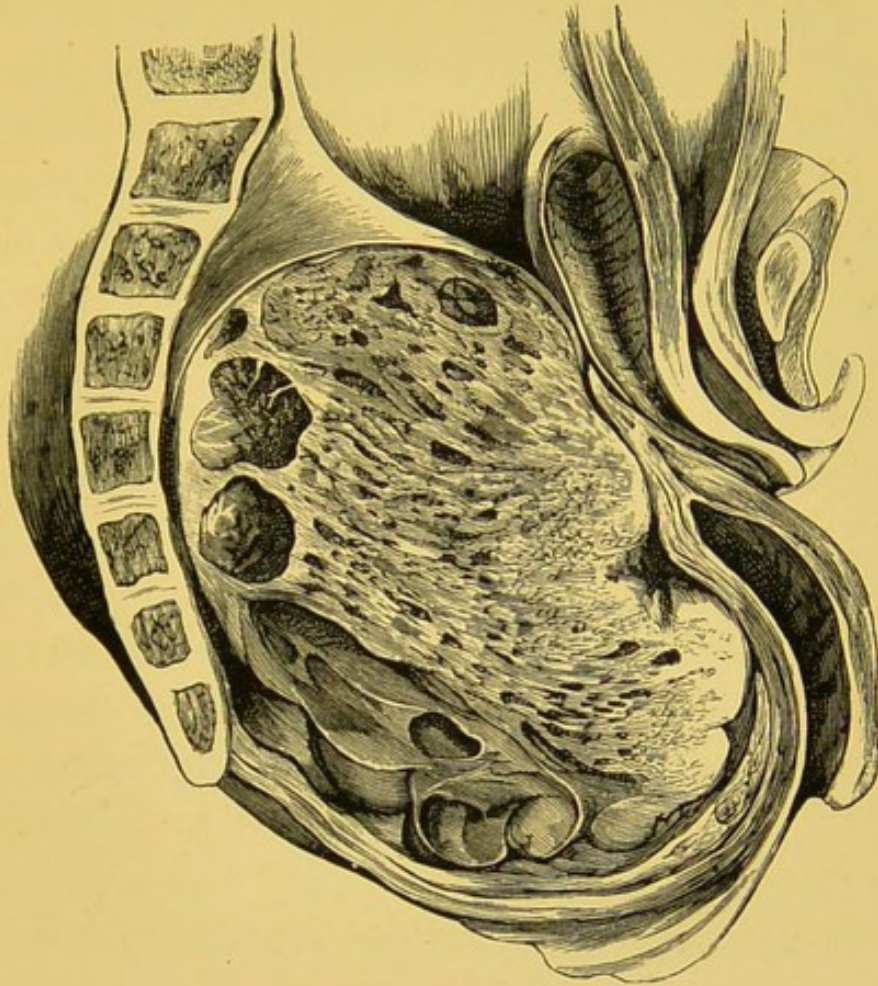
The larger number of the polypi were more or less globose, having slender stalks, but here and there were ribbon-like, ragged, slender, branched-out growths, and some few of the smaller growths were sessile. On microscopic examination the polypi proved to be well-marked examples of the adenoid variety.

There was a considerable deposit of adenoid cancer just at the junction of the sigmoid flexure with the rectum, surrounding the bowel, and almost obliterating its canal. The rectum, where it passed over the concavity of the sacrum, was adherent to the neighbouring parietal peritoneum.

The large intestine above the stricture was enormously distended by fæces. The peritoneum over the anterior longitudinal muscular band of the cæcum had been split by the excessive stretching. There was no effusion or peritonitis, the other organs were normal.

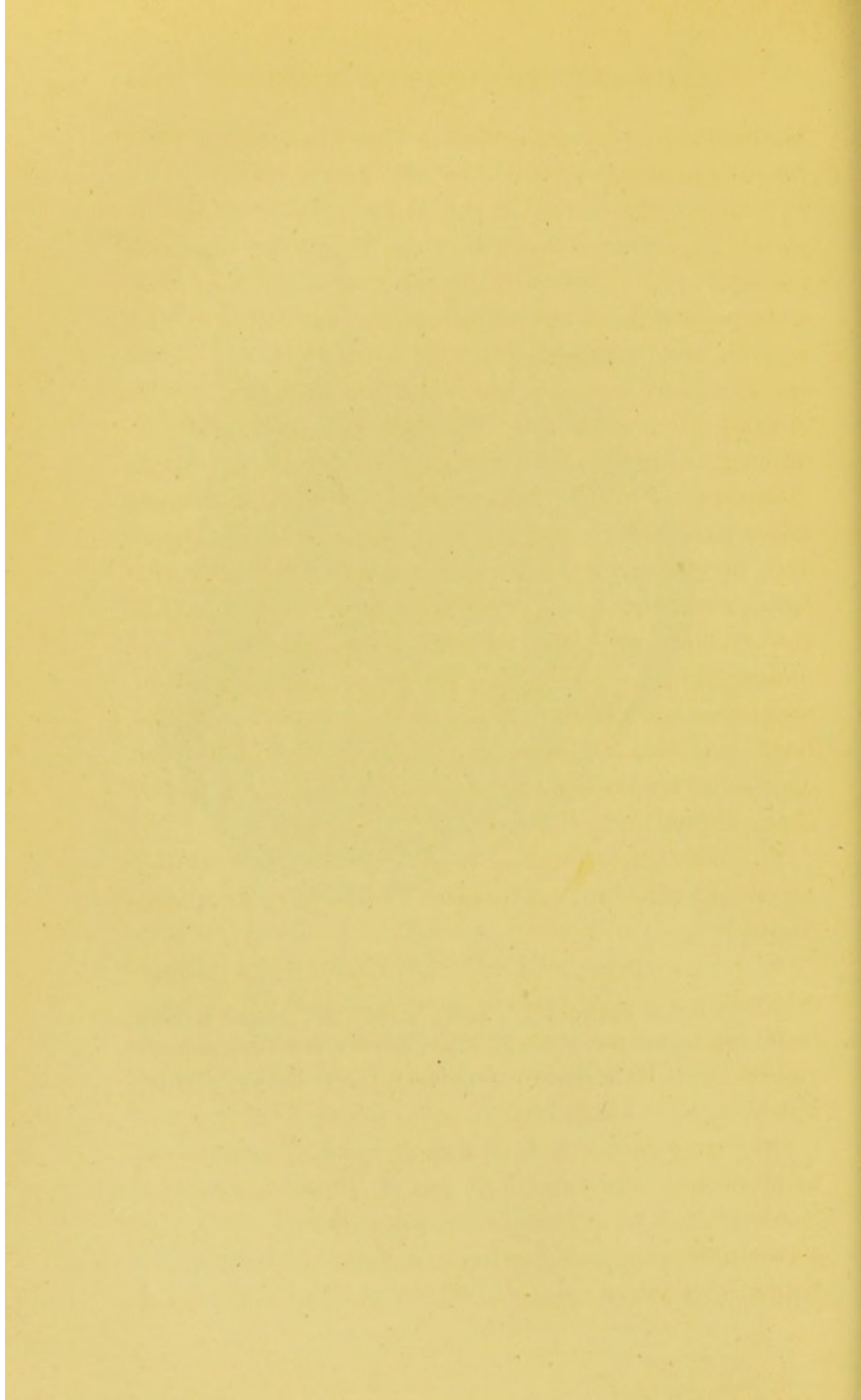
New Growths Outside Rectum.—Occasionally tumours growing in the pelvis and surrounding or pressing upon the bowel may be mistaken for rectal cancer. Such tumours originate either in front or behind. When in front they either spring from the bladder, prostate, or vesiculæ seminales, and in the female from the uterus or ovaries. When arising in front there is, as a rule, not much difficulty in the diagnosis. Partly from the history of the case, but chiefly by careful physical examination, it can be discovered that the earlier symptoms pointed to bladder or prostatic trouble, while, it can generally

FIG. 9.



COCCYGEAL TUMOUR.

The tumour can be seen growing between the rectum in front and the sacrum and coccyx behind. The pelvic viscera are displaced upwards. —Drawn from a Specimen in the Royal College of Surgeons' Museum.



be determined by examination that the organs mentioned are chiefly invaded by the new growth.

A point, again, that is of considerable service in the diagnosis is the nature of the discharge from the rectum. In rectal cancer, although at first the disease spreads in the submucous tissue between the mucous and muscular coats, it quickly gives rise to an ulcerated surface from the destruction of the mucous membrane over it, while this ulceration in its turn is accompanied by a blood-stained grumous discharge. On the other hand, when the disease arises external to the bowel, it may cause considerable stricture, either by direct pressure, or, by the fascia surrounding the rectum being drawn towards the growth, yet, the rectal mucous membrane remains intact, and although other symptoms of stricture are present, there is an absence of the fetid sanious discharge so common in malignant disease. Sometimes, however, the diagnosis is of great difficulty.

The following is a case in point which I attended for some time in conjunction with Mr. Montagu Smith :—

A gentleman, aged about sixty-nine, of a highly nervous and desponding disposition, dated his trouble from eight months previously, when he was seized suddenly with pain in the left iliac fossa. This, however, soon passed off.

On first getting up in the morning he has a desire to stool, but generally only passes some gelatinous-looking mucus. The amount varies much, being sometimes slight, sometimes considerable. Sometimes it is fairly clear, at others stained with faecal

material not tinged with blood. He is often constipated for days together, at other times requires to visit the closet frequently, passing loose motions without a sense of complete relief, and very rarely passing any blood. He often feels discomfort about the lower part of the bowel, but with the exception of being much troubled with wind, suffers little actual pain. He has lost flesh during the last year, and very markedly so within the last ten weeks.

Examination under Chloroform.—The anus was normal, with a weak sphincter. The bowel itself, as far as the finger could reach, was natural. In front of the anterior wall, about the position of the base of the bladder, was a large, firm, oval, swelling feeling like the half of a cricket-ball. It appeared to be situated behind the prostate, though continuous with it. It compressed the rectum between itself and the coccyx.

Taking into consideration the somewhat rapid way in which the symptoms had developed, the emaciation of the patient, and the size of the swelling, I came to the conclusion that it was a case of malignant disease affecting the prostate, and consequently gave an unfavourable prognosis.

During the next year I saw the patient on two or three occasions. But owing to nervousness he stoutly refuses to be examined. The only new symptom which he had developed was the occasional passage of air through the penis, and, later on, the urine at times contained a blood clot, and a dusky deposit, probably faecal.

At the beginning of 1886, a year and a half after I had first seen the patient, I was again asked

whether I still considered the disease to be malignant. At this time his appetite was good, he had plenty of strength, and emaciation had apparently ceased, and he had comparatively little trouble with the bowel, but suffered from a certain amount of cystitis.

I had not the advantage of an examination, but considering that his general condition seemed to be no worse than it had been a year and a half before—indeed, one would say there had been an improvement during the last few months—I had grave doubts whether my original diagnosis of cancer had been correct, and I expressed a more favourable view of the case, considering that the enlargement originally felt about the prostate might have been either of a fibroid, or, more probably, of an inflammatory nature.

The patient's condition remained stationary for some months after this. Then the urinary troubles, together with symptoms of obstruction, quickly increased, and he died in a little less than two years after my first examination.

A post-mortem was fortunately obtained. A mass of cancer was found involving the prostate, from whence it had extended into the cellular tissue around the rectum, causing almost complete occlusion of the bowel.

This case shows an exception to the general course of malignant disease, for the patient's condition, instead of progressing steadily from bad to worse, remained practically unchanged for more than a year and a half. Moreover, the case is instructive as showing how unwise it is to express an opinion

as to the nature of a disease without proper examination.

Doubtless the implication of the rectum occurred many months before death, and with the certain diagnosis that an examination would have afforded, a colotomy should have been strongly advised.

Another case, which I saw in consultation with Dr. Allen Sturge, of Nice, was also an example of a difficulty arising in diagnosis between tumours external to the rectum and those involving the bowel.

A gentleman, aged sixty-three, dated his illness from about six months previously. At that time he suffered much pain in the right iliac fossa, shooting down the thigh to the testicle. The pain continued, coming on at night, and causing him to wake up. The bladder was at times irritable, and he passed water three or four times in the night, and every two hours in the daytime. There was considerable discomfort about the bowel, but the actions were fairly regular.

Examination.—Sounded. No stone found in the bladder. By the rectum a large irregular mass could be felt. It appeared as if divided into two distinct lobes, one in the middle line very hard and prominent, and one on the right side. Each lobe was about an inch and three quarters in diameter; they were of a stony hardness, and covered with mucous membrane. The middle lobe gave the impression that it was an outgrowth from the posterior border of the prostate. The large mass on the right side probably also proceeded from the prostate. Nevertheless, it gave the idea that it was growing from, or fixed to, the pelvis somewhere about the region of

the spine of the ischium. The patient died six months later, the urinary troubles increasing, but he had little trouble with the rectum, pretty clearly showing that the source of the disease was prostatic and not rectal.

I have recorded in my work, on "Diseases of the Rectum" (p. 486), a somewhat similar case in which a cartilaginous growth from the sacrum nearly occluded the rectum.

Diagnosis from Inflammatory Disorders.—This had better be considered under two conditions—the one, acute inflammation, leading to suppuration or sloughing, the other, chronic inflammation, ending in permanent thickening or stricture.

From Acute Inflammation.—The three following cases well illustrate the difficulty that may arise in making a diagnosis between acute inflammation and cancer:—

Mr. D., a gentleman aged fifty-two, with a strong family history of cancer, was recommended to me by Dr. Bright, of Glastonbury. About a year ago he noticed that he was getting weak and somewhat thinner than usual. The weakness decidedly increased during the year, but he has had a fair appetite. During this period he has suffered some slight, vague pains about the rectum, but not sufficient to induce him to take medical advice. There has been no diarrhoea or discharge of any kind; he has never passed any blood, nor, until recently, had he pain on going to stool. Three weeks ago, for the first time, he had severe pain about the rectum, and this has continued ever since, prevents sleep at night, and he has some difficulty in passing his

water. Great pain was caused by introducing the finger. The interior of the bowel felt slightly œdematous, and the vessels pulsated strongly, and an indefinite hardness could be felt about as high as the finger could reach.

Half a pint of warm water was injected, which did not return till a rectal tube was passed. It then came back, only slightly tinged with fæces, but it contained several white flaky membranous shreds.

I rather suspected an abscess, but the case was not clear. A week later there was a copious discharge of pus from the bowel, which gave immediate relief to the symptoms, and confirmed the view that the case was merely inflammatory.

A sailor, about thirty-five years of age, was admitted into St. Bartholomew's, under the care of my colleague, Mr. Bruce-Clarke. He stated that he had suffered great pain about the rectum for nearly a month. On examination, a deep cavity could be felt, on the anterior wall of the rectum, an inch and a half across. The walls of the cavity felt hard, but the edges towards the mucous membrane were fairly soft and not everted. Considerable doubt was felt as to the nature of the ulceration, as to whether it was a breaking-down malignant mass, or a cavity left by the bursting of an abscess. No history could be obtained of any sudden discharge of pus. Chiefly on the ground of the absence of eversion or induration of the mucous membrane edge, we considered the trouble most likely to be inflammatory. This proved to be correct, for it ultimately completely filled in, and the patient was discharged well.

A gentleman, aged thirty-six, was sent to me by Dr. Doig, of Ross. The patient, for the last six years, has been occasionally troubled with piles, but, as a rule, has enjoyed good health. Four months ago he had more decided discomfort about the rectum, but no actual pain until the last five weeks. One afternoon, at that time, he felt so ill, and had so much pain about the bowel, that he went to bed. The pain remained very bad for four or five days. He then took a large dose of purgative medicine, and had a copious evacuation. He also thinks that, after the motion, some matter came away from the bowel. After the evacuation the acute pain left him. A sensation of weight and discomfort has continued, and there has been some slight discharge.

On examination, at about an inch and a half up the bowel, partly on the side and partly on the front wall, was a swelling beneath the mucous membrane. It was somewhat ill-defined at the borders, but prominent in the centre, was fairly soft, but certainly did not fluctuate, and was about an inch and a half wide from above downwards, and a little more from side to side. I could not make a certain diagnosis, but, from the history of the case, I was inclined to regard it as inflammatory. I never saw the patient again, but Dr. Doig has kindly supplied me with the following information:—

“For the next year after you saw him he remained in much the same condition; acute symptoms then set in. A large abscess formed, which was opened, and in the end led to the formation of a fistula, which still remains (1889). He enjoys

fair health, and the fistula gives but slight annoyance compared to his former suffering."

From Fibrous Stricture.—In the great majority of instances a practised finger has little difficulty in recognizing the distinction between fibrous and malignant stricture. Nevertheless, the most skilful practitioner will at times meet with cases when an accurate diagnosis is extremely difficult. I will therefore draw attention to a few symptoms which may assist in forming an opinion.

Time.—This is an exceedingly important consideration in determining the question of malignancy. Although malignant disease may be of a somewhat chronic nature, it must be remembered that when it has advanced sufficiently to produce well-marked stricture its course is comparatively rapid, and a fatal termination not far off. With a considerable experience of these cases, I know but a single instance in which the patient has survived three years after the symptoms of stricture became prominent. Indeed, as a rule, the time is far less than this, the survival even for a year being exceptional. It may be safely assumed, therefore, that if well-marked symptoms of stricture have existed for over three years, that it is improbable that the case is one of cancer.

The following case illustrates the importance of this time element, and shows how an exceptionally careful surgeon may form an inaccurate diagnosis by omitting its consideration:—

M. A. B.¹ was admitted into St. Bartholomew's Hospital, March 1874.

¹ Sitwell Ward Register, St. Bartholomew's Hospital, vol. iii. p. 33.

“Three years ago, after her last confinement, she was troubled with piles, never before having had any pain or disorder of the bowel. Since that time has had increasing difficulty in passing her motions. From time to time she passed blood in small quantities. She was often seized with pain and straining during the day, sometimes ten to twenty times, after which a fluid motion passed. The motion was very seldom solid, and when so was no bigger than a pipe-stem. She had never noticed discharge of matter from the bowel, and there was no history of syphilis.

“Upon examination there was seen a ring of small pale external hæmorrhoids, and the finger introduced into the bowel detected a funnel-shaped cavity leading from the anus down to a stricture situated three inches from the orifice. The rectal walls were hard, nodular, and thickened. The stricture was annular, edges thick and indurated, and was so tight as not to admit the tip of the little finger. When examined by a speculum the stricture presented a ragged ulcerated edge of ashy-grey colour. After a short treatment by bougies she was discharged uncured from the hospital, and the disease was considered by the late Mr. Callender to be malignant.”

The above record I have abstracted from the excellent notes of Mr. T. Butlin, who was then Surgical Registrar. The abstract I have had by me for some time, and the case had excited my interest on account of the rareness of malignant stricture lasting so long. I could, however, obtain no further history of the case. In 1882 M. A. B. again turned

up at the hospital, and being admitted I had an opportunity of examining the patient, which I need hardly say I did with considerable interest. Of course with the knowledge that the symptoms had now existed for ten years, it was absolutely certain that the case was not one of cancer. Yet I am confident that at the time of my examination a diagnosis could not have been certainly established apart from the history of the case. The parts were bathed with a foul discharge, and she had no control over the fæces, which ran partly from the anus and partly from a hole in the vagina. The parts about the posterior vaginal wall and the stricture felt hard and irregular, while the bowel was firmly fixed to the neighbouring parts. Her general condition was one of debility with emaciation, and would have corresponded well with the cancerous cachexia. The stricture was a fibrous one, and she was greatly improved by appropriate treatment.

Discharge.—In malignant stricture the discharge, if not at the beginning, certainly before very long, is generally dark and blood-stained. In fibrous stricture, on the other hand, it may for months and years be comparatively slight, and more resembles thin pus. It is true, that, in advanced cases of fibrous stricture, where there is deep ulceration, the discharge may be of a dark coffee-ground colour, as in cancer.

In cancerous stricture there is often a marked tendency to bleed. Bleeding is exceptional in fibrous stricture. This is particularly marked after an examination. In the one case, even, the gentlest introduction of the finger may cause bleeding, while in

the other, even introduced roughly, it seldom excites hæmorrhage.

Condition of the Bowel below the Stricture.—

In malignant disease this portion of the bowel is generally comparatively healthy, in fibrous stricture it is seldom so, and the bowel, instead of feeling soft and velvety, conveys a hard, creaking sensation to the finger, the mucous membrane being irregular and adherent to the subjacent tissue, sacculated in some places, and nodular in others.

The stricture itself feels different. In malignant disease the lower border is abruptly marked, and there is often all round it an everted, hard, nodular ring marking the border of the advancing disease on the mucous membrane. This nodular border is absent in fibrous stricture. The entrance into a fibrous stricture may sometimes be felt like a small orifice in the centre of a kind of diaphragm, but far more commonly the contraction is gradual, as if the finger were being passed into the apex of an extinguisher. Fibrous stricture is softer and less rigid than in malignant disease.

Careful examination should always be made of the inguinal glands, for, though rectal cancer frequently runs its course without these being implicated, nevertheless they often become infiltrated when the cancer has been some time in progress, and has encroached upon the anus. The absence of glandular enlargement therefore proves nothing, but its presence would be of the highest diagnostic value. The general weakness and malaise forming the group of symptoms known as cachexia, although not always absent in simple stricture, generally

form a very marked feature in malignant disease.

In conclusion, I believe that it is occasionally impossible to express a positive opinion as to the nature of a stricture until the case has been some weeks under careful and continuous observation.

From Tubercular Ulceration.—There is a rare form of ulceration about the anus and rectum as to the nature of which all authorities are not agreed. Some describe it as lupus, some as rodent ulcer, while others regard it as of a tubercular nature. I am not familiar with lupus in this part of body, but I have seen an ulceration here which so closely resembles in its appearance and course the rodent ulcerations met with on the face, that it is probably the same disease. Such a case will be found described by McDonald,¹ but the peculiar ulceration to which I am about to refer seems rather to be of a tubercular nature. In some of its features it closely resembles epithelioma, but I have little doubt that it is not cancerous.

The two following cases will serve as illustrations of this rare disease:—

A gentleman, aged thirty-five, seen in consultation with Dr. F. O. Smith and Mr. Pepper, had always been an active man with good general health. Thirteen years ago he had an ischio-rectal abscess which ended in a fistula. This fistula, with the exception of a little weeping, gave hardly any trouble till three years ago, when the parts inflamed, and owing to the pain he had the fistula operated upon. The wound healed very slowly, indeed part

¹ Edinburgh Medical Journal, April 1884.

of it never healed at all, for there remained a large tunnel running up the ischio-rectal fossa for about an inch and a half outside the bowel. The canal ended in a cul-de-sac, and was of such a diameter as would readily admit the index finger. Until eight months ago this large sinus gave little trouble, there was always some discharge from it, but it gave no pain. At this time he noticed that he was gradually getting very constipated, having to strain a good deal to pass his motions. These troubles continued to the present time, and he has lost much flesh during the last six months.

Seven weeks ago, owing to pain and inflammation about the anus, he was again examined. Two or three fistulous openings were found in the anal neighbourhood, one being as far forward as the scrotum. three fistulous channels were freely laid open, and I was asked to see the patient because the wounds had refused to heal. On examining the part, the anus appeared to be quite gone, as if an excision had been performed. A circular opening existed, about $1\frac{1}{4}$ in. in diameter with a thin cicatricial margin. The skin adjoining the margin was thin and smooth, having a white cicatricial aspect. On looking into the cavity that represented the anus, the rectal orifice could be seen, and on passing the finger into this, the mucous membrane felt fairly healthy, but was much contracted.

The narrowing gradually increased as far as the finger could reach, at which spot it fitted the fingertip, with no room to spare.

On each side of the bowel, running up for a couple of inches, were two channels, each large

enough to admit the index-finger. The sides of these channels had a hard, harsh, nodular feel, so that the two formed rigid tunnels. A probe, introduced into the fistulous opening referred to in the perineum, passed five inches downwards, but it did not enter the rectum or either of the hard tunnels. We were in doubt as to the nature of the disease. The hard, nodular condition of the tunnels suggested epithelioma, but, with this exception, the general character of the disease scarcely accorded with cancer. The discharge especially was unlike that found in cancer. It was scarcely blood-stained, almost free from odour, and had a healthy, gelatinous look.

The induration referred to, though very marked in the tunnels, did not affect all the ulceration, and some superabundant granulations covering part of the ulceration were soft. Mr. Pepper informed me that colotomy was performed soon after my visit, with relief to the symptoms of obstruction, and that the patient lived for just a year, getting gradually weaker, the urine containing more than half albumen. The sinuses discharged as freely as ever. There was no fungating growth, spread of the disease, or anything new to suggest that the disease was cancerous.

A woman, aged between thirty and forty, kindly sent to me by my friend Mr. Sankey, of Oxford. A year ago an abscess formed and burst by the side of the labium. A few months later a fistula was found on the anterior rectal margin. This was freely laid open by Mr. Sankey, and the sphincter divided. The wound thus made refused to heal, notwithstanding many changes of local treatment.

Present condition.—On the front wall of the rectum

is an ulceration the size of a half-crown. It is covered by some red, irregular granulations. It feels soft on direct pressure with the finger; neither are the edges, which are scarcely raised, indurated. With one finger in the rectum and one in the vagina, there is some hardness felt about the base of the ulcer. The lower border of the ulcer is close to the anal verge, and at one spot the thickness between it and the vagina is no more than that of a penny. A hole in the centre of the ulcer leads into the rectum again, an inch higher up. Mr. Sankey tried scraping and the cautery, but the part refused to heal. The ulcer was then excised, and the patient got well.

Uterus Mistaken for a Cancer.—It would seem scarcely possible that the uterus could be mistaken for malignant disease of the bowel, but yet I have reason to know that such mistakes are not infrequent. In some women the uterus has a tendency to tilt a little more forwards or backwards than usual, so that its long axis lies more or less at right angles to the rectum. In such cases, upon introducing the finger into the rectum, a hard, well-defined swelling can be felt on the anterior wall, encroaching considerably on the calibre of the gut. Occasionally this encroachment is sufficient to produce symptoms of partial obstruction. In those circumstances a hasty examination of the bowel leads to an error in diagnosis. A little further investigation, however, will soon correct the mistake. The mucous membrane is always smooth and intact, and glides over the swelling, which can itself be moved from side to side.

A bi-manual examination of the vagina and the rectum, of course, immediately clears up the nature of the supposed tumour.

Chronic Enlargement of the Prostate.—The situation of the swelling, and its firm, well-defined character, together with the fact that the rectal mucous membrane is healthy and intact over it, generally points to the innocent nature of the enlargement. A difficulty in diagnosis will, however, occasionally arise, such as occurred in the case recorded on page 119; but here, had a second examination been permitted, the alteration in the character of the swelling, and the fact of its extending round the bowel, would have made the diagnosis clear.

CHAPTER VI.

RECTAL CANCER—TREATMENT BY EXCISION.

IN discussing the treatment of rectal cancer, the first question of importance that arises is whether the disease admits of permanent cure. In the last edition of my work I stated that my experience was too limited to allow of a decided answer, but French and German surgeons of eminence had asserted that cures were occasionally effected by excision. I now feel justified in confirming this view, for it will be seen on reference to the table of my cases appended, that one of them operated on ten years ago still remains in perfect health. There can be no question as to the nature of the original disease in this case, for, both in its clinical aspects before the operation, and from microscopic sections subsequently obtained from the growth, it was as typical a case of the common adenoid cancer as could well be selected. I have also operated on other cases in which such a period has elapsed since the operation, as to make it most probable that they will escape recurrence.

Unfortunately, a large proportion of patients from motives of false delicacy or mistaken diagnosis do not apply for advice until the disease has made such progress as to render extirpation impossible. In other cases, from the first, the affection is too

high up the bowel to admit of direct surgical interference.

It is not, however, with reference merely to the cure, that the treatment has to be considered, but also with the view to retarding the progress of the growth, and rendering the last years of life as tolerable as possible.

It is proposed, therefore, to consider the methods of treatment under the following headings:—

1. Excision of the disease.
2. Colotomy.
3. Palliative treatment.

Treatment by Excision.—The name of Lisfranc stands prominently forward amongst the earlier advocates for treatment of rectal cancer by extirpation. The operation had been previously mentioned by Morgagni, and performed by Faget. During the earlier portion of the present century Pinault published some remarks on the subject, but the able paper read by Lisfranc before the Académie Royale de Médecine, March 24, 1830, together with Dieffenbach's many successful cases, were without doubt the leading cause that established the treatment of rectal cancer by extirpation in modern surgery. Some six or seven years later Velpeau described the operation, with some ingenious modifications, and gave the result of an extensive personal experience. About the same time Recamier's operations were published by Massé. In the year 1854

¹ Dict. Operative Chirurgie, Leipzig, 1845.

Chassaignac employed the *écraseur*. Maisonneuve in 1860, and Fumouze, Nussbaum, and Schuh later, are also well-known modern authors on the subject. There is a complete and carefully written work on the operation by Marchand, who, taking advantage of previous researches and his own experience, published an interesting work in 1872. In America Roberts,¹ Briddon and Kelsey² have done much towards establishing the operation on a sound footing, while in this country I may fairly claim that my Jacksonian Prize Essay written in 1876 advocating treatment by excision has not been without its influence on surgical practice. We are also much indebted to Sir James Paget, Mr. Morrant Baker, and others, for reviving an operation which had long fallen into discredit among English surgeons.

In discussing the treatment by excision the following are the chief points requiring consideration:—

1. Selection of cases suitable for operation.
2. Immediate risk to life involved.
3. Amount of benefit to be expected.
4. Best method of operating.

Selection of Cases.—It is of no avail to show that anatomy will allow and that there may be theoretically carried out a surgical operation, unless it can be further proved that, in a majority of cases, it is followed by beneficial results. There is scarcely an operation upon the human body which is not liable to be abused by the ignorant or enthusiastic,

¹ Excision of Rectum for Cancer, Philadelphia Med. Soc., June 1887.

² An Analysis of 140 Cases of Excision of Rectum, New York Med. Jour., December 1880.

although in the hands of a discreet surgeon of the utmost value to the sufferer.

It requires much care to select cases of malignant rectal disease in which benefit is likely to result from its removal. Unfortunately, suitable cases are comparatively rare, for the symptoms are often overlooked or neglected until the disease has assumed uncontrollable proportions, or, it may be that even from the first it is situated too high to admit of operative interference.

To regard excision as the ordinary treatment for rectal cancer is but to throw discredit upon the method; and the mortality following Billroth's operations should stand as a warning against the indiscriminate performance of excision.

In selecting cases for operation the general constitutional state of the patient, together with the local conditions of the growth, have both to be considered.

The same rules that would guide a careful surgeon before undertaking any severe operation must hold good in cases of rectal cancer. The age of the patient, his general strength, and the condition of the urine, must be taken into consideration, for an operation, which, in a middle-aged and comparatively healthy patient, is one of small risk, becomes extremely hazardous in the aged and feeble.

The abdomen must be examined to ascertain that the abdominal viscera and lumbar glands are not implicated.

If the general state of the patient be satisfactory, the local conditions of the growth should next be inquired into.

In dealing with cancer no operation should be

undertaken without a reasonable prospect of its being possible to remove the whole disease. Under ordinary circumstances the finger can explore to a distance of from four to five inches. If the patient be told to strain down or the abdomen pressed with the hand, a slightly further distance of bowel can be reached. If at this examination the finger fairly pass beyond the disease in an upward direction, the next point to be ascertained will be the implication of the surrounding tissues, and the extent to which the disease has formed adhesions to the neighbouring parts. If the whole circumference of the bowel be involved, it will be found that it is attached more or less firmly to the surrounding structures, especially on its anterior aspect. It is of great importance to ascertain with some precision the extent to which the prostate, vagina or uterus are implicated. In the male, although the disease may be situated in that portion of the bowel in contact with the prostate, it is a long while before the prostate itself becomes infected; in women, on the contrary, when the disease is on the anterior part of the bowel, the vagina and uterus quickly become implicated. So long, however, as the vaginal mucous membrane remains free, it is possible to dissect the anterior wall of the rectum from the vagina without making an opening into the latter. If the disease is adherent to the upper portion of the vagina in the immediate vicinity of the uterus, the peritoneal membrane of Douglas's pouch is nearly sure to be drawn towards the disease which cannot be removed without opening the peritoneum. In these circumstances, it is better that no operation

should be undertaken; not so much on account of the necessary opening of the peritoneal cavity, as that the disease, once having implicated this membrane, is nearly sure to have spread in the course of the lymph-paths beyond the reach of complete removal. It is well to remember in the female how near to the perinæum the peritoneal membrane descends, it being much more commonly at a shorter distance than three inches than at a distance in excess of that measurement. The cases in which invagination occurs, as referred to on page 102, must also be remembered. In these instances the origin of the disease springs from the bowel much higher up than might be supposed from the examination. Moreover, it is not improbable that a considerable fold of peritoneum has been drawn down by the growth in its descent.

I do not consider the implication of the lower part of the vaginal wall as necessarily forbidding an operation. Indeed, in one of my cases where this complication existed the woman did remarkably well, notwithstanding that a considerable portion of the septum had to be excised.

If the disease is confined to the posterior wall, the case is in every respect more favourable to the operation than when situated in front. In this position there are no anatomical difficulties to prevent the thorough removal of the disease to the extent of four to four and a half inches, care being taken to ascertain, if possible, whether the coccygeal or sacral glands are involved. As a rule, glandular infiltration comes on late; if it is extensive, hard nodular masses lying behind the rectal wall can be felt.

To sum up briefly the general outline of the cases suitable for operation, I should say that the disease must be within four inches of the anus, and in women must not have extended on the anterior wall further than three inches, and that the rectum must be fairly movable on the neighbouring parts. Each case will, however, have to be decided upon its own merits, after due consideration has been given to the surrounding circumstances. The distances just mentioned must only be considered as approximate. Should there be any doubt as to whether these conditions are fulfilled, a second examination under an anæsthetic is advisable before deciding absolutely against an operation. It has occurred more than once in my practice to find, on such second examination, that the growth came readily within reach, which had at first appeared too high up for safe removal.

I find from an extensive experience that the cases of rectal cancer which fulfil the condition rendering an excision advisable do not amount to more than 15 or 20 per cent. of cases coming under observation.

Risk to Life involved in the Operation.—The difficulty of estimating with exactness the relative mortality following operations of an exceptional nature is notorious.

“The evil that men do lives after them,
The good is oft interred with their bones.”

But where as in surgical cases the operators are usually their own chroniclers, success is apt to survive in history, failure to pass into oblivion with

the bones it consigns to decay. When cases, however, are principally drawn from authors who publish the whole of their experience, this objection is in a great measure obviated, and data sufficiently reliable for comparison may be obtained.

In the tables appended to my Jacksonian Essay, no doubt a few of the cases were merely isolated records of success, but it will be found that the majority represent the whole experience of reliable authors. On these grounds it is probable that the mortality record up to that date is fairly reliable.

Out of a total of 53 cases, $\left\{ \begin{array}{l} 44 \text{ recovered,} \\ 9 \text{ died,} \end{array} \right.$

giving a mortality of about 17 per cent.

Kelsey, in one of his able and instructive papers¹ from a collection of 140 cases, including 7 of my own, finds that the immediate mortality was as follows:—

Out of a total of 140 cases, $\left\{ \begin{array}{l} 118 \text{ recovered,} \\ 22 \text{ died,} \end{array} \right.$

giving a mortality of about 19 per cent.

In contrast with the foregoing statistics, which may be regarded as representing the death-rate from the operation when performed in various countries, we must unfortunately mention the terrible mortality following Billroth's operations, who is reported² to have lost 19 cases out of 45, or over 40 per cent. A death-rate so appalling as to suggest that reforms either in the method of operating or in the class of cases selected are urgently needed in the Austrian capital.

¹ New York Medical Journal, Dec. 1880.

² Practice of Surgery, Bryant, vol. i. p. 819.

That a lower rate of mortality can be obtained than even in the most favourable of the foregoing series by a more careful selection of cases, and greater care in the after-treatment, is certain. My own experience of excision of the rectum is 30 cases (see table) in patients varying from 27 to 76 years of age. Of these

Died	2
Recovered	28

A mortality of less than seven per cent.

We will now consider the causes of death. Excluding Billroth's cases it will be found that the causes of death in the three series were as follows:—

Peritonitis	15	} 20
Cellulitis	5	
Septicæmia		4
Erysipelas		3
Exhaustion		4
Hæmorrhage		1
Not stated		1
		<u>33</u>

It thus appears that peritonitis and cellulitis are by far the most frequent causes of mortality. In many of the cases the peritoneum had been opened. The danger of this accident must necessarily be in proportion to the height of the bowel removed, and of course the danger would be reduced by a more careful selection of cases suitable for operation. It cannot, however, always be avoided, and I find that it occurred four times in my own operations. These four cases all did well. In three of them I was enabled after carefully washing out all the blood-clots to bring the cut edges of the membrane together by fine sutures. In the fourth case where this was not

practicable, by careful and frequent cleansing of the wound no harm resulted. I consider, moreover, that the risks both of peritonitis and cellulitis must be greatly increased by the practice of some operators of stitching the end of the cut bowel to the anal margin, for, owing to much bruised tissue, many ligatures, and the inevitable tension on the bowel, it is certain not to heal by first intention. Matter and débris is sure to be pent up behind, and not being properly washed away by irrigation, decomposes, and forms a starting-point for cellulitis and peritonitis.

Of the only two cases I have lost from the operation of excision, one, an old man of 76, died on the 23rd day from exhaustion, the other, a woman aged 59, died on the 12th day from erysipelas, which was prevalent in the hospital at the time. A table of my cases will be found on page 182.

The operation is of course one of some danger, but by the careful selection of cases on the lines already laid down, this is not great. My own operations show a mortality of less than 7 per cent., which, considering the nature of the disease and the inevitable death which must follow when left alone, is a risk well worth incurring.

The Amount of Benefit to be Expected.—In my Jacksonian Essay forty-four cases of recovery from the operation are recorded. The subsequent history is not stated in sixteen of these cases: the results are given for the remaining twenty-eight; three of these were deducted, from the nature of the disease being doubtful. Of the remaining twenty-five cases no recurrence had taken place in eleven instances, after intervals varying from a few months

to some years. In three of the cases over four years had elapsed without recurrence. In the remaining fourteen cases recurrence took place after intervals varying from four months to three years. In some of these the recurrence was of a very trivial nature, and was easily removed by a second operation, while in others the patients died of general cancerous cachexia.

In Kelsey's statistics out of one hundred cases which recovered, six cases are reported as permanent cures in which there had been no return for ten years. Three of these are reported by Volckman, two by Velpeau, and one by March of Albany. Besides these, in twenty-four other instances the patients were alive and well without sign of return at intervals varying from one to six years after the operation. My own figures are pretty well in accordance with these, as may be seen in the accompanying table of my cases:—

Table of Thirty Cases of Excision of the Rectum by
HARRISON CRIPPS.

Recovered, 28.

Died, 2.

Subsequent History of Cases that Recovered.

No reliable subsequent history	6
Recurrence within one year	10
Recurrence between first and third year	4
Died without recurrence a year later	1
No recurrence in eighteen months, not seen since	1
No recurrence up to present date	6
After six months	1
After nearly two years	2
After three years	1
After four years, probably eight	1
After nine years	1

The foregoing results cannot be said to be brilliant, but yet when we consider the nature of the disease, and the inevitable death which occurs when Nature is left to run her course, they cannot be said to be altogether unsatisfactory.

Moreover, when compared with operations for malignant disease undertaken in other parts of the body, excision of cancer from the rectum gives at least as good results. I believe that, taking one case with another in which excision is suitable, that in from 10 to 15 per cent. of the cases a permanent cure may be hoped for, while, even in the remainder, it offers the chance of prolongation of life, and, at least for a while, in comparative comfort.

A most distressing symptom of rectal cancer is pain at the seat of the disease. This pain is in no proportion to the extent of the growth, and, indeed, is often more intolerable from a small cancerous ulceration involving the sphincter than from extensive disease in the higher part of the rectum. Complete relief from this pain is the first and most marked result of the operation. Indeed, the patient will often state on the morning following the operation that a better night has been passed than for months previously.

With the removal of disease not only is there cessation of pain, but also the tenesmus and blood-stained discharge ceases, and the patient rapidly improves in general health and strength. If the disease return in distal organs the suffering is usually inconsiderable, while in the event of a local return there appears to be very little pain compared with that caused by the original growth, a fact probably

accounted for by the destruction of the terminal nerve-filaments at the seat of operation.

The possibility of incontinence cannot be urged as a drawback to the operation, for if the cancer be allowed to remain unoperated upon, incontinence is nearly sure to become a complication.

In four of my cases in which no return of the disease has taken place, there is practically perfect control over the bowel, while in the two others there is good control except when there is any diarrhoea or looseness.

It might be supposed that the destruction of the internal sphincter, and at the same time more or less damage to the external muscle, would be followed by an incontinence of fæces. In my Jacksonian Essay, out of thirty-six cases recorded defæcation was normal in twenty-three instances, while fæces could be retained, when not too fluid, in six cases, incontinence resulting in seven instances only. My own experience is quite in accordance with these facts. In all cases, after operation, there is at first complete incontinence, and the patient loses all consciousness of the passage of fæces, but as convalescence advances control returns. In those instances where portions of the sphincter have been left intact, the muscle, temporarily paralyzed, probably regains its power, but when the sphincter has been wholly removed, retention of fæces requires another explanation. Chassaignac attributed it to an hypertrophy of the circular fibres around the termination of the cut margin, constituting a sort of rudimentary sphincter. Lisfranc considered that it depended most probably on the somewhat narrow, tortuous

course through the cicatrix, assisted by the surrounding muscles. In the Bulletin of the Société de Chirurgie, 1861, an interesting discussion on this subject will be found. In the majority of cases it does not appear that hypertrophy of the circular fibres has anything to do with the power of retention, nor in cases that I have examined has any such hypertrophy been found. The common plan by which the passage of fæces appears to be prevented will be best gathered from a description of MacM.'s¹ case, whose rectum I have frequently examined since the removal of two inches and three-quarters of bowel. She is able to restrain both wind and motions, as a rule, completely, but if she has any diarrhoea the linen is slightly stained. Upon separating the sides of the buttocks the anal aperture appears as an oval opening in the skin, one inch long by three-quarters wide. The margin of the opening is formed by a slight inversion of the skin. The edge is not hard and admits of a certain amount of stretching; just within the orifice is seen a bright red protrusion, which, upon examination, is found to be a sort of prolapse of one side of the bowel, completely blocking up the opening. Very slight pressure enables the finger to pass into the bowel. This valve-like approximation of the sides of the bowel would appear to be but a feeble guard against the passage of fæces, but nevertheless in practice it is completely efficacious.

It is probable in discussing this question of incontinence that sufficient consideration is not given to

¹ Page 191.

the normal method by which fæces pass from the bowel. It must not be supposed that there is always a mass of material just within the sphincter ready to pass away directly its grasp is relaxed. In health, unless the bowels be very loose, a certain amount of straining by means of the abdominal muscles is necessary to bring the fæces against the sphincter, which eventually yields to the pressure, so that during the greater portion of the day the last few inches of the rectum is empty.

Contraction of the anal outlet is often a trouble, and will invariably occur unless proper attention is paid during the healing of the wound. If stricture is allowed to take place, incontinence and a dribbling away of fæcal material will render the patient miserable, and may, as I have seen in one case, end in complete obstruction. Stricture, however, can always be prevented by early and proper treatment.

To summarise my views as to excision of the bowel for malignant disease, after careful observation and considerable experience I am confident that in properly selected cases the operation should be undertaken as the only known means of affording a chance of a possible cure.

Method of Operating for Excision of Rectum.—

Various plans of operating have been proposed. I have employed two methods, the one by ligature, the other by the knife and scissors. The first case in which I removed a portion of rectum was in 1875. The portion was quite the lower part of the bowel, certainly not more than two inches; the plan followed was similar to the one described by Maisonneuve and called by him *Procédé de la ligature extemporanée*.

The advantage claimed for the operation is that it can be performed without hæmorrhage, but I consider it has nothing to recommend it, and that it is vastly inferior to the operation as performed by cutting, and, moreover, it would be quite impracticable except when the disease is situated close to the anus.

The operation which I now perform is the result of many small improvements on that performed by Lisfranc. These improvements are partly the result of my own experience, and partly derived from the suggestion of others, perhaps the most important being the posterior incision advised by Denonvillier.

The operation is thus performed:—The patient being prepared by half an ounce of castor oil administered not less than twenty-four hours previously, and by a warm water enema one hour before the operation, is placed fully under the influence of an anæsthetic, and arranged in the lithotomy position, with a firm square pad under the buttocks, the legs being drawn up and fixed upon the abdomen by Clover's crutch. This consists of a metal bar, eighteen inches in length, at each end of which is a semicircular padded crutch, with a strap and buckle attached. The legs being flexed on the thighs, the bar is placed between them, so that the crutches fit against the legs just below the knee, and are kept in position by means of the straps and buckles. The thighs are then bent on the abdomen and a soft leather strap passes over the head and one shoulder, and the free ends being then buckled to the crutch, the strap is then tightened so as firmly to fix the thighs in a bent position. The instruments required for an operation consist of a

strong, curved, sharp-pointed bistoury, a straight probe-pointed bistoury, a scalpel, a pair of blunt-pointed scissors, a pair of strong curved scissors, two pairs of large, strong vulsellum forceps, the benzoline cautery, artery forceps, eighteen pairs of pressure forceps, and plenty of Chinese silk ligatures, and, if the operator likes, a steel wire *écraseur*. The left forefinger being passed into the rectum, feels for the tip of the coccyx, the probe-pointed bistoury, held in the right hand, is passed into the bowel. The whole of the intervening tissue between the anal margin and the side of the coccyx is cut through. If this cut be made with a clean sweep, as near as possible in the middle line, little hæmorrhage will result. The left hand of the operator is now placed on the right side of the buttock, so as to draw the anus outwards and stretch the tissues at the line of junction of the mucous membrane with the skin. The portion of the rectum or anus through which the lateral incision is to be made must depend upon the distance from the anus of the lower margin of the disease, and, if possible, should be made wholly through the mucous membrane rather than through the skin. The point being selected, the knife is made to cut deeply by using firm pressure, a crescentic incision extending from the margin of the first cut round the anus to a point in the middle line in front. This cut should be made boldly, and of sufficient depth to extend well into the fat of the ischio-rectal fossa. The forefinger thrust into this incision will readily separate the bowel from the surrounding tissue, except the insertion of the levator ani, which, should be divided with scissors. A piece of sponge,

pressed into this cut, and held by an assistant restrains any bleeding, while the opposite side is treated in a similar manner. The lateral and posterior portions of the bowel being freed from their attachments, the next and most delicate step in the operation is the separation of the bowel from its anterior connections. In the case of a man this is much facilitated by having a full-sized catheter passed into the bladder and held during the operation, like the sound in lithotomy. The catheter can be readily felt during the operation, and prevents any chance of the urethra being wounded. The separation of the anterior wall requires the judicious use of the knife and scissors, it being too intimately adherent to be separated by the fingernail without greatly tearing the parts. During this dissection the bowel should be drawn downwards and backwards by the left hand, while the finger should from time to time be introduced into the bowel cavity to make sure that the dissection be not carried too close to the bowel. When the dissection has been continued to a sufficient distance beyond the disease, the bowel should be drawn down with a moderate amount of force with vulsellum forceps.

At this period of the operation the wire loop of the *écraseur*, if this instrument is used, is passed over the forceps and partially detached bowel, and is pushed up as far as possible, before being tightened. The wire should consist of seven strands of steel of moderate thickness, only slightly twisted together with great evenness. If too much or irregularly twisted the strands will break, by cutting one against another. The *écraseur* must be very powerful.

The diseased portion of the bowel is then slowly cut through and removed. If any vessels happen to bleed, they must be secured by pressure forceps.

In my later operations I have discarded the *écraseur*, preferring to cut across the bowel with a knife or scissors, the vessels being clamped with pressure forceps immediately on division. It is essential to have a good light, and a first-rate assistant. With these auxiliaries much valuable time is saved at a critical point in the operation, and there is, I fancy, less risk of recurrent bleeding than when the *écraseur* is used.

The hæmorrhage varies a good deal in different cases. It is nearly always free, and sometimes to a dangerous extent. It is best treated by making the posterior and the two lateral incisions as boldly and rapidly as possible, and putting on pressure forceps on spouting vessels, and pressing a sponge firmly into the wound till the posterior and lateral connections of the bowel have been separated. The bleeding vessels are chiefly situated in the coats of the bowel, so that when the partially detached bowel can be grasped in the left hand, much of the hæmorrhage is restrained. The vessels in the partially detached portion of the bowel will again, in the latter part of the operation, be cut across higher up, so that to ligature them in the first stage of the operation only wastes time. Should any vessel in the sides of the wound bleed it may be secured. There is always considerable oozing after the diseased portion has been detached, but this is principally venous, and stops when the body is put out of the lithotomy position. The ends of any ligatures used should be cut off short. The

hæmorrhage having been attended to, the parts should be carefully examined by the finger, to make sure that no portion of the disease remains behind. For this reason I dislike the use of any form of cautery during the operation, for after its use it is exceedingly difficult to distinguish between the hard nodules of burnt tissue and portions of the disease left behind.

In the case of women the dissection of the anterior wall is best accomplished by keeping as close as possible to the vaginal mucous membrane, the dissection being carried through the loose submucous coat.

The operation, as just described, is for the removal of the whole circumference of the bowel. Cases, however, will occur in which the disease affects only a small part of the circumference, and in such cases it is not necessary to remove the whole bowel. So far as the operation itself is concerned, it is certainly easier to remove the whole circumference of the bowel than a portion only, but since one of the chief troubles following the operation is contraction of the outlet, and this contraction rarely occurs to an inconvenient extent, unless the whole circumference has been removed, it will be seen that if any considerable portion of the bowel be quite free from disease it may be left with advantage. In these circumstances the operation requires a slight modification of the method just described. In any case, even if the disease be situated in the middle of the posterior wall, the preliminary incision backwards is advantageous, greatly facilitating the operation.

If the diseased tissue be confined to the lateral portion of the bowel on either side, the semicircular

incision round the anal margin is made only on the diseased side. A longitudinal cut is now made with the scalpel deeply through the mucous membrane on the middle line of the anterior wall, or, at such a distance from the site of the disease as may seem desirable. The making of this incision is much facilitated by using a very large duck-billed speculum. The strip of diseased bowel which now lies between the posterior incision, and the one just made in front, can be separated by the finger from its lateral connections, the separation of course commencing from the semilunar incision round the anus.

In this way the rectangular flap of bowel in which the disease is situated is detached, except at its upper margin. It is then drawn down and cut off by the *écraseur* or scissors. It can be readily understood how the steps of this operation must depend upon the portion of bowel in which the disease is situated. If it be in the middle line behind, the disease, or a portion of it, will probably have been split in two by the first incision, in which case a strip of bowel must be removed on either side; or again, if it be on the anterior wall, an incision will have to be made on either side of it. Any attempt to draw down the cut edge of the bowel and stitch it to the anal margin is perfectly useless. The stitches are sure to give way, and before they do so prevent a free discharge from the wound, by forming spaces in which matter may collect and decompose. It is for the same reason that I employ no plugs or dressings. Anything that can in the least impede the discharge and cause its collection, is a source of danger.

A piece of india-rubber tubing, five or six inches long, with two or three holes at the end, is passed a little distance up the divided bowel. A square piece of lint smeared with eucalyptus ointment, with a small hole in the middle to let the tube through is pressed against the sides of the wound, and then the space between it and the tube is gently plugged round with iodoform cotton-wool, and the whole secured by a T-bandage. The tube allows wind and blood to escape.

After the operation the patient should lie on his side or back. I prefer the former position as it allows of the part being more easily examined, and any oozing is at once detected. Should the position become irksome he can be gently turned on his back. There is little pain after the operation, but fifteen drops of liquor opii sedativi should be given nightly for a week to keep the bowels confined. After the third day the discharge becomes considerable.

Thirty-six hours after the operation I remove the cotton-wool plug, and gently syringe with a little weak carbolic lotion the lint which is now adherent to the wound. Twenty-four hours later the lint which is found to be loosened, will come away with syringing. I put in no fresh dressing, but have the wound gently syringed three times in the twenty-four hours.

The syringing must be done very gently, but thoroughly, by means of a Higginson's syringe, with a warm Condylion lotion. Great care should be taken to introduce the syringe well into the wound, so that every part be thoroughly washed, and all blood-clot removed and deodorized. After the syringing the

parts must be gently dried by pluggets of absorbent wool, and dusted over with iodoform powder.

All fluids and secretions are prone very quickly to decompose in this neighbourhood, and the proximity of the peritoneum, and the free supply of absorbents in this part of the body, render the absorption of putrid material peculiarly dangerous. My experience is at present too limited to state the fact with certainty, but I think that it will eventually be found that the liability to peritonitis is in direct proportion to the extent to which the products of putrefaction are allowed to accumulate. Unfortunately, it is scarcely possible in operations about the rectum strictly to carry out Professor Lister's antiseptic treatment, but every care should be taken to exclude, as far as possible, the chance of septic infection from without. The patient usually convalesces rapidly, and can leave his bed in a month or five weeks.

After a fortnight the wound should be carefully examined every third day for early signs of contraction. This will inevitably come on sooner or later during the healing process. If neglected it will lead to an intractable stricture, while, if properly treated, it causes but little trouble. The stricture is prevented by using a full-sized bougie¹ during the latter stages of the healing process. I have never found it necessary to commence its use till after a fortnight, and often not till the fourth week. It should then be passed every day, and left in as long as the patient can bear it without much discomfort, generally speaking for three or four hours a day. If this procedure

¹ See fig. 15, p. 175.

be adopted, it will be found, that, by the time the wound is completely healed at the end of a couple of months, there is no stricture. As a precautionary measure, the patients should for at least a year pass a conical bougie for themselves on alternate evenings. This should be merely passed just in and out, and should not be retained.

The cut end of the bowel quickly forms attachments to the sides of the cavity that remain as the result of the operation, and seems during the process of cicatrization to be drawn considerably downwards, so that if three inches of the bowel have been removed, and the parts are examined six months later, it will not be found that the gut terminates three inches above the external orifice, but at a distance of about one inch from it, and that the lining of the canal for the remainder of the distance is composed of a tissue similar to the ordinary scar tissue found on cutaneous surfaces, but of a softer consistency. This tissue has sometimes a great tendency to contract, thus narrowing considerably the outlet. If, however, the whole circumference of the bowel has not been removed, and a strip of the normal mucous membrane, however narrow, has been left, extending to the anal margin, the tendency to contract is greatly diminished; and for this reason, when the disease affects only a portion of the bowel, it may be well not to remove the whole circumference. For the first ten weeks there is little or no control over the motions but this gradually returns as the wound soundly heals.

CHAPTER VII.

RECTAL CANCER—TREATMENT BY COLOTOMY.

COLOTOMY must not be considered in any way as a rival operation to that of excision in cases of rectal cancer. In a large number of instances excision is quite impracticable, and it is in such cases that the question of colotomy arises. The advantages of the operation lie partly in the relief it affords to symptoms, partly as a means of retarding the growth of the cancer. The pain caused by the growth itself varies greatly, and is more influenced by the position than by any other factor. When the growth is near the anal margin the pain is often intense, whereas, when higher up the bowel, there is comparative immunity. Sooner or later the bowel becomes strictured, the symptoms of which are very characteristic, and often cause the greatest misery. The sufferer is troubled with constant calls to the closet, and generally believes that he is suffering from diarrhœa, and not infrequently has been told that his disease is chronic dysentery.

What is passed at such times is not a true motion, but rather a grumous mucoid discharge, stained with blood and fæcal colouring matter. This discharge arises from an accumulation of scybalous masses in the dilated bowel above the stricture, and what

comes away is merely the overflow from this mass mixed with blood and mucus. As time advances the trouble increases, the anus becomes raw and excoriated, and the patient is perpetually tormented with tenesmus. Purgatives and enemata gradually become useless, and the whole attention is fixed upon getting a proper evacuation. The abdomen often becomes swollen and tympanitic, and the patient dies from fæcal vomiting, or occasionally suddenly from perforation of the intestine.

Colotomy completely relieves all symptoms arising from the contracted state of the bowel, while it serves as a permanent safety-valve against the risk of complete obstruction. The influence of the operation in retarding the growth is a debatable question. My own impression is a strong one, that the progress of the growth becomes much slower after the bowel is set at rest by the operation.

It is a well-known physiological law, moreover, that disuse of a part is followed by a diminished blood supply and atrophy. It is probable, therefore, that the lessened activity of the rectum consequent on colotomy may favourably affect the disease by retarding its growth.

The operation of colotomy although it has advanced in professional estimation has done so but slowly. It has never been popular, and has generally been reserved for cases of complete obstruction. American writers have been particularly opposed to the operation, Professor Gross going so far as to declare that it is quite unjustifiable, and should be discarded as amongst the obsolete devices of surgery.

It has been supposed to be a procedure so fraught with danger as only to be justifiable as a last resource, and taking into consideration that it is demanded for malignant disease, it has been argued that the risks are greater than the prospective advantages justify. Others disparage the operation on the supposition that it leaves the patient in a miserable condition with fæces constantly running away from the opening. These adverse views must be founded on a misconception of the operation.

I propose to consider the question of colotomy under the following headings:—

1. Risk to life involved.
2. Condition of the patient after the operation.
3. Method of operating.

Risk to Life involved.—Colotomy, when performed before there are any signs of complete obstruction, is an operation of expediency rather than of necessity. The immediate risk to life involved therefore requires careful consideration. In the eight years from 1869 to 1877 the number of colotomies which were performed at the two hospitals of St. Bartholomew's and Guy's amounted to 39 cases, with 27 deaths, or a mortality of 66 per cent. These figures are taken from the Hospital Registers,¹ and do not necessarily mean that patients died as the immediate result of the operation, but that death took place before leaving the Hospital.

Treves² quoting Erckelens statistics, published in

¹ Cancer of the Rectum (Cripps), 1st ed. p. 136.

² Intestinal Obstruction (Treves), p. 472.

1884, states that out of 110 cases of colotomy for cancer 42 died, a mortality of 38 per cent. From these statistics, collected from various sources, the death-rate appears to be so high as scarcely to justify the operation, but further investigation throws much light on the cause of this terribly high death-rate. Many of the operations were performed for complete obstruction, so that death resulted in many cases not from any inherent danger in the operation itself, but from its being so long delayed as to make recovery impossible.

Moreover, it is not right in discussing the mortality following any operation to appeal to any collection of isolated cases, but rather to see what can be accomplished by those who have had special experience of the operation.

Colotomy is an operation of great delicacy, requiring a good anatomical knowledge, with trained manipulative skill. The preparation of the patient, the hygienic surroundings, and the subsequent treatment of the wound, all demand most careful consideration, and materially influence the result. It is therefore but fair, in estimating the mortality, that, instead of collecting isolated cases, the records of individual surgeons should be taken as more fairly representing what may be expected from the operation.

The statistics just recorded I therefore consider absolutely worthless and misleading, and if the operation was really followed by such a death-rate I should unreservedly adopt the opinion of Gross, and condemn it in the same unmeasured language.

I am confident that the risk is far less in the hands of such experienced operators as H. Allingham,

Bryant, Ball, Chavasse, Edwards, and Reeves. Both H. Allingham and Reeves I know have had a large number of cases with a very slight mortality. As a further proof of the worthlessness of the collected statistics I give a table of all the cases in which I have myself performed colotomy for malignant disease of the bowel,¹ they amount to 41 in number, with but a single death, a mortality of less than $2\frac{1}{2}$ per cent., and thus show how slight is the risk to life involved. A full detailed table of these cases will be found on page 183.

Lumbar, 14	...	Recovered, 14	...	Died, 0
Inguinal, 27	...	Recovered, 26	...	Died, 1
<hr/>		<hr/>		<hr/>
Total 41		40		1

The majority of my cases were in the wards of St. Bartholomew's Hospital. The low death-rate is, no doubt, in some measure due to the excellent hygienic surroundings, but probably more than anything to the extreme care and attention of my house-surgeons, Messrs. Balgarnie, Gow, Young and Roberts.

Condition of Patient after Operation.—The return of strength and gain of flesh is often well-marked after colotomy, no doubt chiefly due to the increased appetite, the relief from pain, and the quiet nights following the operation.

To suppose that a patient after colotomy is in a miserable condition, with fæces constantly running away from the opening, is a delusion. If, as sometimes occurs, the opening is made too small, or allowed unduly to contract, the advantage of the operation is, in great measure, lost, and constant

¹ Up to August 1889.

dribbling occurs from the wound. If, however, care be taken to make the opening valvular and of sufficient size, a motion generally passes but once a day, and there is a fair amount of control over the new anus.

After the operation the amount of discharge from the rectum immediately becomes diminished, and soon loses its feculent character. If, however, the disease be far advanced, there will still be some purulent discharge from the anus. The length of time the patients will live after the operation, and the extent to which they will be able to get about, is difficult to forecast, and will in a great measure depend upon the rapidity with which the disease advances. One patient upon whom I operated was able, for at least a year, to go daily to the City and remain there from ten till five without inconvenience, while I have had several women in the lower class who have been enabled to perform their household duties from one to two years subsequent to the operation.

Of course it must be remembered that the malignant disease is still present, and, slowly advancing, undermines the patient's strength, so that, perhaps, a year after the operation they will complain that they feel no better than before its performance. But here, of course, it is not right to compare their condition with what it was a year ago, but rather with what it would have been had no operation been undertaken.

With many opportunities of watching cases in which colotomy had been performed, and others where Nature had been allowed to run her course, I have no

hesitation in saying that the relief obtained and the suffering avoided are unmistakable, and leave me in no doubt as to the great benefit of the operation.

Time when the Operation should be Performed.

—This is a question of some importance. If the disease is causing no trouble, and by only invading a portion of the bowel has not produced any appreciable narrowing, it may be well to wait. On the other hand, should there be any signs of commencing stricture, I agree with Mr. Reeves that the operation should be performed without delay. If deferred, not only does the patient lose the advantage of the operation, but it may have eventually to be performed for complete obstruction under the most dangerous and unfavourable circumstances.

Method of Operating.—The surgeon has his choice of two sites for opening the colon, the one posteriorly in the lumbar region, known as Amussat's operation, the other in the inguinal, known as Littré's operation. I have had considerable experience of both methods, and have no hesitation in saying that the abdominal operation in front is vastly superior to the lumbar.

The following appear to be some of the chief objections to lumbar colotomy:—

First, the space in which the operator has to work, between the lower border of the last rib and the crest of the ilium, is often extremely confined, so that he is, to a great extent, at the mercy of the anatomical accuracy of the course of the bowel, and even a slight deviation involves a difficult operation. Thus, in the search, the subperitoneal fat becomes extensively bruised, and not infrequently the peritoneum in-

advertently, or even unknowingly, opened. To this cause many of the deaths from lumbar colotomy are attributable.

Secondly, it is not always easy to identify the bowel in the limited space. The longitudinal bands are sometimes impossible to recognise. From this cause numerous instances are recorded of fatal mistakes. I have twice seen the small intestine stitched to the skin and opened. The duodenum has many times been likewise opened, and even the stomach has been a victim to the same mistake.

Thirdly, in a fat or muscular patient, owing to the depth of the bowel, and its want of mobility, there is a difficulty in fixing it to the skin without undue tension.

Fourthly, and certainly what is the gravest objection of all, is that if the colon happens to take an abnormal course, altogether avoiding the lumbar region, as so well described by Mr. Lockwood,¹ the attempted operation completely fails. I have been fortunate in not having met with one of these abnormalities, but have been present on three occasions when the most skilful surgeons failed to find the colon, and in which subsequent post-mortem examination proved the bowel to be quite inaccessible from the lumbar wound.

Lastly, the position of the opening behind is inconvenient to the patient for purposes of cleanliness and for the adjustment of pads.

Inguinal colotomy meets all these objections. The space in front is practically unlimited, and thus

¹ Abnormality of the Colon a Cause of Unsuccessful Colotomy, by C. B. Lockwood.

allows of a thorough exposure of the part by a clean incision without the least damaging of the tissues. There can be no possibility of mistaking the small intestine or other structures for the colon, which from its longitudinal bands clearly marked, its convoluted surface, and its glandulæ epiploicæ, admits of absolute identification. Owing to the mobility of the sigmoid flexure, and the ease with which the skin can be depressed, there is little difficulty in fixing the bowel without undue tension on the stitches.

Abnormalities of the colon do not mean failure of the operation. If the bowel be not in its usual position, it is possible to make a thorough exploration of the abdomen and search for it. An instance of this occurred in Case 25, Table C. Here, on opening the abdomen, the small intestine presented, and, on pushing this back, and looking for the colon, it was evident that it was not in its normal position. However, by introducing two fingers, it was eventually found passing down near the middle line, apparently in front of the small intestine. I am confident that it could never have been found by the lumbar incision and the operation would have been a fiasco.

Besides meeting the chief objections that can be raised to the lumbar operation, the inguinal method has in certain instances an advantage entirely its own. This consists in using the first part of the operation as a means of verifying the diagnosis in obscure cases before the bowel is opened. For instance, an obstruction exists probably high up in the rectum or there may be a communication between the bowel and the bladder. An examination of the

lower part of the rectum has thrown no light as to the site of the lesion. In such a case the surgeon would hesitate at doing a lumbar colotomy, feeling that it might be useless as being below the seat of disease. In inguinal colotomy such a mistake could not occur, for the diagnosis as to the site of obstruction could be made certain before the bowel is actually opened.

Two objections have been especially urged against the inguinal opening: first, that it affords greater facilities for prolapse of the bowel; and, secondly, that it is unsuitable for urgent cases. In answering the first of these, it is not my experience that prolapse is more frequent from the one opening than from the other: moreover, by a little care in drawing down the bowel in the inguinal operation protrusion can to a great extent be guarded against. The second objection could only hold good in a certain number of cases, and I believe even in these the danger is more imaginary than real.

Doubtless it would be more prudent, when possible, after stitching the bowel to the skin, to allow a certain interval to take place before opening it, in order to afford the peritoneum time to become sealed off. If the bowel be distended and vomiting present, there is no time for waiting, for the pressure thus caused would certainly burst the bowel away from the stitches. In two cases I at once open the bowel after accurately stitching it to the skin. In both instances the wound was immediately swamped by feculent material. A stream of warm water was kept constantly pouring over the wound for ten minutes or so till the distended bowel had completely

relieved itself. The wound was then again most carefully washed, and the dressings applied. Both these cases did extremely well without the slightest sign of peritonitis.

Having discarded lumbar colotomy for rectal cancer, I shall not describe the steps of an operation which I consider to be obsolete, but I will at once proceed to describe the inguinal operation.

History of Inguinal Colotomy.—This operation was first suggested by Littré, 180 years ago, in the “Memoirs of the Academy of Sciences of Paris.” He there discusses the advisability of opening the sigmoid flexure by an operation through the abdominal walls as a means of relieving infants born with an imperforate bowel. It would not seem, however that he ever had an opportunity of carrying out his own suggestion, and the idea appears to have slept for over sixty years when Pillore of Rouen performed the operation by opening the cæcum on the right side. The accounts of subsequent operations through a long series of years are very meagre.

In 1839 Amussat introduced the lumbar operation, and his method was universally followed in this country until comparatively recent times. The successes following abdominal sections for ovarian disease soon demonstrated that the peritoneum was more tolerant of surgical interference than probably any other structure in the body, and thus attention was again turned to the operation of opening the sigmoid flexure through the abdominal walls. Some twelve years ago, Mr. Reeves of the London Hospital reintroduced and advocated the method. Since that time substantial improve-

ments in detail have been added, and for these we are specially indebted to Mr. Lawson Tait for showing how intestine can be safely stitched to the skin, and to Mr. Chavasse and Mr. Herbert Allingham for applying the principle to the colotomy operation. I have myself, too, done what I could to advocate the operation, and improve its details.¹

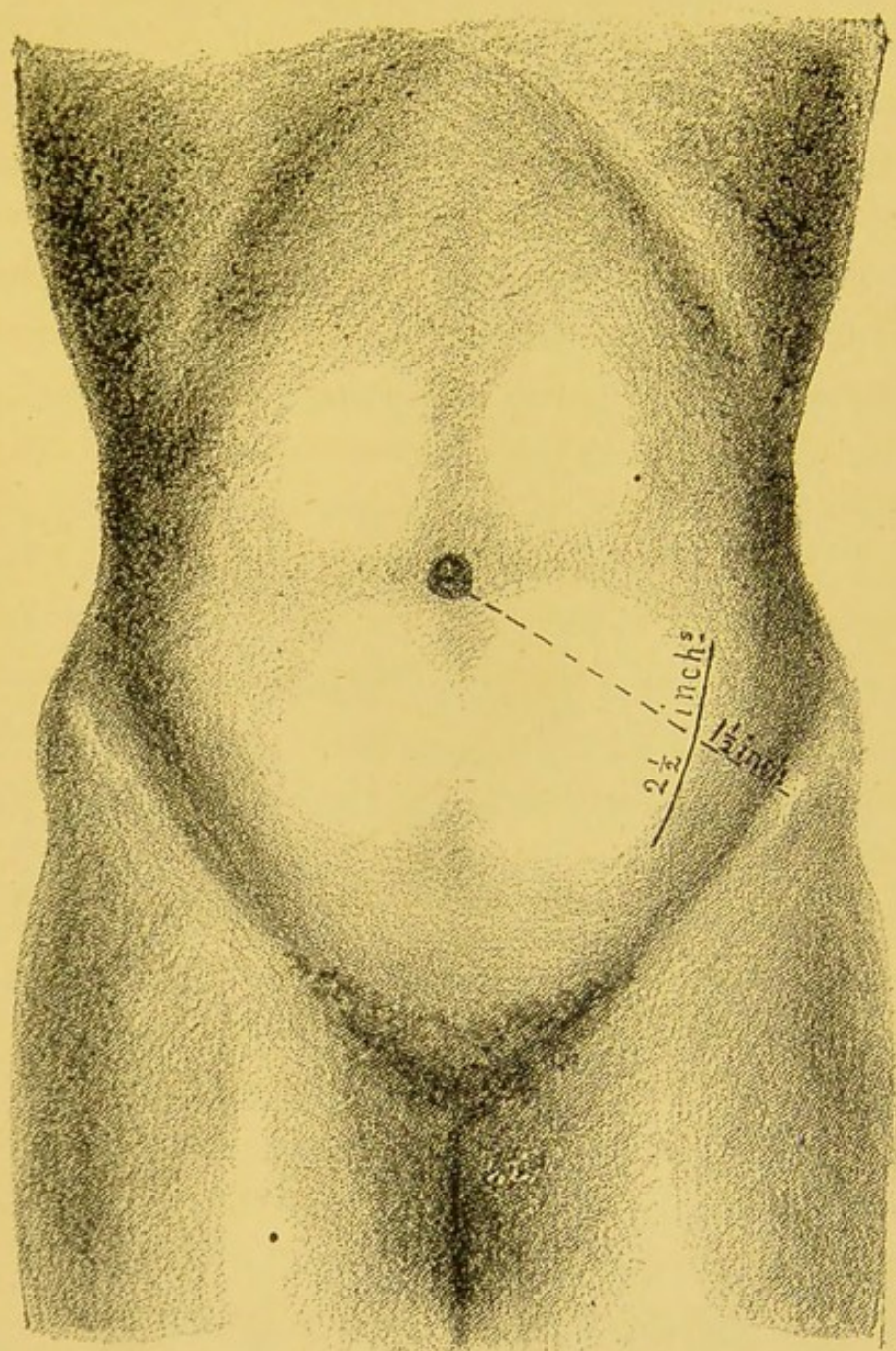
Method of Performing Inguinal Colotomy.—

The patient has a warm bath the night previous to the operation, the abdomen being thoroughly well cleaned with soap and water, and afterwards covered with a light antiseptic dressing. This is important, for, since the operation is usually undertaken for cancer of the rectum, the part is liable to become contaminated with the fetid discharge. I make my incision rather higher than most operators. The branches of the epigastric artery are thus avoided, and there is subsequently less pressure on the wound than when lower down. As a guide, I take an imaginary line from the anterior superior spine to the umbilicus; the incision, two inches and a half long, crosses this at right angles, an inch and a half from the superior spine. Half the cut is above and half below the imaginary line, as shown in the accompanying sketch.

In making the incision the skin should be drawn a little inwards, so as to make the opening somewhat valvular. The peritoneum being reached, it is pinched up by fine forceps and an opening made sufficient to admit the finger. The intestines being

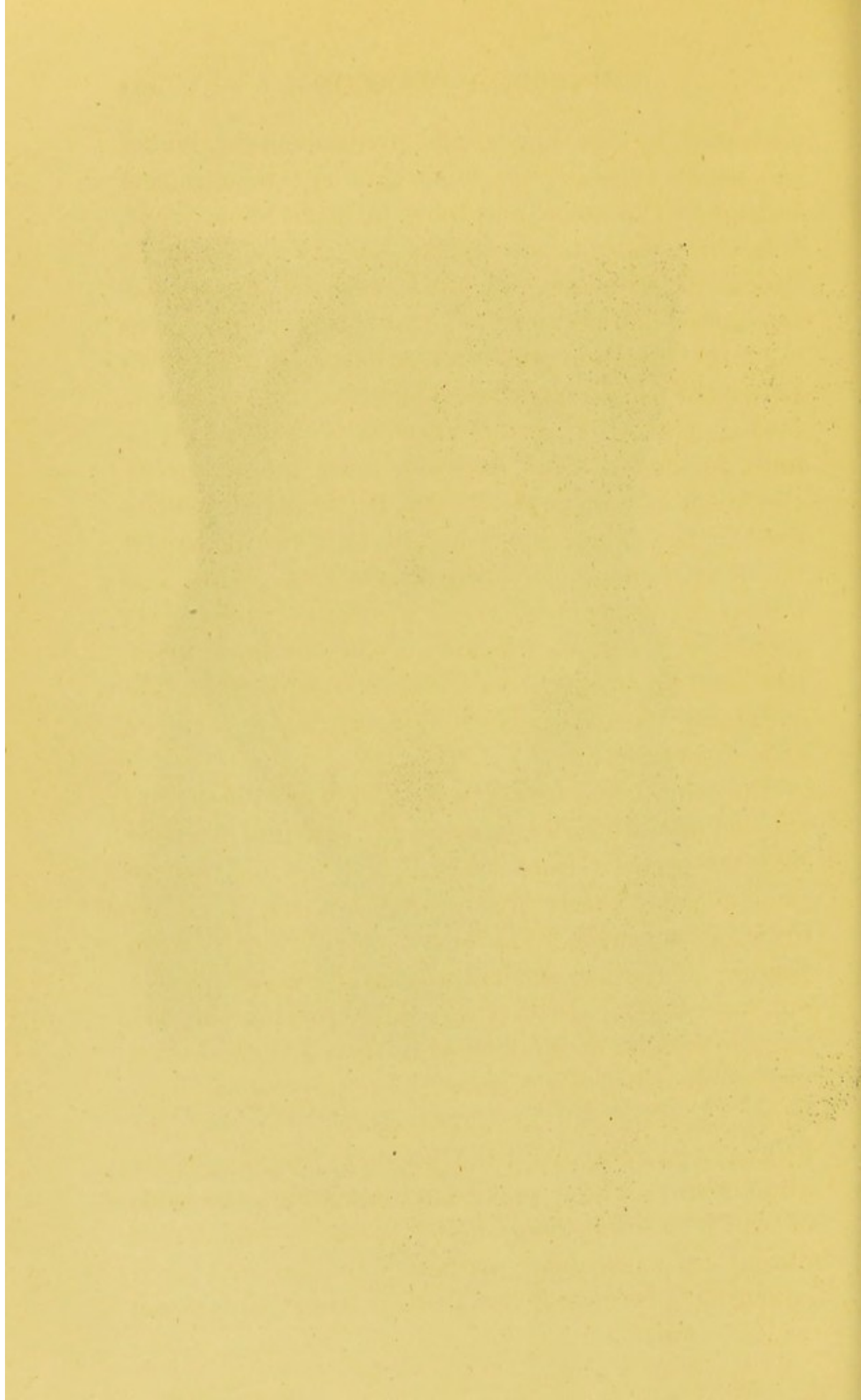
¹ Inguinal *versus* Lumbar Colotomy, with a Record of thirty-seven Consecutive Cases. Paper before Harveian Society, Brit. Med. Journ., April 6, 1889, by Harrison Cripps.

FIG. 10.



Shows the line of incision adopted by Harrison Cripps for inguinal colotomy.

An imaginary line is taken from the anterior superior spine to the umbilicus, the incision $2\frac{1}{2}$ inches long crosses this at nearly right angles, at $1\frac{1}{2}$ inches from the anterior spine.



protected by the finger, the peritoneum is divided by scissors to nearly the full length of the cutaneous incision. The colon may now at once show itself, and can easily be recognised by its longitudinal bands, its glandulæ epiploicæ, and by its regular convoluted surface. In about a third of my cases the large intestine presented at once; in the others either the small intestine, omentum, or mesentery first appeared. If any of these latter present, they must be pushed back and the colon sought for by the finger. Sometimes it can be detected by the hard scybalous masses within it, or it can be traced up after passing the finger into the pelvis, and feeling for it as it crosses the brim. Great care should be taken to prevent any of the small intestine from protruding, otherwise a considerable difficulty may be experienced in returning it into the abdominal cavity.

The colon being found, a loop of it is drawn into the wound. In order to avoid the prolapse which is likely to occur if loose folds of the sigmoid flexure remain immediately above the opening, I gently draw out as much loose bowel as will readily come, passing it in again at the lower angle as it is drawn out from above. In this way, after passing through one's fingers an amount varying from one to several inches, no more will come. Two provisional ligatures of stout silk are now passed through the longitudinal muscular band opposite the mesenteric attachment. These provisional ligatures, the ends of which are left long, help to steady the bowel during its subsequent stitching to the skin, and moreover, are useful as guides when the bowel

is ultimately opened. They should be about two inches apart.

The bowel is now temporarily returned into the cavity. With a pair of fine forceps the parietal peritoneum is picked up, and attached to the skin on each side of the incision, the muscular coats of the abdominal wall not being included. Four sutures of fine Chinese silk are sufficient, two on each side, an inch and a half apart (Fig. 11).

The bowel is again drawn out, and fixed to the skin and parietal peritoneum by seven or eight fine ligatures on each side, the last suture at each angle going across from one side to the other. The bowel should be so attached as to have two-thirds of its circumference external to the sutures. By turning the bowel slightly over, the lower longitudinal band can be clearly seen, and it is best to pass the sutures for the lower side through this, since it is a strong portion of the gut (see Fig. 12). The upper longitudinal band through which the provisional ligatures have already been passed, is seen in the middle line of the wound. The bowel being now turned downwards, the opposite line of sutures are inserted close to its mesenteric attachment. No longitudinal band can, however, here be seen. The sutures, of the finest Chinese silk, are passed by small, partly curved needles, the needle passing through the skin one-eighth of an inch from the margin, then through the parietal layer of the peritoneum, and, lastly, partly through the muscular coat of the bowel, great care being taken to avoid perforating the mucous membrane. It is easier to pass all the threads before tying them up.

The wound should be most carefully and gently

FIG. 11.

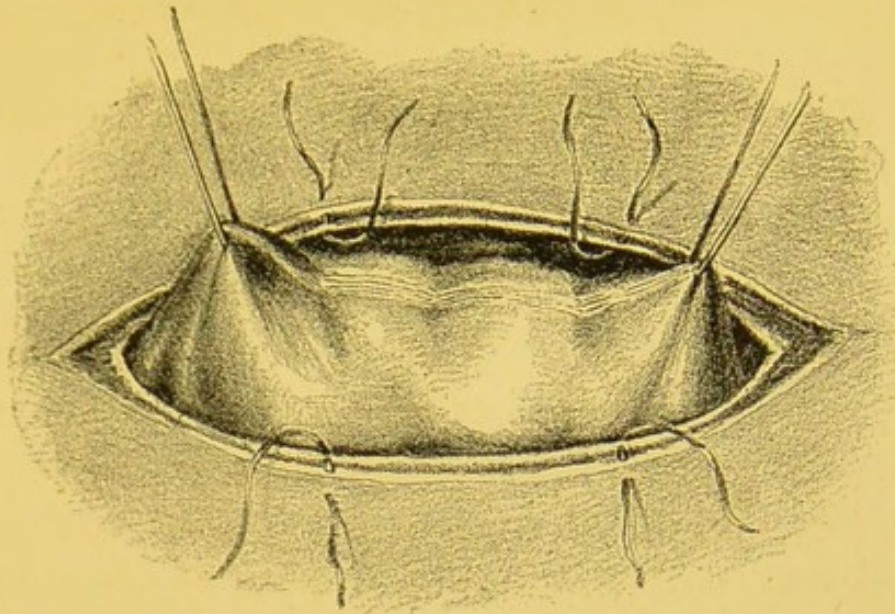


FIG. 12.

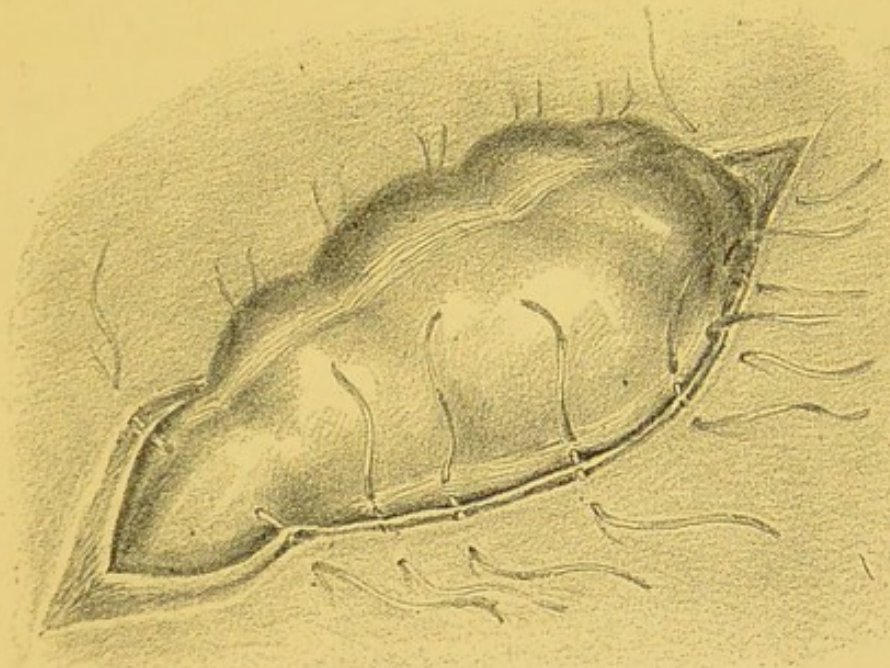
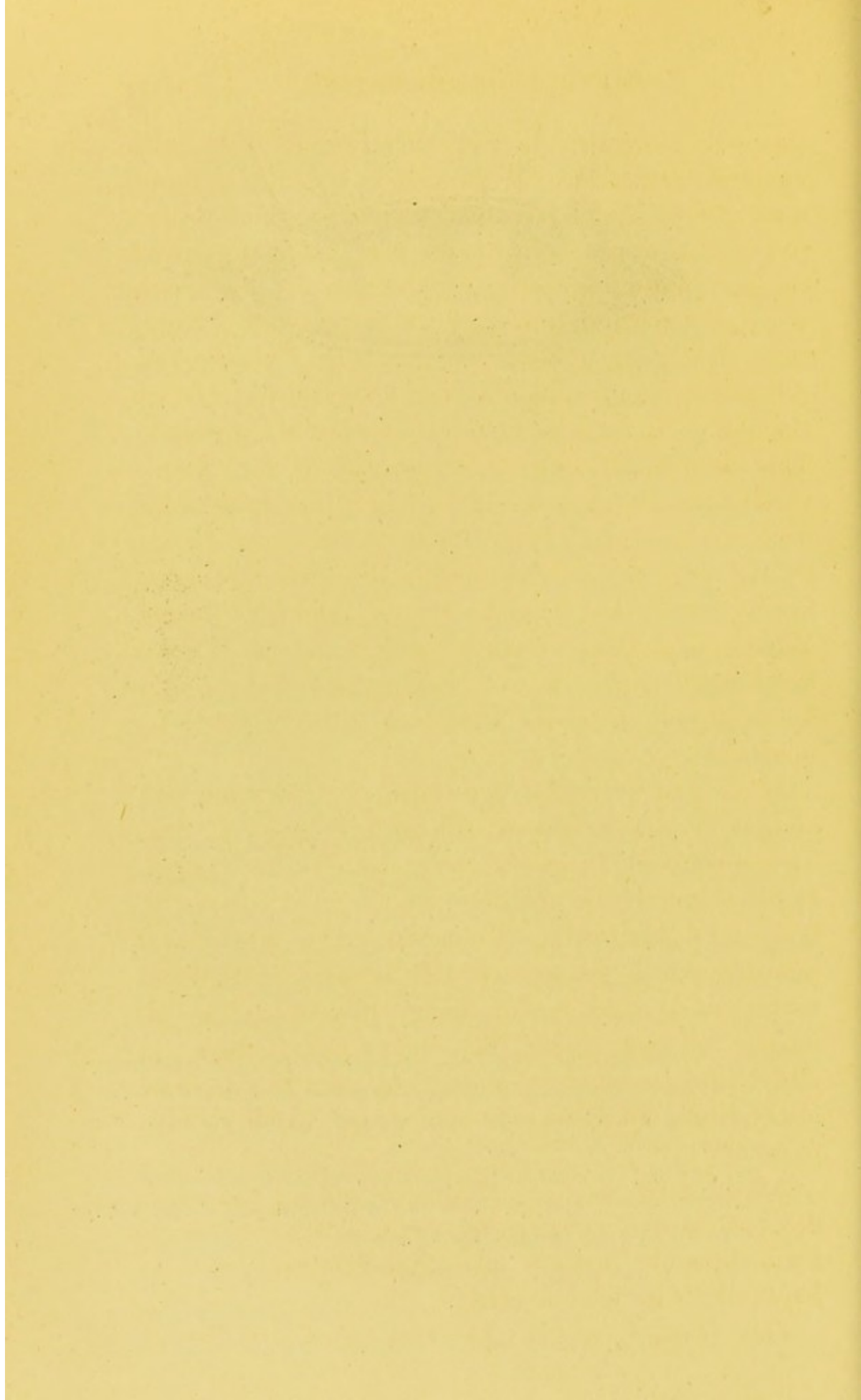


Fig. 11 represents the second stage of the operation for inguinal colotomy. The two silk threads used as guides are seen passed through the external or muscular wall of the bowel, while the four ligatures for fixing the peritoneum to the skin are seen in position.

Fig. 12 shows the position of the bowel when all the ligatures have been passed, but not yet tied up. None of the ligatures pass deeper than through the muscular coat of the bowel.



cleaned; the threads can then be all tied with moderate tightness. If the case is urgent, the bowel may now be opened; if not, a piece of green protective is put over it, a necessary precaution to prevent the granulations adhering to the gauze. The whole is covered with an antiseptic dressing, an additional thick pad being placed over the site of the wound. A broad flannel bandage is then wound firmly around the abdomen, so as to insure considerable pressure. This is a most important precaution, for, should vomiting occur, the bowel is likely to burst away from the stitches. I also insist on the nurse sitting by the patient, with directions to press her hand firmly over the wound should sickness occur. When the patient becomes sensible, he can do this for himself. The wound is best dressed on the following day, to make sure that nothing has been misplaced.

If all goes well the dressings may be reapplied, and the bowel not opened till the fifth or sixth day. The bowel being insensible, no anæsthetic is required. It will usually be found covered with a layer of lymph of surprising thickness. The provisional ligatures which have been left in will be found a useful guide, the bowel being opened to the full length between them. The superfluous flaps on either side are trimmed off with scissors to the level of the skin. In doing this one or two vessels require to be tied.

All ligatures may be safely removed by the ninth day, or earlier if there is redness around them. Firm pressure with a pad and bandage will be required for some time later.

The question as to the date when the bowel

should be opened is an important one. In urgent cases, as already mentioned, I should not hesitate to open it at once. On the other hand, if there is no vomiting or constitutional symptoms, it may be advantageously left to the sixth day. The patient, however, requires to be very carefully watched. If the abdomen becomes distended with wind, if pain is felt, or, above all, should vomiting come on, the bowel should be immediately opened. The unfortunate result in Case 27 was, I believe, chiefly due to neglect of this precaution, for, had I opened the bowel when vomiting first commenced, and removed the scybalous mass obstructing it, I believe the result would have been different.

The wound varies much in different cases in its way of healing. In no inconsiderable proportion the union takes place between the skin and the bowel by first intention. In other instances, after a few days, the bowel, together with the parietal peritoneum to which it has become adherent, falls away from the skin, and sinks below the level of the muscular parietes.

This want of primary union depends on two causes, the one being due to the stitches being too numerous and too tight, so that the skin is too much strangulated, the other to the too early opening of the bowel. With reference to this last, it is interesting to observe the effect that antiseptic protection has on the effused lymph. This is thrown out in a considerable quantity, and quickly covers the exposed bowel and edges of the wound with a thick layer. So long as this is aseptic there is no sign of redness or inflammation at the line of junction, and,

FIG. 13.



FIG. 14.



FIG. 15.

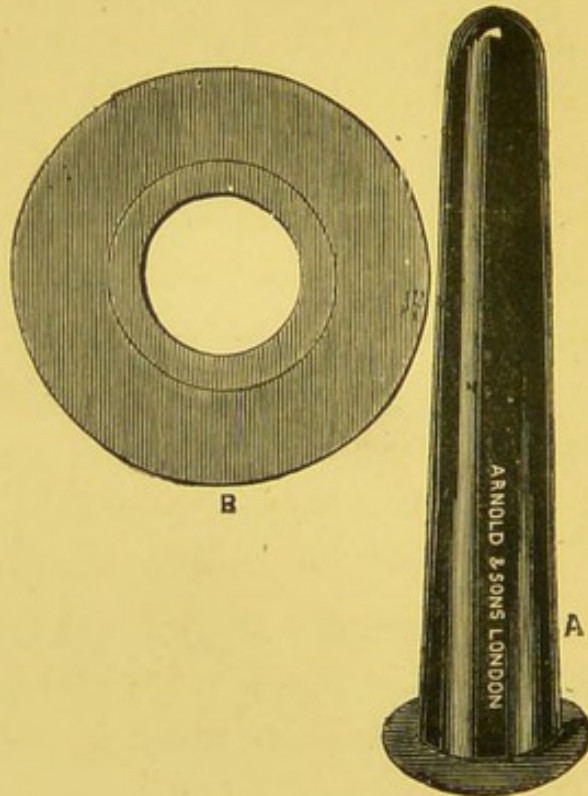


FIG. 16.

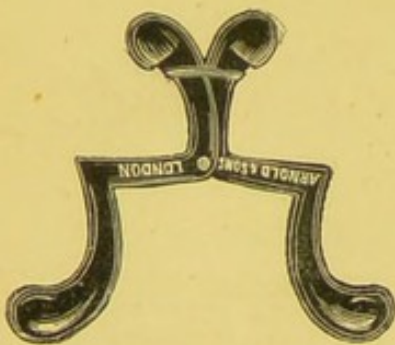


FIG. 13. Cripps's double bougie ($\frac{1}{3}$ actual size).

FIG. 14. Olivary headed sound for measuring strictures ($\frac{1}{3}$ actual size).

FIG. 15. Cripps's conical bougie ($\frac{1}{3}$ actual size).

FIG. 16. Cripps's colotomy dilator ($\frac{1}{3}$ actual size). The lower arms fit into the colotomy opening and from their curve are self-retaining. An india-rubber band round the upper arms causes a constant pressure to be exercised on the opening.

in a few days, it will have so far developed as to effect a permanent union between the bowel and the skin. On the other hand, when an early opening of the bowel necessitates the abandonment of the antiseptic treatment, the lymph already formed melts away, a red line appears at the margin of the skin, and primary union frequently fails.

In some of my cases, in which the wound ultimately healed by granulation, there was considerable contraction. This commences about the fourth week, and, if untreated, in the course of a few weeks so narrows the opening as scarcely to admit the finger. The narrowing is doubtless due to the contraction of the new fibrous tissue formed from the granulations. It is, difficult, however, to explain why, in some cases, although the wound healed by granulation, there was no subsequent contraction.

The contraction is a troublesome complication, but, if dealt with early, can be effectually remedied. So soon as this tendency to undue narrowing is observed, a little spring dilator of the pattern shown (Fig. 16) should be employed. It is self-retaining, and can be introduced for four or five hours daily, and will by its elastic pressure keep the opening well dilated till such time as the tendency to contraction ceases.

Often no motion will pass through the new opening for several days. Should no motion have appeared by the eighth day after opening the bowel, a teaspoonful of castor-oil should be given.

The subsequent inconvenience arising from the colotomy opening varies in different cases. If the opening be too small, or allowed unduly to contract,

the advantages of the operation are in a great measure lost, and constant dribbling occurs from the wound. If, however, care be taken to make and maintain the opening of sufficient size, the motion generally passes once a day, and there is a fair amount of control over the new anus.

Different varieties of trusses have been devised for covering the opening, but I doubt whether anything answers better than a pad and flannel bandage. A piece of lint three inches square, smeared with simple ointment, should be placed over the opening. Above this a small pad of boracic wool, or one of Gamgee's sponges, may be applied, the whole being covered with a large flat pad of cotton-wool, protected with gutta-percha tissue. The pads may be kept in position by a few turns of a wide flannel bandage, using a perineal strap if necessary.

After colotomy a small amount of fæces will pass by the anus. This is only what has previously collected between the colotomy opening and the stricture. In many cases there is no discharge from the anus after colotomy; in others there is a certain amount. This discharge arises from the surface of the cancer. If it is troublesome, the bowel should be washed out daily with a little warm Condy lotion, or with boracic acid: a teaspoonful to the pint.

Linear Proctotomy and Scraping away the Growth.—It has been suggested by Kelsey, in one of his able papers,¹ that instead of colotomy a free posterior proctotomy, so as to divide the strictured bowel,

¹ New York Med. Journ., June 1880.

might be performed. In rare cases, when the obstruction is close to the anus, the operation might be right; and in the single case¹ in which I have seen it performed some temporary benefit followed. But should the disease be at the usual height the difficulty of dealing with any hæmorrhage from the rotten tissue would be an element of considerable danger, while the relief could only be but temporary.

In one case,² in which the disease close to the anus grew into a large cauliflower mass, which threatened completely to occlude the bowel, I thoroughly scooped away all the soft growth with a blunt spoon down to its hard base. This was very easily accomplished under chloroform without much bleeding, and the result for a time was highly beneficial to the patient, enabling the motions to pass with ease.

¹ Lucas Ward Register, vol. viii. p. 300.

² Jacksonian Essay, p. 187.

CHAPTER VIII.

PALLIATIVE TREATMENT.

IF excision be impracticable, and a colotomy unadvisable or declined, something may yet be done to relieve the patient's condition. The diet requires careful attention, and should be of a nourishing description, and taken as far as possible in a concentrated form in order to diminish the amount of fæcal material. If the bowel be very irritable, I have seen much temporary benefit follow a pure milk diet. Mutton- and chicken-broth generally agree better with the patient than beef-tea, while Valentine's meat-juice, well diluted, may be employed with advantage.

So far as medicines are concerned, I know of none that have the slightest direct effect upon this disease.

Chian turpentine I have given a thorough trial, but am sorry to say that in my hands it has not proved of the slightest service. If it agrees with the patient, a dessert-spoonful of cod-liver oil three times daily I have fancied retards the emaciation, while it certainly renders the motions easier. With patients who cannot take the oil, some light mineral acid tonic may be prescribed, such as the nitro-hydrochloric acid (mx) with a little tincture and syrup of orange-peel twice daily.

Purgative medicines must be avoided, for they may set up a violent diarrhœa difficult to control; while if administered for symptoms of obstruction, they are positively dangerous. I have seen at least one death after colotomy which was chiefly due to violent purging setting in after operation, caused by the large doses of medicine previously administered.

There is no objection to the patient taking, if necessary, some mild laxative, such as a small quantity of Friedrichshall water, or a small dose of liquorice powder; but the constipation is most commonly mechanical and due to a difficulty in passing motions through a narrow gut, and should therefore be treated by careful oil-and-water injections.

Wind, often a troublesome symptom, may be relieved by charcoal or by bismuth and turpentine. Of the former, a teaspoonful spread on bread-and-butter may be tried two or three times a day; while the latter may be prescribed thus:

Olei terebinthinæ, ℥xv
Liq. bismuthi, ʒss
Mucilag. acaciæ, ʒij
Aquæ carui, ʒj

two or three times daily.

If the nights are restless, a single dose of opium, varying from ten to twenty drops of liquor opii sedativi, is valuable, but I have the greatest dislike to the frequent administration of opium both day and night in increasing doses. The craving for the drug becomes such that the patient will magnify his sufferings to any extent in order to obtain a frequent dose.

The mental depression and utter demoralization thus produced causes far more misery to the patient and distress to the friends than the physical suffering it is supposed to relieve. Employed in an indiscriminate manner, I consider opium as one of the greatest curses to which suffering humanity can be subjected.

Patients in a position to do so should be encouraged to take a fair amount of exercise, unless they notice that such a course clearly aggravates the symptoms. The venous circulation being so much assisted by movement in the surrounding parts probably explains why pain and discomfort is often less after a day of moderate exercise than one in which the patient has lain completely at rest. If, however, the disease implicates or protrudes from the anus, exercise can scarcely be borne from the irritation it produces.

Local Treatment. — This is important. The parts must be kept scrupulously clean, great care being taken to prevent the collection of acrid discharges about the anus. The part should be frequently washed with soap and water, and thoroughly dried with a soft towel.

If there be any fungoid projections, they can be kept dry and comparatively sweet by being dusted over with a mixture of boracic acid and iodoform powder, in the proportion of three parts of the former to one of the latter. A small pad of absorbent cotton-wool kept in position by a T-bandage prevents the linen from being soiled.

The diarrhœa and tenesmus, so troublesome a symptom in the later stages, are often due to the

retention of faecal material above the disease, its presence producing congestion and irritability of the ulcerated part. In these cases great comfort and relief follows the use of a good oil-and-water enemata every night ; it clears the bowel above the disease and thus removes a potent source of irritation. To be of use this must be done very thoroughly. I often find, unless special instructions be given, that the injection is merely passed into the anus, dilating the rectum below the disease without removing the matter above. To be effective, a Higginson syringe should be attached to the half of a No. 12 soft catheter, with an eye near the point. The catheter should then be gently passed up the bowel beyond the disease. After the bowel has been cleaned in this way, an injection to be retained of an ounce of warm thin starch, to which twenty drops of liquor opii sedativi have been added, is very soothing. This must be injected through a soft catheter by a little india-rubber syringe made to hold the necessary amount.

CHAPTER IX.

TABLE OF CASES.

TABLE B.

Thirty Cases of Excision of the Rectum by HARRISON CRIPPS.

No.	Date.	Name.	Age.	Sex.	Place or Medical Attendant.	Amount removed.	Result.
1	...	...	...	...	{ Details already published. }	...	Recovered.
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12	1885. Feb.	J. L.	27	F.	St. Bart.'s.	2½ inches.	Recovered.
13	Feb.	S. H.	68	M.	St. Bart.'s.	3 inches.	Recovered.
14	June.	R.	46	F.	Sir Andrew Clark.	3 inches.	Recovered.
15	Aug.	R.	54	M.	H. C.	3½ inches.	Recovered.
16	July.	L. R.	61	M.	St. Bart.'s.	3 inches.	Recovered.
17	Aug.	J. H.	63	M.	St. Bart.'s.	3 inches.	Recovered.
18	Oct.	T. P.	50	F.	St. Bart.'s.	2½ inches.	Recovered.
19	1886. Jan.	W.	40	F.	Dr. Smith.	Portion at 4 inches.	Recovered.
20	Nov. 1887.	J.	69	M.	Dr. Hastings.	3 inches.	Recovered.
21	April.	S. S.	63	F.	St. Bart.'s.	3 inches.	Recovered.
22	April.	E. C.	59	F.	St. Bart.'s.	3½ inches.	Died.
23	May.	R.	50	F.	Dr. Whitla.	4 inches.	Recovered.
24	Oct.	A. S.	39	F.	St. Bart.'s.	4 inches.	Recovered.
25	Oct. 1888.	S. P.	38	F.	St. Bart.'s.	4 inches.	Recovered.
26	Jan.	P.	41	M.	Dr. Fletcher.	3 inches.	Recovered.
27	April.	J.	76	M.	Dr. Pearson.	2 inches.	Died.
28	June.	E. C.	62	M.	St. Bart.'s.	3½ inches.	Recovered.
29	July. 1889.	T.	54	M.	Dr. Scott.	4 inches.	Recovered.
30	May.	E. C.	49	M.	St. Bart.'s.	3 inches.	Recovered.

TABLE C.

Forty-one Consecutive Cases of Colotomy for Cancer by HARRISON CRIPPS.

No.	Date.	Name.	Age.	Sex.	Place.	When Opened.	Part Presenting.	Operation.	Remarks.	Result.
1	1885. Feb.	S.	70	M.	Private (Dr. Stokes).	At once.	...	Lumbar.	The opening acted very satisfactorily, and the patient had no trouble with his bowel till the time of his death.	Recovered.
2	March 28.	J. W.	48	F.	St. Bart.'s.	"	...	Lumbar.	Bowel only found after inflation.	Recovered.
3	1886. Feb. 8.	M. H.	50	F.	St. Bart.'s.	"	...	Lumbar.	Lived just two years after the operation. This patient was shown at the Clinical Society, and had perfect control over the artificial opening.	Recovered.
4	Feb.	H.	35	M.	Private (Dr. Swindell).	"	...	Lumbar.	So much contraction followed the operation that much of its benefit was lost.	Recovered.

No.	Date.	Name.	Age.	Sex.	Place.	When Opened.	Part Presenting.	Operation.	Remarks.	Result.
5	June.	G.	59	M.	Private (Dr. Foreman).	At once.	...	Lumbar.	Artificial opening acted well until death eight months later.	Recovered.
6	July 6.	L. R.	63	F.	St. Bart.'s.	"	...	Lumbar.	Was alive in March 1888. She was very weak, and the artificial anus acted well once a day and gave no trouble.	Recovered.
7	Nov. 8.	C. C.	51	F.	St. Bart.'s.	"	...	Lumbar.	...	Recovered.
8	Dec. 21.	M.	55	F.	Private (Fitzroy Sq.)	"	...	Lumbar.	...	Recovered.
9	1887. Jan. 19.	M.	55	M.	Private (Dr. Wade.)	"	...	Lumbar.	After the operation patient was able to go to business daily without discomfort, the bowel acting well once a day. Died somewhat suddenly in August 1888.	Recovered.
10	March 7.	E. W.	58	M.	St. Bart.'s.	"	...	Lumbar.	...	Recovered.
11	March 10.	T. H.	34	M.	St. Bart.'s.	"	...	Lumbar.	...	Recovered.

12	March.	J.	60	M.	Private (Dr. Hastings).	"	...	Lumbar.	...	Recovered.
13	May.	R.	50	M.	Private (Mr. Cripps).	"	...	Lumbar.	Cancerous communication between bowel and bladder. The patient passed all his motion by the penis, and suffered intensely. He was extremely exhausted from the pain and retention of urine. Operation gave complete relief to the bladder trouble, and wound healed, but the patient died a few weeks later.	Recovered.
14	July 13.	R. K.	—	M.	St. Bart.'s.	"	...	Lumbar.	...	Recovered.
15	Oct. 26.	G. G.	55	M.	St. Bart.'s.	2nd day.	Small Intestine.	Inguinal.	The gut fell back from the skin, the wound ultimately uniting by granulation.	Recovered.
16	Dec. 8.	P. W.	47	F.	St. Bart.'s.	3rd.	Large Intestine.	Inguinal.	Opening made rather too small.	Recovered.
17	1888. Jan. 12.	O. N.	50	F.	Private (Dr. Godson).	6th.	Small Intestine and Omentum.	Inguinal.	Healed by first intention. Spring dilator used for a while.	Recovered.

No.	Date.	Name.	Age.	Sex.	Place.	When Opened	Part Presenting.	Operation.	Remarks.	Result.
18	Jan. 16.	J. M.	43	M.	St. Bart.'s.	3rd day.	Omentum.	Inguinal.	Most of the wound healed by first intention.	Recovered.
19	Jan. 30.	H. C.	43	F.	St. Bart.'s.	3rd.	Large Intestine.	Inguinal.	Healed by first intention. Dilator used for a while.	Recovered.
20	Jan. 31.	T.	65	M.	Private (Dr. Lawrie).	6th.	Small Intestine.	Inguinal.	Healed by first intention.	Recovered.
21	Feb. 20.	L. F.	50	F.	St. Bart.'s.	5th.	Small Intestine.	Inguinal.	Healed by first intention. Urine albuminous.	Recovered.
22	March 19.	G. A.	50	M.	St. Bart.'s.	6th.	Small Intestine.	Inguinal.	Large scybalous masses distended the bowel, and had to be pressed downwards before stitching the bowel to the skin.	Recovered.
23	March.	C. S.	64	M.	St. Bart.'s.	6th.	Large Intestine.	Inguinal.	Patient had severe bron- chitis, but ultimately convalesced without trouble.	Recovered.
24	May 7.	W. M.	52	M.	St. Bart.'s.	6th.	Small Intestine.	Inguinal.	Only partly healed by first intention. Had some tendency to con- traction.	Recovered.

25	May 14.	O. P.	56	M.	St. Bart.'s.	6th.	Small Intestine.	Inguinal.	Great difficulty in finding the colon. Small intestine completely occupied the left side of the abdomen. After a long search a portion of large intestine was at last found by pressing two fingers far into the wound while the viscera was pressed over from the right. The wound healed by granulation.	Recovered.
26	July 2.	W. L.	30	M.	St. Bart.'s.	4th.	Large Intestine.	Inguinal.	Communication between bladder and sigmoid flexure. The operation was completely successful in preventing any more feces passing into the bladder.	Recovered.
27	June 28.	M. B.	58(?)	F.	St. Bart.'s.	4th.	Mesentery.	Inguinal.	Patient very feeble. Vomiting day after operation. A scybulous mass found blocking the gut. Vomiting recurred the 4th day. Bowel immediately opened. 3 days later entire bowel had dropped back into abdominal cavity. Abdomen thoroughly washed out, and bowel re-attached. Death 8 hours later.	Died.

No.	Date.	Name.	Age.	Sex.	Place.	When Opened.	Part Presenting.	Operation.	Remarks.	Result.
28	July 2.	D.	43	F.	Private (Dr. Gillibrand).	6th day.	Large Intestine.	Inguinal.	...	Recovered.
29	Aug. 10.	J. S.	32	M.	St. Bart.'s.	5th.	Large Intestine.	Inguinal.	...	Recovered.
30	Sept. 17.	F. P.	30	F.	St. Bart.'s.	At once.	Large Intestine.	Inguinal.	Obstruction complete. Constant fecal vomiting. Patient in a most serious condition. Colon, after being accurately stitched to the skin, was at once opened, giving vent to an enormous amount of feculent matter. She recovered without drawback, but subsequently there was much tendency to contraction.	Recovered.
31	Oct. 1.	S. B.	32	F.	St. Bart.'s.	2nd day.	Mesentery.	Inguinal.	On account of distension the bowel was opened the next day. The wound did not heal by first intention, and there was again some tendency to contraction, which was remedied by the spring dilator.	Recovered.

32	Nov. 5.	A. S.	54	F.	St. Bart.'s.	5th.	Omentum.	Inguinal.	...	Recovered.
33	Nov. 7.	R.	18	M.	Private (Dr. Hastings).	3rd.	Small Intestine.	Inguinal.	Obstruction nearly complete. From the early opening the wound failed to unite entirely by first intention. As the granulations cicatrized there was a tendency to contraction, which the dilator would soon have remedied. The relatives, being impatient, sought more eminent advice, and, beyond being informed that our operation had failed, and a second performed, we obtained no further information.	Recovered.
34	1889. Feb. 22.	T.	54	M.	Private (Dr. Scott).	6th.	Large Intestine.	Inguinal.	...	Recovered.
35	Feb. 27.	E. C.	62	M.	St. Bart.'s.	2nd.	Mesentery.	Inguinal.	...	Recovered.
36	April 4.	M. J.	45	F.	Private (Dr. Patt).	2nd.	Small Intestine.	Inguinal.	...	Recovered.
37	June 11.	M. S.	50	F.	Private (Dr. Hastings).	2nd.	Small Intestine.	Inguinal.	...	Recovered.

No.	Date.	Name.	Age.	Sex.	Place.	When Opened.	Part Presenting.	Operation.	Remarks.	Result.
38	June.	...	...	M.	St. Bart.'s.	3rd day.	Large Intestine.	Inguinal.	Nature of disease doubtful.	Recovered.
39	June 20.	A. T.	52	F.	Private (Dr. Hutson).	3rd.	Large Intestine.	Inguinal.	Intestine fell back on 5th day. Faeces extensively extravasated into the peritoneal cavity. Washed out thoroughly and bowel re-stitched to the wound, the drainage-tube being used. Recovery without a bad symptom.	Recovered.
40	July.	M. D.	60	F.	Private (Dr. Delacour).	5th.	Small Intestine.	Inguinal.	...	Recovered.
41	August.	G.	65	F.	Private (Mr. Lawrence).	5th.	Omentum.	Inguinal.	...	Recovered.

CHAPTER X.

SELECTED ILLUSTRATIVE CASES OF CANCER.

It would occupy too much space to record in detail the whole of the cases for which I have operated, either by excision or colotomy, all of which will be found referred to, with dates and reference, in the foregoing tables. I will, however, give the details of a few selected cases so as to draw a more realistic picture of the course of the disease than can be afforded by the abstract symptoms described in an earlier portion of this work.

M. M., aged sixty-one, being kindly sent to me by my friend Mr. Doran, was admitted under my care at the Great Northern Hospital in April 1878. She was very thin and emaciated, and for some time had been unable to follow her occupation as a laundress. For more than a year she had suffered discomfort in the rectum, and had lost blood from time to time, a muco-purulent discharge being persistent. During the last few months the pain had greatly increased, her nights were sleepless, and she was tormented with a constant desire to go to stool. She suffered from alternate attacks of diarrhoea and constipation, and could not retain her fæces when liquid. On examination with the finger, commencing just within the anus and extending upwards

a couple of inches, an ulcerated mass of cancer was felt. This did not completely surround the bowel, a small portion of the anterior wall being free. The operation was performed in the manner already described. The patient made a quick recovery, leaving the hospital in five weeks, free from all pain, with some control over her motions, and her general health greatly improved. She subsequently came to my out-patient room once in every fortnight, on which occasions the bowel was carefully examined. All seemed well for the first three months. She then complained of a slight irritation of the part. Upon examination, at a spot on the strip of the mucous membrane that had been left, the membrane looked rather more vascular than normal, and seemed to be slightly raised above the surrounding level. Incautiously, something was said about a further operation being necessary, and the patient, a nervous woman, ceased to attend for six weeks. She then attended again, frightened by passing blood with her motions. I found at the spot that had previously looked suspicious a beautifully round papillary growth, about the size of a large pea. It projected into the rectal cavity and felt soft, but, when taken between the finger and the thumb, could be felt to have somewhat of a hard base. The little growth, including its base, was seized by a pair of vulsellum forceps, drawn down, and cut off with scissors. The wound healed quickly. The patient remained perfectly well for fourteen months; at that time she felt no pain, but her attention was again drawn to the part by a little blood in her motions. I found that the

blood proceeded from a minute speck of red granulation-looking material, certainly not larger than a millet-seed, which projected through a tiny hole in the cicatrix that was left by the second operation. By placing the thumb in the vagina and the forefinger in the rectum, a little tumour, less than a quarter of an inch in diameter, could be distinctly felt in the recto-vaginal septum. The mucous membrane of the vagina was freely movable over the nodule, which was firmly connected with the cicatrix on the rectal surface. This tumour was removed, and the woman called at my house every six months during the next three years. I examined her carefully on each occasion. There was no sign of any further recurrence. She gained flesh, had no pain, and had perfect control over her motions, except when fluid. The only trouble she complained of was occasionally some prolapse of the bowel. Upon my last seeing the patient, about four years after the operation, she promised to call and see me if at any time she had further symptoms.

A. G., aged fifty-four, a small emaciated woman, with a dark complexion, was admitted into the Royal Free Hospital, November 7, 1878. She had six children living, in good health, and has lost none. The father and mother died at advanced ages; there was no family history of tumours or phthisis. The patient had good health until two years ago, but has always been subject to constipation, for which she has taken castor oil in considerable quantities. Two years ago she began to suffer from pain and a feeling of weight in the rectum. Eighteen months ago she first noticed a discharge of blood and mucus

from the bowel. During the past year she had lost flesh rapidly, having formerly been very stout. She had been for some months in a London hospital, but obtained no relief. Her sufferings were very great; she had lost control over the sphincter, the fæces escaping without her knowledge. Upon examination, the parts were found to be very tender, with a growth extending almost to the margin of the anus, about which the skin was œdematous and excoriated. A considerable mass of disease occupied the lower three inches of the bowel, taking the form of a large irregular ulceration with a hard base and fungating margins. At one point the disease extended somewhat higher than three inches. The recto-vaginal septum was implicated, but the mucous membrane on the vaginal aspect appeared sound.

Considering the length of time that the disease had existed, and the extent to which it had encroached on the anterior wall of the rectum, it did not seem a very favourable case for operation. The patient, however, was exceedingly anxious to have an attempt made to remove it, having been recommended to consult me for that purpose by my friend Mr. Macready. The operation was performed in the usual manner. There was no difficulty in detaching the bowel from its posterior and lateral connections, but it required some time and caution to dissect through the recto-vaginal septum; this was done by keeping as near as possible to the mucous lining of the vagina; but even at the time there appeared a suspicion that the disease at this part had not been thoroughly removed. Whilst detaching the upper anterior part of the rectum, the peritoneal membrane

was distinctly seen. The diseased bowel being brought down, was cut with a wire *écraseur* a little more than three inches from the anus. Upon detaching the portion, a small coil of intestine was seen in the upper part of the wound, but it was not known at what period of the operation the peritoneal membrane had been opened. The knuckle of bowel was gently pressed up by the finger, and disappeared. The wound was treated in the ordinary way, without any dressing or sutures, and kept thoroughly free from all discharge by frequent syringing with warm carbolic lotion.

The patient never had a symptom of peritonitis, recovered quickly, and left the hospital at the end of the month free from all pain, and much stronger and more comfortable than she had been for a long time; she had no pain on passing her motions, over which she had a fair amount of control. She appeared well and comfortable for three months; she then complained of some irritation about the part, and upon examination a soft fungating nodule could be felt springing from the anterior wall of the rectum. She suffered little pain. A month later the disease had greatly increased, forming a considerable fungoid mass, blocking up the lower end of the rectum, causing some difficulty in passing her motions. It did not seem advisable to make any further attempt by a cutting operation; but, acting as other surgeons have done in these circumstances, as far as I could with the finger-nail and a blunt gouge, I scraped away the cauliflower growth down to its hard base. There was not much bleeding during this proceeding, and it gave her great relief,

and she was enabled to pass her motions with comparative ease. The growth rapidly returned, the patient dying a few months later.

Miss D., a single lady, aged forty, living partly in London and partly in the country, had always enjoyed good health until towards the end of 1879. She then for the first time noticed a slight amount of blood in the motions, and suffered considerable pain at times. She was treated for some time as suffering from piles, but grew worse, the pain increasing, and there was a profuse discharge of matter. In July 1880 she consulted Dr. Matthews Duncan, who, recognizing the nature of her illness, kindly advised her to consult me.

At this time she had lost flesh considerably, and had a sallow complexion. The pain had become much worse lately, and she was tormented with a frequent desire to pass a motion, which generally resulted in some blood-stained discharge. Upon examination, the anus outside appeared normal, but a hardness could be felt in the left ischio-rectal fossa, and pressure on this spot was painful.

By drawing the sides of the anus apart, a small portion of growth could be seen protruding from the bowel on the left side. Upon introducing the finger into the anus, there was found to be a hard mass occupying the left side of the rectum, and apparently filling the ischio-rectal fossa.

On the surface of the tumour, towards the rectum, was a deep crater-like depression; the growth at the margin of the depression was somewhat raised above the mucous membrane. The upper border of the growth was two and a half inches from the anus, and

it occupied about one half the circumference of the bowel.

July 28, 1880.—The patient being put in the lithotomy position, and ether being administered by Mr. Mills, with the assistance of Mr. Butlin I performed the following operation. I divided the bowel back to the coccyx, keeping a little to the right of the middle line. I then made a semicircular incision, just at the junction of the mucous membrane with the skin round the left side, to half an inch beyond the middle line of the anterior surface of the bowel. As usual in these cases, the separation of the bowel and tumour from the ischio-rectal fossa was easily accomplished by the finger assisted by a few snips with the scissors. Careful dissection was required to separate the anterior surface of the bowel from the posterior wall of the vagina. After carrying this dissection well across the middle line, I divided the bowel with scissors by a longitudinal incision three inches in length. By this means a portion of the rectum involving two-thirds of its circumference, in which was included the morbid growth, was isolated from all its connections, forming a flap connected only by its upper border. The mass was then forcibly drawn downwards, a loop of a wire *écraseur* passed over it, and the section of the upper border cut through by this means at a height of three inches. The portion thus removed was rectangular in shape, three inches long. When spread out, there was from a quarter to half an inch of the healthy mucous membrane all round the growth. The disease itself had extended into the ischio-rectal fossa to the depth of three-fourths of an inch. The growth towards the

bowel was deeply ulcerated in the centre. At the margins the growth appeared to be insinuating itself between the muscular and mucous coats, lifting up the latter, so as to form a ring-like elevation. From the lower border were two fungating masses. Beneath the microscope the specimen proved to be a beautiful example of adenoid cancer. The patient convalesced without a single bad symptom, her only trouble being her inability to pass water for ten days. By August 18 she was sufficiently convalescent to go to Bournemouth, but had only slight control over the motions.

The following notes complete the case :—

Oct. 30, 1880.—The wound has perfectly healed, and she has little or no trouble as regards retention. There is no sign of any return of the disease, but there is a tendency to contraction of the anal orifice. She was at once advised to pass a full-sized bougie daily.

April 1882.—I examined the patient, and there was no sign of any return of the disease. The part all feels perfectly supple and normal, and there is scarcely any contraction, and she feels perfectly strong and well, and has become quite stout.

Sept. 26, 1883, I received the following letter (three years after the operation) :—

“MY DEAR SIR,—I am very thankful to say, in reply to your inquiry, that I am still perfectly free from any appearance of disease. There is no pain whatever in any part, and no weakness. Indeed, nothing at all that I could in any way complain of. The contraction is not sufficient to necessitate the

use of the instrument you furnished me with, and I have discontinued its use for nearly a twelvemonth. My general health is as good as ever."

May 1889.—The patient is still in perfect health, and the bowel gives no trouble at all.

M. H., a woman aged about fifty, was kindly placed under my care at the hospital by Dr. Griffith. I am indebted for the following notes to Mr. Balgarnie, her dresser.

The woman was admitted on Dec. 15, 1885. She dates her present illness from the spring, when she first noticed pain in the lower part of the back, and soon afterwards pain during defæcation. The character of her motions gradually altered, becoming smaller in size, and at times flattened, and generally tinged with blood. The frequency of her stools increased, at first to three or four times a day, but latterly much more often. She has been getting thinner, and at times has much severe pain, which she describes as like "labour pains."

The patient on admission looked weak and anæmic, with a feeble pulse. She had nearly constant pain, and was much distressed by a troublesome diarrhœa, having to go to stool as often as ten or twelve times in the night. The act of defæcation was very painful, and nearly always attended by loss of blood. On examination, the anus appeared healthy, and on introducing the finger the mucous membrane for about three inches felt smooth and natural. The finger then came in contact with a mass feeling not unlike an enlarged cervix uteri. Around this was a cul-de-sac, deeper posteriorly than anteriorly. The mass itself was hard and nodular. The opening

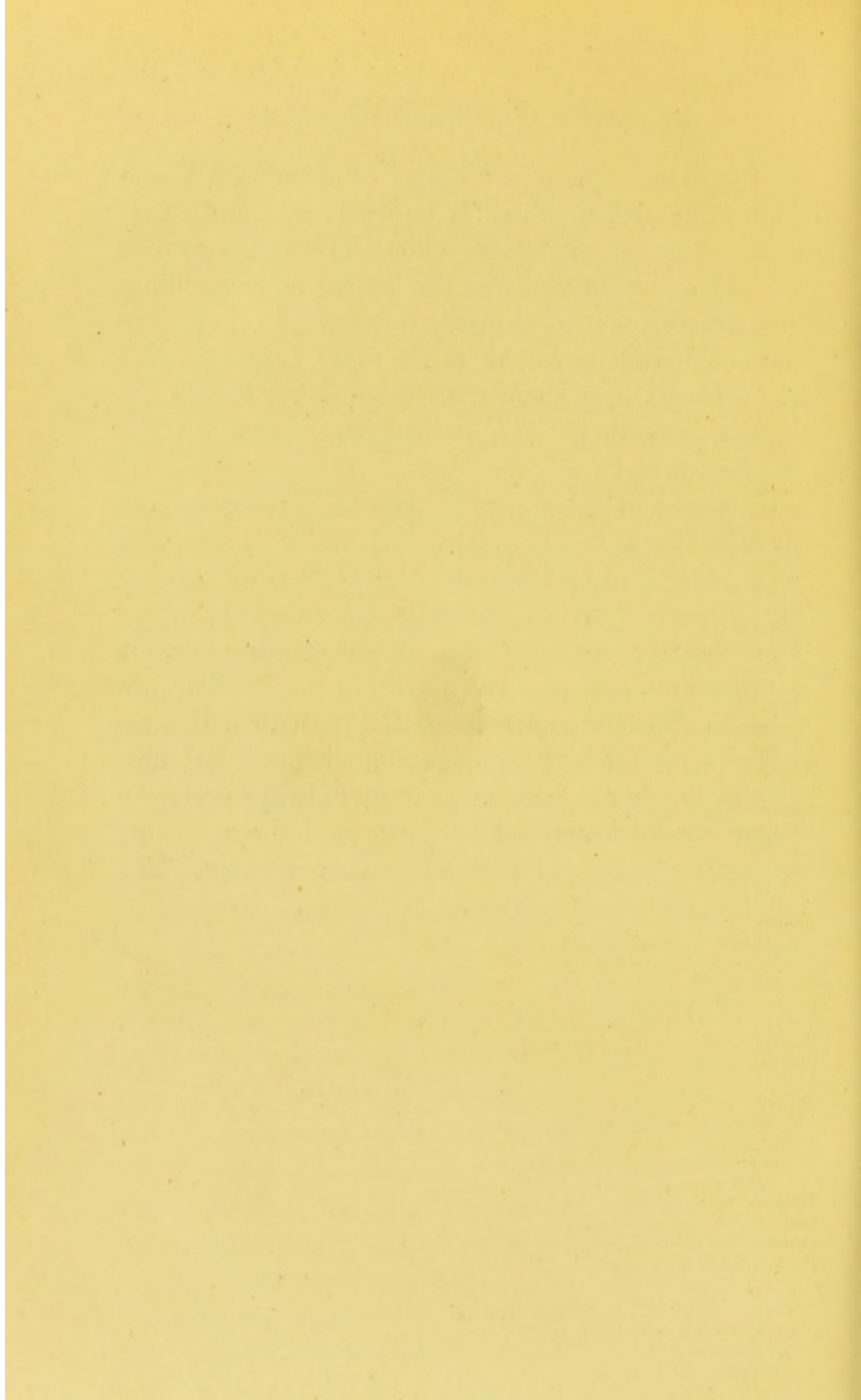
through it would only admit the tip of the finger, and the bowel at the constricted point was firmly fixed to the surrounding structures.

The patient, not wishing then to stay in the hospital, left, but was re-admitted on Feb. 1. She had become weaker, and her symptoms had increased since her discharge. The mass also had grown considerably, and could now be felt to be within an inch and a half of the anus. On Feb. 8, 1886, the case being considered unsuitable for excision, I performed lumbar colotomy. The various layers between the skin and the lumbar fascia were purposely not divided on quite the same level, and the opening in the fascia was considerably above that in the skin, so that the bowel when drawn out ran obliquely for a short distance between the skin and the fascia. The wound united by first intention. No motion passed through it for a week. During the next six weeks a certain amount of fæces passed through the rectum as well as through the wound. This gradually ceased, and when she was discharged in March everything passed through the artificial anus. She improved very much whilst in the hospital, and was comparatively free from pain.

April 1887.—The patient is not only alive, but wonderfully improved; and, notwithstanding that the local growth has made some advance, her general health and strength is far better than it was a year ago. She is no longer troubled with diarrhoea, but has one good motion daily through the artificial anus, and she has been able to attend as usual during the year to her domestic duties. The artificial anus readily admits the forefinger, and the mucous membrane is exactly on the level

of the skin. There is no sign of cicatricial tissue round the orifice, which is perfectly soft and dilat-able. The patient knows when she is going to pass a motion, which she has the power of controlling, there being no involuntary escape. In fact, the patient herself says she is no more troubled with the artificial anus than when the opening was in the natural situation. The patient was shown at the Medical Society.

I regard it as a great advantage to make the opening through the abdominal walls as valvular as possible, and this is best accomplished by making the incision through the skin considerably lower than that through the fascia. If the opening is made in this way, and care taken during the healing process to prevent contraction, the patient will have little or no difficulty in managing the artificial anus. In the foregoing case the part was always perfectly clean, she had one motion daily, and she was able to do her household work without annoyance. The patient lived for two years.



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