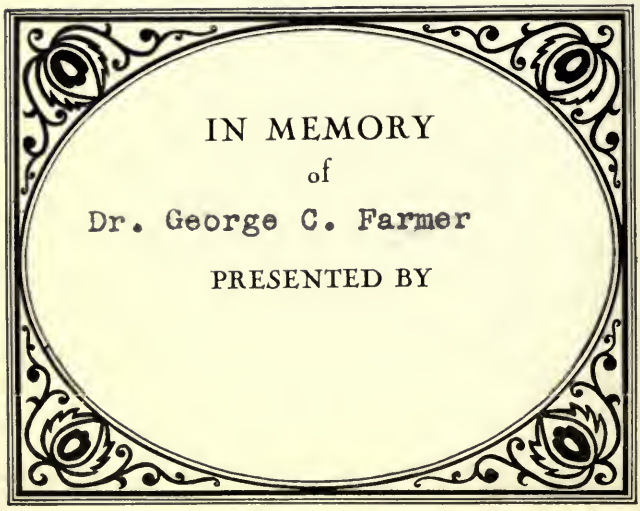
THE PHYSICAL EXPLORATION OF THE RECTUM.

BODENHAMER.


IN MEMORY
of
Dr. George C. Farmer
PRESENTED BY

THE

PHYSICAL EXPLORATION

OF THE

RECTUM:

WITH AN APPENDIX ON THE

LIGATION OF HÆMORRHOIDAL TUMORS.

BY

WILLIAM BODENHAMER, A.M., M.D.

"The accuracy of our diagnosis is in direct relation to the thoroughness of physical exploration."—Prof. G. T. Elliot, Jr.

ILLUSTRATED BY NUMEROUS DRAWINGS.

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PREFACE.

THERE are but few minor operations of surgery that require more knowledge, experience and tact, in order to be enabled to perform them efficiently and satisfactorily, than the physical exploration of the rectum, including the sigmoid flexure of the colon. The natural obstructions in the way of such an examination, in these portions of the intestinal canal, are many, and others, still more numerous, may be found from disease and other circumstances. These various difficulties can only be successfully met and overcome by a complete knowledge of the anatomy of the parts, both natural and morbid, and by the adroit employment of suitable instruments.

Inasmuch as the general treatises upon surgery, as well as the most modern writers on the diseases of the rectum, are almost wholly silent upon this important point in the diagnosis of rectal diseases, the author conceives that it will not be out of place to indicate the rules which he follows in exploring this portion of the intestinal canal, and to give different methods of performing that operation.

A correct understanding of the manner of introducing the sound, bougie or tube into the rectum, or into the sigmoid flexure of the colon, is often as important to the safety of the patient as is the passage of the catheter into the bladder; yet, as before observed, it is scarcely ever mentioned by authors, and is certainly not included in the catalogue of surgical operations. Therefore, taking into consideration the anatomical relations of the parts concerned, the construction of instruments especially adapted to the purpose, and the various obstacles which may obstruct their passage, together with the necessary measures of overcoming them, it is obvious that the subject demands a more thorough examination than has yet been bestowed upon it. This would appear to be the more particularly called for at this special juncture of time, when nature, in other departments of the science, is being subjected to so much a severer test of interrogation than has ever before been adopted, and by so much superior and more thorough methods of investigation; and more especially, too, since the scope of medical science is now daily expanding, and an inquisitive public anxiously expecting and impatiently awaiting the establishment and exposition of its unmystified rational practice.

Although the labor in this field of investigation is by no means inviting and pleasant, but rather repulsive and distasteful, yet it must be admitted by all to be highly important and useful, for upon it the life, health, comfort and convenience of so many so much depend. No subject, however, should be considered undignified, or unworthy of anxious attention, which involves such serious consequences, or which has for its object the improvement of the healing art or the extension of our knowledge of nature's operations. No standard is known by which to determine the dignity or the respectability of any branch of medicine, than its capability of saving life and suffering.

The ligation of hæmorrhoidal tumors, the subject of the appendix, although out of place here, should nevertheless attract the reader's attention.

It may seem to some that the descriptions in this work, both anatomical and operative, are too unnecessarily minute in their details; but the author would observe to such, that it is the neglect of minuteness and the fondness for generalization which involve a subject in obscurity. As long as we adhere to facts, we cannot be too microscopical, for facts, however simple, are as essential to refute opinions as they are to establish principles.

Upon some points it will be seen that the author has not hesitated to express opinions more or less at variance with those of surgeons of deservedly high reputation and celebrity. If, however, he has done this in a respectful manner, no just exception can be taken and no apology is necessary.

In conclusion, the author would remark, that while this little *brochure* does not profess to be anything more than an introduction to, or an outline of the subject, it nevertheless does not fail to include the most salient points. He therefore trusts that sufficient has been presented to make it attractive and useful, especially to the student and junior practitioner, to whom, with its many defects, it is most respectfully addressed.

237 Fifth Avenue, New York, *July*, 1870.

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tutes rectal eversion for it. The author points out the difficulties of rectal eversion, and shows that at best it is too limited in extent to dispense with the anal speculum. Rupturing the sphincter ani, as a means of diagnosis, as advised by Prof. Storer. The author is of opinion that no such operation is ever justifiable for such a purpose, inasmuch as the great capacity of the anus and anal canal naturally for dilatation may always be dilated readily, speedily, safely and sufficiently under the influence of anæsthetics or belladonna, without inflicting any injury whatever upon the integrity of the parts. Splanchnoscopy by translucency. Exploration by means of the probe. 19–31

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THE

PHYSICAL EXPLORATION

OF THE

RECTUM.

SECTION I.

INTRODUCTORY REMARKS.

Mr. Lizars, in his "System of Surgery," very correctly observes that,—"*diseases of the rectum are very common, very numerous and important; still, however, they are but little understood.*" Not many years ago, such was the ignorance on the subject of some of those diseases, that a very able writer in the "London Medico-Chirurgical Review" observed that,—"*beyond the treatment of Fistula in Ano and Hæmorrhoids, the surgery of the rectum is a sort of land of the Cimmerians, where quacks alone can breathe, and where humbug darkens the air.*"

But are not the diseases of the rectum just as susceptible as any others of exact observation, of scientific analysis, and of safe, certain and appropriate treatment? Is it indeed impossible for light ever to dawn upon this *region*, said to be darkened by humbug and inhabited alone by quacks?

It may be observed that the ignorance on the subject of the diseases of the rectum, which had so long prevailed, and which to a certain extent still exists, may very justly be attributed to the failure, on the part of practitioners generally, of making a proper exploration of this organ. The rectum heretofore has been a *terra incognita* in the domain of surgery, into which

the practitioner did not care to venture. But this ignorance is now being rapidly dispelled, and this organ is becoming as subservient to the laws of physical exploration as any other. The surgery of the rectum, particularly as it regards its manipulative branch, has made rapid strides since the introduction of anæsthetics. These and the now common use of the speculum ani and rectal endoscope are daily revealing the dark and the hidden mysteries of this darksome passage.

Some of the reasons, however, why an examination of the rectum is so universally omitted are obvious enough. Such an inspection is not a very pleasant affair, either to the patient or to the practitioner, but rather more or less repulsive to both. In females, too, the delicacy of the sex often induces them to conceal their maladies in this region, and throws various obstacles in the way to an inspection of them; yet, if the practitioner consults his own reputation or the welfare of his patient, he will insist on making an examination, especially when positive symptoms are complained of, or when suspicious ones, not otherwise well accounted for, do exist. The surgeon should never prescribe for affections of the rectum and anus without a proper visual and tactile inquiry into their real character. I have often witnessed the folly and the mischief arising from the practice of prescribing for supposed or imaginary complaints, the product of the patient's own judgment or imagination, the real nature of which might have been readily discovered by a proper examination of the parts concerned. Patients most always call their maladies in this locality—*piles;* indeed, all the various affections of the rectum and anus are generally so denominated by them. The surgeon, however, should not copy the errors of his patient in this respect, to believe without evidence or conviction, which, if he does, will assuredly lead him to prescribe for diseases which exist only in the conjoint imagination of both.

It is, doubtless, owing to these several causes that so many patients suffering from these affections have heretofore fallen into the hands of empirical, unprincipled and reckless practitioners, whose deceptions were favored by the locality of the disease, and who were thus encouraged and emboldened to continue to practice their impositions with impunity. Indeed, it may truly be said that the general ignorance which pre-

vailed in the profession with regard to those diseases, and the locality of them, furnished the ignorant pretender with an almost inaccessible asylum. But, as before observed, this ignorance of the subject, and this repugnance to making or submitting to a rectal examination, are now being rapidly dispelled.

From the preceding considerations, it is of the utmost importance, as a general rule, that a careful and minute exploration of the rectum and anus should be made, as a preliminary step to the treatment of the diseases of these organs, the diagnosis of some of which is often so very obscure. This examination, too, should not be long delayed, for, by the neglect of this precaution, an affection which, if timely attended to, would readily yield, is suffered to make progress and to become difficult of cure.

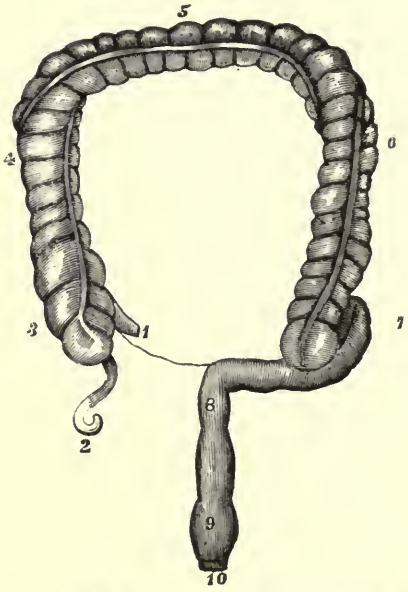
SECTION II.

THE ANATOMY OF THE RECTUM.

1. A knowledge of the anatomy of the rectum is an essential prerequisite to the successful exploration of the same. I will here, however, only give a description of this intestine so far as it relates to its position in the pelvis; its commencement; its termination; its length; its direction; its form; its capacity; its relations; its divisions, and the rugæ or folds of its mucous lining.

That portion of the alimentary canal which has obtained the appellation,—*rectum*, occupies the posterior part of the pelvis, and is continuous with the sigmoid flexure of the colon (Fig. 1).

FIG. 1.



[A view of the Rectum, together with the position and cnrvatnres of the colon. 1. The ileum terminating in the cæcnm. 2. The appendicula vermiformis. 3. The cæcnm. 4. The ascending, or right lumbar colon. 5. The transverse colon, or arch of the colon. 6. The descending, or left lumbar colon. 7. The iliac colon, or sigmoid flexure of the colon. 8. The rectum. 9. The ponch of the rectum. 10. The anus.]

It commences at a point horizontal with and quite contiguous to the left ilio-sacral symphysis, and it terminates at the anus. Its length in full grown subjects, taking the standard of the human body at from five feet eight inches to five feet ten inches, is about eleven inches. The rectum, however, is neither of uniform length nor caliber, as the following admeasurements I made of it in the dead bodies of eight adult subjects will show. The organ in each of these instances was carefully examined whilst *in situ*. In these cases, if the rectum had been detached from its natural situation in the pelvis and dilated, a very different result would, doubtless, have been obtained.

The following table, giving the results which I obtained, presents the age of the subject, the sex, the whole length of the rectum, the diameter at its commencement and at the bottom of its pouch, immediately above the superior margin of the internal sphincter of the anus :—

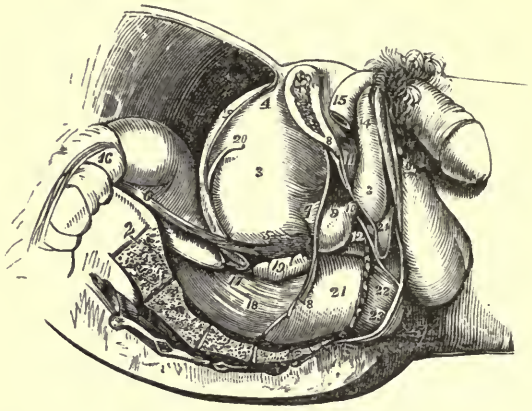
TABLE.

Subject.	Age.	Sex.	Length of Rectum.	Diameter at Commencement.	Diameter at Bottom of Pouch.
1	21	F	11 Inches and 5 Lines.	1 Inch and 5 Lines.	1 Inch and 10 Lines.
2	28	M	11 Inches and 11 Lines.	1 Inch and 9 Lines.	1 Inch and 11 Lines.
3	47	M	12 Inches and — Lines.	1 Inch and 8 Lines.	1 Inch and 11 Lines.
4	40	F	10 Inches and 11 Lines.	1 Inch and 2 Lines.	1 Inch and 9 Lines.
5	60	M	12 Inches and 2 Lines.	1 Inch and 10 Lines.	2 Inches and 3 Lines.
6	55	M	12 Inches and 3 Lines.	1 Inch and 11 Lines.	2 Inches and 1 Line.
7	35	M	11 Inches and 9 Lines.	1 Inch and 10 Lines.	1 Inch and 10 Lines.
8	45	F	11 Inches and 8 Lines.	1 Inch and 7 Lines.	2 Inches and 5 Lines.

The form of the rectum is cylindrical at its commencement, and indeed throughout a considerable portion of its extent; but towards its inferior extremity, however, it becomes large and saccated, forming a terminal pouch, which is dilated and flattened from before backward, and the mouth of which is closed by the internal sphincter muscle, like a purse. The size of the rectum for some distance is nearly continuous with that of the sigmoid flexure of the colon; but it differs from the other portions of the intestines by its becoming wider in its downward progress, until it reaches the superior margin of the

internal sphincter muscle. From its commencement on the left side, at the superior opening of the pelvis (Fig. 2),

FIG. 2.



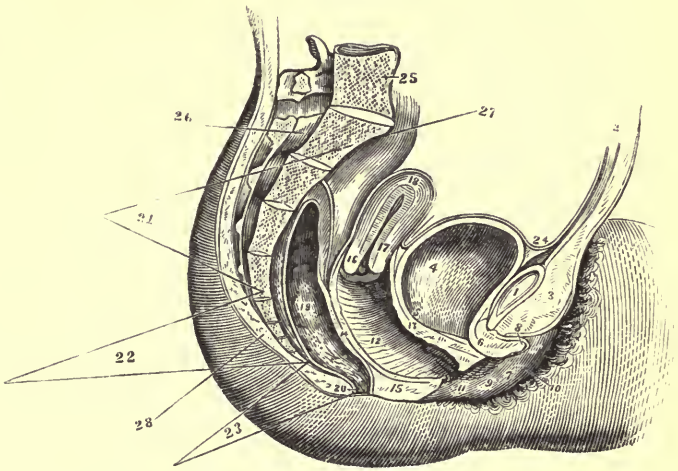
[A side view of the pelvic viscera of the male in their normal situation. 1. The divided surface of the pubic bone. 2. The divided surface of the sacrum. 3. The body of the bladder. 4. Its fundus, with the urachus at its apex. 5. The base of the bladder. 6. The ureter. 7. The neck of the bladder. 8. The pelvic fascia. 9. The prostate gland. 10. The membranous portion of the urethra. 11. The triangular ligament formed of two layers. 12. One of Cowper's glands. 13. The bulb of the spongy body. 14. The body of the spongy structure. 15. The right leg of the penis. 16. The upper part of the superior portion of the rectum. 17. The recto-vesical fold of the peritonæum. 18. The central or middle portion of the rectum. 19. The right seminal vesicle. 20. The deferent duct. 21. The rectum covered by the descending layer of the pelvic fascia. 22. A part of the elevator muscle of the anus. 23. The external sphincter ani. 24. The interval between the deep and superficial perinæal fascia. 25. The anus.]

it is directed from above downward, and at first a little obliquely from left to right, descending into the pelvis along the anterior surface of the sacrum for about six inches, occasionally undergoing, in some subjects, slight lateral inflections, until it has arrived at the median line of the body, at a point opposite the junction of the third and fourth bone of the sacrum; adapting itself, during its downward course, to the curvature of the bone over which it has to pass. From this point it is then directed obliquely from above downward, and from behind forward, for about four inches, still in the median line, to the extremity of the coccyx, and on a level with the prostate gland. Finally, from immediately below the level of the prostate gland, it is directed obliquely from above

downward, and a little from before backward, for about one inch and a half, to terminate at the anus.

2. *Divisions of the Rectum.*—The rectum, for better elucidation, may be distinguished into three divisions:—a *superior*, a *central*, and an *inferior;* the three main curvatures which the organ describes, in its downward course, being made the foundation of these natural divisions. (Fig. 3.) Each division

Fig. 3.



[A side view of the viscera of the female pelvis in their natural situation. 1. The symphysis pubis. 2. The abdominal parietes. 3. The fat forming the mons veneris. 4. The bladder. 5. The entrance of the left ureter. 6. The canal of the urethra. 7. The meatus urinarious. 8. The clitoris and its prepuce. 9. The left nympha. 10. The left labium. 11. The orifice of the vagina. 12. Its canal and transverse rugæ. 13. The vesico-vaginal septum. 14. The vagino-rectal septum. 15. Section of the perinæum. 16. The os uteri. 17. The cervix uteri. 18. The fundus uteri. 19. The rectum. 20. The anus. 21. The superior portion of the rectum. 22. The central or middle portion of the rectum. 23. The inferior portion of the rectum. 24. The peritonæum reflected on the bladder from the abdominal parietes. 25. The last lumber vertebra. 26. The sacrum. 27. The promontory of the sacrum. 28. The coccyx.]

is distinct in its situation, structure, and in the nature and importance of its connections with regard to the several organs in the pelvic cavity. Their several relations vary in the two sexes, and a complete knowledge of which is of the highest importance in a surgical point of view. (See Figs. 2, 3.)

The Superior Portion.—This portion of the rectum extends from the commencement of this organ, at the inferior extrem-

ity of the sigmoid flexure of the colon, to the junction of the third and fourth bone of the sacrum, just where the organ leaves its peritonæal investment to curve below the bladder. It is about six inches long, being the largest portion, and about half the length of the whole organ itself. In its direction downward, as has already been noticed, it describes a curve, the convexity of which is turned backward, and corresponds to the sacrum. Anteriorly it corresponds to the posterior surface of the bladder in the male, and to the uterus and a small portion of the vagina in the female, and in both sexes to a fold of the ileum, lodged in the intervening cul-de-sac. It is tortuous, smooth and loosely attached to the left half of the anterior surface of the sacrum by a short fold of the peritonæum, the *meso-rectum.* This portion of the rectum might, with great propriety, be termed the *peritonæal* portion, because of its being completely invested by this membrane.

The Central Portion.—This portion commences where the rectum leaves its peritonæal envelop, and begins to pass below the bladder. It is about four inches long, and its direction is obliquely from above downward, and from behind forward, slightly curving in the same direction, the convexity bearing upward. It is fixed and immovable, and always corresponds anteriorly to the vagina in the female; and in the male to a small portion of the posterior part of the bladder, from which it is separated downward and outward by the seminal vesicles and vassa deferentia, and lies in close relation with them. Towards its termination it corresponds to the prostate gland and the commencement of the membranous portion of the urethra, and is in contact with them. In the female it is very intimately and firmly connected to the vagina by a vascular network constituting the recto-vaginal septum; but in the male it is but loosely connected to the base of the bladder and prostate gland by a layer of cellular tissue of a soft and lax character. It differs quite materially in its organization, structure and attachments from the superior, or free portion, and being destitute of the peritonæal covering, except a small portion on the upper part of its anterior face, over which the peritonæum is sometimes extended when the bladder is empty.

The Inferior Portion.—This portion of the rectum commences at the extremity of the coccyx, and terminates at the

anal orifice. Its length is about one inch and a half, and its direction is obliquely downward and backward. This last inflection separates it from the urethra in the male, and from the vagina in the female. It is of greater capacity above than below, and is surrounded by dense adipose cellular tissue, except at its upper extremity in front, where it is closely attached to the prostate gland. In its lower three-fourths it is completely invested by the sphinctores ani. This portion of the rectum might, with great propriety, be termed the *anal* portion, or *anal canal.*

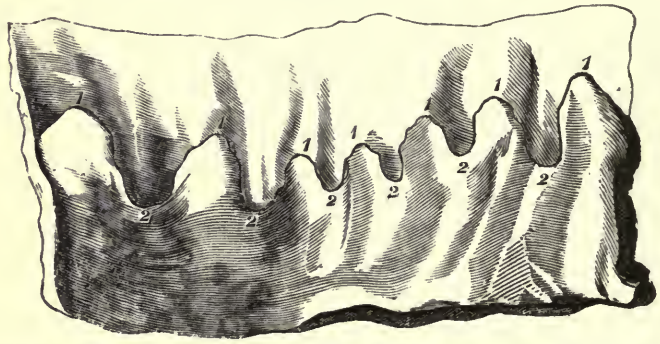
3. *The Mucous Membrane.* The mucous tunic of the rectum is quite redundant in every direction, but especially so in the superior portion; as it approaches the inferior portion, however, it begins to lose this redundancy to a considerable extent, and this is most evident, in its circular direction. In consequence of its great amplitude, it is, when not distended, disposed into irregular undulating plicæ which usually assume a transverse direction. It is sometimes, however, thrown into distinct ridges, which observe a slightly oblique and circular direction, resembling very much the valvulæ conniventes of the small intestines. This corrugated condition of the mucous coat of the rectum is purely accidental and caused by muscular contraction, since there are no valves naturally furnished this organ. The duplications are not permanent and may be entirely effaced by distention. They neither observe any regular form, any regular number, nor always any particular situation or direction.

4. *Columns of the Rectum.* The mucous coat of the rectum after having presented itself in transverse folds, as has already been observed, begins immediately above the superior margin of the internal sphincter of the anus, to display itself in parallel longitudinal folds, which stand out or project in such a remarkable manner, as to have obtained from Morgagni the appellation *columns* or pillars of the rectum, hence they are termed by the French—"*colonnes du rectum ou de Morgagni.*" (*Dictionnaire de Médicine et Chirurgie, p.* 701. *Paris*, 1845.)

These duplicatures are not so numerous and so irregular as

the transverse and oblique, nor as the radiated folds of the external integument at the anus. Their dimensions are unequal, and they vary in number from four to ten or twelve, and when they are more numerous some of them are rudimentary. Their number and position, to a considerable extent, appear to be fixed, by the peculiar terminal arrangement of the longitudinal muscular fibres. They differ from the other mucous folds of the rectum, by being formed of the mucous, as well as of the adjacent cellular tissue and the longitudinal muscular fibres, which give them additional density and strength; by their not being alone the result of muscular contraction; and by their not being capable of entire obliteration by distention. These *columnæ* after entering the anal canal and proceeding downwards, diminish in size and terminate rather abruptly in rounded extremities just above the inferior margin of the internal sphincter of the anus. They somewhat resemble the longitudinal duplications of the œsophagus.

Fig. 4.



[A vertical section of the parietes of the rectum, showing the bases of the columns of Morgagni, and the lacunæ or sacculi of the rectum. 1. The bases of the columns. 2. The lacunæ.]

5. *Lacunæ of the Rectum.* (Fig. 4.) In the sulci formed by the columns of the rectum, another arrangement of the mucous coat takes place, which is always, however, most remarkable at the termination of the sulci immediately below the inferior margin of the internal sphincter ani. At this point membranous folds, more or less numerous, of a semi-lunar form, present themselves, their number corresponding to that of the grooves

themselves, and their direction being usually transverse, though sometimes, but rarely, oblique. These folds, occurring as they do, at the lower end of the grooves, and between the columns, have each of their ends attached to the base of one of these columns, and their free and curving margins directed from below upward, thus forming a series of narrow semi-lunar lacunæ or pits, varying in depth from one to four lines, and the orifices of which presenting upward, whilst their bottoms are directed downward. These lacunæ or sacculi always contain more or less mucus furnished them by the glands of the vicinity, and ready to be poured out for the lubrication of the lower portion of the anal canal, whenever they are compressed by the act of extruding the fæcal matter. Distention of the canal compresses them, but it does not entirely obliterate them. By pressing them firmly at any time, a little viscid mucus may be seen to issue from them. They have certain physiological and pathological relations which are not necessary to notice here.

The existence of these lacunæ or sacs in the lower portion of the anal canal, has at an early day, been recognized by some of the old anatomists. Astruc says that,—"In the margin of the anus itself, several short ducts, or rather *lacunæ* appear which convey a viscid humour." (*A Treatise on the Fistula of the Anus, p.* 6. *London*, 1738.) Winslow also notices them in the following concise manner:—"Near the extremity of this intestine (rectum) the rugæ or folds become in a manner longitudinal and at last, towards the circumference of the inner margin of the anus, they form little bags, or semi-lunar lacunæ, the openings of which are turned upward toward the cavity of the intestine. These lacunæ are sometimes like those at the lower extremity of the œsophagus, or upper orifice of the stomach." (*An Anatomical Exposition of the Structure of the Human Body. English translation. By G. Douglas, M. D., Vol. II., p.* 148. *London*, 1732.) Cruveilhier also mentions these lacunæ. He says that,—"The point at which it (the skin) becomes continuous with the mucous membrane is deserving of notice; it is within the rectum, at the distance of some lines from the anus properly so called, and is marked by a waved line, which forms a series of arches, or festoons, having their concavities directed upward. Sometimes there are small pouches in the situation of these arches opening upward.

From the angles at which the arches unite, some mucous folds proceed, and small foreign bodies detached from the fæces, are often retained in the cul-de-sac, and become the causes of fistulæ." (*The Anatomy of the Human Body. Translated by G. S. Pattison, M. D., p.* 380. *New York*, 1844.) H. Cloquet also describes these lacunæ very correctly. He says, —"Entre ces colonnes, il existe presque constamment des replis semi-lunaires membraneux, plus ou moins nombreux obliques ou transverses, dont le bord est diringé de bas en haut du coté de la cavité de l'intestin. Ces replis forment des aspèces de lacunes dont le fond est etroit et tourné en bas." (*Traité d'Anatomie, tome* II., *p.* 343. *Paris*, 1822.) John Bell, doubtless, alludes to these lacunæ, under the phrase, *notched-like irregularities*, when he says,—"Towards the anus the folds become longitudinal, and terminate in the notched-like irregularities of the margin." (*The Anatomy and Physiology of the Human Body. Vol. III., p.* 234. *New York*, 1817.) Horner also describes them. He says,—"At the lower end of the wrikles, between the columns are small pouches of from two to four lines in depth, the orifices of which point upwards; they are occasionally the seat of disease, and produce when enlarged, a painful itching." (*Op. cit., p.* 47.) Some anatomists have failed to discover these lacunæ, and, consequently, have concluded that they do not exist. In the numerous examinations I have made of the lower end of the rectum, I have never failed to observe them. I have generally found them more fully developed in the negro, and to be larger and more open in the dog and in the rabbit. They, doubtless, are normal and constant.

6. *Are there Veritable Valves in the Rectum?* I must here observe that a question of no small importance to the rectal explorer has arisen among eminent anatomists respecting the existence or non-existence of valves in this organ. The peculiar valve-like arrangement of the mucous membrane of the rectum, already mentioned, has led some anatomists to infer and to endeavor to prove that *there are* veritable valves in this as in the small intestines. Cheselden among the old anatomists alludes to valves in this organ. When speaking of valves in the colon, he says,—"but as the gut approaches the

anus, they (the valves) become less remarkable and fewer in number." (*Anatomy of the Human Body, p.* 159. *London*, 1778.) Morgagni observes that he found valves in two subjects, situated about a finger's breadth above the anus. The form of the valves in one, he says, was circular, and in the other transverse. (*Adversaria Anatomica III. Animadversio VI., p.* 10. *Lungduni Batavorum*, 1723.) Portal also speaks of these folds in the following language:—"Mais on remarque a son extrémité inferieure pres de l'anus, divers replis de sa lame interne, lequels forment des especes de valvules rangées a peu pres circulairement. Glisson, qui les a reconnues, les nomment les valvules semi-lunaires. La membrane interne qui constitue ces replis se relache et se prolonge quelquefois au point de former un bourlet qui s'oppose a la sortie des excrements." (*Cours d'Anatomie Médicale. Paris*, 1803.) The idea of calling these small folds valves, and then of their becoming relaxed and prolonged, except in a diseased state, so as to form a barrier or an obstruction to the passage of the fæces, is, to say the least of it, hypothetical. If ever such cases occur, they must be rare indeed. M. Boyer seems to verify the description of Portal. He says,—"Quelquefois mais rarement, au lieu des replis semi-lunaires dont il vient d'etre parlé, on trouve de véritables valvules qui bouchent en quelque sort l'extrémité inferieure du rectum." (*Traité d'Anatomie, tome IV., p.* 377. *Paris*, 1815.) Wilson says, —"In the cæcum and colon the mucous membrane is smooth, but in the rectum it forms three valvular folds, one of which is situated near the commencement of the intestine; the second extending from the side of the tube, is placed opposite the middle of the sacrum; and the third proceeding from the front of the cylinder is situated opposite the prostate gland." (*The Dissector. Edited by P. B. Goddard, M. D., p.* 52. *Philadelphia*, 1844.) Horner says that,—"At a corresponding part on each side of the gut in its interior, exists a transverse doubling of the mucous membrane, forming the valvula connivens alluded to. The result of this arrangement is a semi-circular valve on each side, one above the other, the margins or diameters of which pass each other, in the empty and contracted state of the rectum, but touching at the same time, and they present an additional barrier to the involuntary

evacuation of fæces." (*Special Anatomy and Histology, Vol. II., p.* 47. *Philadelphia*, 1851.) Meckel speaks of several kind of fishes which present very analogous transverse folds or *valves*, as he terms them. He says they are often very numerous and occupy the end of the intestinal canal. (*Deutsches Archiv für die Physiologie, Band III., II.* 11.)

The first anatomist, however, who called especial attention to a valvular arrangement of the rectum was Mr. John Houston, of Dublin, curator of the Museum, and one of the demonstrators in the school of the College of Surgery in Ireland. This he did in a very able practical paper, entitled "*Observations on the Mucous Membrane of the Rectum*," inserted in the fifth volume (1830) of the Dublin Hospital Reports.

Mr. Houston states that the tube of the rectum does not form, as is generally conceived, one smooth uninterrupted passage, it is on the contrary, made uneven in several places by valvular projections of its mucous membrane, standing across the passage. In a physiological point of view, he considers that these valvular projections are necessary to support the weight of fæcal matter, and prevent its urging towards the anus and exciting a sensation demanding its discharge. Viewed pathologically, he believes that they explain the resistance given to the introduction of bougies; that their arrangement indicates the necessity of employing a *spiral-shaped*, instead of a straight bougie; that they may possibly become the most frequent seat of stricture; that they have often been mistaken for strictures, and by leading to the frequent practice of bougies, have brought on the very malady intended to be removed; that they have been entirely overlooked by all authors who have treated of diseases of the rectum, and have only been cursorily alluded to by M. Cloquet and some other anatomical writers, &c.

After stating that there are usually three or four of these valves, Mr. Houston proceeds to describe them as follows:—"The position of the largest and most regular valve is about three inches from the anus, opposite the base of the bladder. The fold of next most frequent existence is placed at the upper end of the rectum. The third in order occupies a position about midway between these, and the fourth, or that most rarely present, is attached to the side of the gut, about one inch

above the anus. In addition to these valves, of tolerably regular occurrence, there are frequently several intermediate smaller ones, but which from their trifling projection and want of regularity in their situation, merit comparatively little notice.

"The form of the valves is semi-lunar; their convex borders are fixed to the sides of the rectum, occupying in their attachments from one-third to one-half of the circumference of the gut. Their surfaces are sometimes horizontal, but more usually they have a slightly oblique aspect, and their concave floating margins, which are defined and sharp, are generally directed a little upwards. The breadth of the valves about their middle, varies from a half to three-quarters of an inch and upwards, in the distended state of the gut. Their angles become narrow, and disappear gradually in the neighboring membrane. Their structure consists of a duplicature of the mucous membrane, enclosing between its laminæ some cellular tissue, with a few circular muscular fibres.

"The relative position of the valves, with respect to each other, deserves attention. That situated opposite the base of the bladder, most commonly projects from the anterior wall of the gut; the valve next above from the left, and the uppermost from the right wall; that near the anus, which is of least frequent occurrence, occupies a place when present towards the left and posterior wall. Many deviations from these stated points of attachment for the folds will be found to occur, but the arrangement is nevertheless always such, as to form by their being placed successively on different sides of the gut, a sort of spiral tract down its cavity.

"In regard to the sacculated form which the rectum acquires by the presence of these valves, the gut resembles somewhat the colon in the condition of its interior, but in the peculiar spiral arrangement of the valves, it bears more an analogy to the large intestine of some of the lower animals, in which, as for example, the cæcum of the rabbit, the large intestine of the serpent and dog-fish, a continuous spiral membrane traverses the cavity from end to end, and gives to the alimentary matters a protracted winding course towards the anus."

Mr. Houston further remarks,—"My attention was first called to these valves by preparations which I made to demon-

strate the relative situation of the pelvic viscera, and to display the natural state of their cavities; and from the manner in which the making of these preparations was conducted, viz.: —by distending and hardening all the parts with spirit, previously to being cut open, the valvular condition above alluded to, was most satisfactorily exhibited." He further says,— "This is the only method by which the condition of these valves in the distended state of the rectum can be displayed," and that "by the ordinary procedure of extending it, after removal from the body, the valves are made to disappear." Again, speaking of these so-called valves, he says,—"Their presence may likewise be ascertained in the empty state, if looked for soon after death, and before the tonic contraction of the gut has subsided. They will then be found to overlap each other so effectually, as to require a considerable manœuvre in conducting a bougie or the finger along the cavity of the intestine."

I have quoted quite sufficient from this ingenious author to present him fairly, and I hesitate not to say at once that in my opinion he has entirely failed to establish the verity of his statements, that the folds or projections of the rectum are genuine valves; that they are sufficiently strong to bear the whole weight of the fæcal mass, and to retard its downward movement and cause it to take a winding direction; and that they exert great opposition to the introduction of the finger, the bougie or any other instrument not in the shape of a *cork-screw*.

The anatomical evidence against the existence of veritable valves in the rectum is corroborated by numerous facts, a few of which I will now adduce.

I maintain that the irregular folds of the mucous membrane of the rectum, supposed to be valves by the several authors I have named, are not permanent, but purely accidental, and are caused by the partial contraction of the intestine. This can be verified by any one, by carefully examining this membrane in the same subject on different days, at such time when the rectum is not distended; and these folds will be found each time to be more or less changed in appearance, and to occupy different situations. Not so with veritable valves anywhere in the body.

I further maintain that valves, such as described by Mr. Houston, capable of supporting the whole weight of the fæcal matter collected in the rectum, and of resisting the introduction of the bougie or the finger, would most certainly be easily distinguishable and demonstrable in the living body; and in the dead body the removal of the organ ought not to obliterate them, but on the contrary, that they should be capable of being demonstrated easily, and at any period previous to decomposition.

I deny most positively that these plicæ, except in an indurated or diseased state, are ever firm and unyielding; on the contrary, they are soft, pliable and unresisting, being easily displaced by a proper size bougie, or, if in reach, by the extremity of the index finger, either being well lubricated, and gradually introduced into the rectum. Should there be resistance, it will be found not to be occasioned by valves, but either by fæcal accumulation, by the promontory of the sacrum, by contraction of the rectum, by one or more tumors, by chronic irritation or inflammation of the mucous lining, by spasm in nervous and irritable subjects, &c. I have often found that a small size rectal bougie, say a number two English, will be apt to become hooked or entangled in these folds or superabundant membrane, whilst one of a much larger size will so dispose of them as to pass readily. A small sound, as a general rule, the organ being in a normal and healthy state, will often encounter much more resistance than a larger one, as any one must have experienced who has frequently sounded the rectum or the urethra.

Veritable valves contain muscular fibres and are capable of firmly constricting the bowel, and can never be entirely effaced by distension, I care not how far it is carried in length and in width; not so these irregular folds, for they may be completely defaced by this process. In my anatomical investigations, I have found in the small intestines, independent of the valvulæ conniventes, precisely such a valve-like arrangement of the mucous tunic, which may also be entirely effaced by distension. Others have discovered and reported the same.

A very important office of the valvulæ conniventes is doubtless to prevent the alimental mass from passing along the intestine too rapidly, before its nutritive particles are taken up by the absorbents, which it would otherwise readily do, being quite fluid. The greater development of these valvulæ in the superior por-

tion of the small intestines is a curious phenomenon, since the fluid contained in this portion possesses the most nutritious properties. Valves, besides delaying the substances in the intestinal canal, also prevent the regurgitation or reflux of its contents, provided they are fluid or gaseous. The reflux of consistent fæcal matter, however, is impossible. From these considerations a very strong inference may be drawn that there is no necessity for valves in the rectum, inasmuch as the fæcal mass, before reaching this point, has been entirely deprived of its nutritious as well as fluid properties, and merely being arrested here and detained, not by valves but by the sphinctores ani muscles, to await its final expulsion.

Veritable valves sufficiently large and strong to obstruct or dam up the inferior extremity of the rectum, is simply ridiculous; such never have, and in my opinion never can be demonstrated, the able authorities I have quoted to the contrary notwithstanding. I admit that these accidental folds of the rectum resemble the valvulæ conniventes of the small intestines, that they look like valves; yet they lack the essential attributes, and consequently are not valves.

The foundation of Mr. Houston's error in relation to these folds of the mucous membrane of the rectum, was his peculiar method of investigation. He did not examine this membrane in its natural state; indeed, his procedure was anything but natural, although he intimates that it is the only method by which the condition of these valves, as he calls them, can be displayed. Now it is well known to anatomists that such a mode of proceeding is entirely unnecessary to the exhibition of the valvulæ conniventes, or of any valves in the body; that such valves were never discovered and demonstrated by such a process. The following remarks of Dr. Bushe upon this point are so just, that I will quote them. "With all due deference to Mr. Houston, I would beg to remark that his misapprehension of this piece of anatomy has arisen from his methods of investigation: one by filling the intestine with alcohol, and then opening it; the other by inflation and drying. In the first the accidental folds are rendered permanent by the induration resulting from the action of the alcohol; while in the second, the projections resembling valves are produced by the angles formed by the setting of the intestine during the process of dessication." (*Op. Cit. p.* 13.)

SECTION III.

PHYSICAL EXPLORATION.

1. In the diseases of the rectum and anus, the diagnosis is principally determined by a visual and a tactile examination of the parts. The proper instruments to be employed for this purpose are the *index-finger* of the right hand, the *speculum ani*, the *rectal endoscope*, the *rectal exploring sound*, the *rectal bougie*, a *gas* or *oil lamp* with a reflector and a lens attached, a suitable *silver probe* for the exploration of fistulæ, fissure, &c., and an *acupuncture* or *exploring needle*, or a *small trocar*, to test the character of ambiguous swellings or fluid collections, when met with in these parts. By this last-named instrument we are enabled at once to determine whether fluid exists or not in such, and, if it does, whether it is pus, serum, or blood.

2. *Digital and Specular Examination.*—In the inferior portion of the rectum the principal information may be obtained by the digital examination alone. By means of the practiced finger, moved about in different directions within the canal, tumors, foreign bodies and ulcers may readily be detected when within reach, and their locality, size and character accurately determined; by it, too, contractions of the passage may also be discovered, when low down. Indeed, the examination with the finger will generally enable the surgeon to satisfy himself most fully as to figure, texture and tendency. It cannot be expected, however, that practitioners in general, who necessarily have not the opportunities of acquiring the *tactus erudinis*, should be expert in determining by the finger alone the true condition of the case. This knowledge can only be acquired by time and extensive practice and experience.

The hand is sometimes used to explore the rectum, and auscultation and percussion may also be advantageously employed as diagnostic measures in diseases of this organ.

3. *Preliminary Steps.*—Preparatory to making a thorough inspection of the rectum, and a few hours previous, this intestine should be completely emptied by either a dose of castor oil, or a relaxing enema, or by means of both. The patient should be requested to empty the bladder also. Should there exist, as is sometimes the case, exquisite sensibility of the anus and anal region, especially when attended by pain and spasm of the anal sphincters, the patient for examination should always, if nothing contra-indicates it, be put under the influence of æther or chloroform; for without its use, it would be impossible, in such a state of the parts, to make any satisfactory exploration. By its influence, the spasm of the excitable muscles yields, and a thorough examination may be made, which otherwise could not be without subjecting the patient to intense suffering and distress. In such cases, instead of the anæsthetic, I sometimes administer the following suppository an hour before the examination, which usually has a most soothing, relaxing and happy effect:—

> Recipe, Extracti Belladonnæ, granum unam,
> Morphiæ Sulphatis, granum dimidiam,
> Butyri Cacao, scrupulum.
> Misce et fiat suppositorium.

4. *Position of the Patient.*—The rectum and the bladder being both completely emptied, the patient should be placed upon his left side, on the edge of a bed or table, at least two feet and a half high, in front of a strong light; the back and hips as near the edge as possible; the pelvis elevated, the head and shoulders depressed, and the thighs flexed upon the abdomen; and in this position he should be anæsthetized, if deemed necessary. Should the peculiar nature of the case, however, require it, the patient may be placed precisely in the position for lithotomy; or, if a male, he might lean over the back of a suitable chair, with his hands resting on the front edge of it, his head being depressed and nates elevated; or place himself across a bed on his hands and knees, with his head depressed. Whatever position is selected, a strong light is indispensable to success, especially when the speculum is to be used.

The surgeon being placed in an easy and convenient posi-

tion, with his right arm next to the patient, who occupies the first position named, should proceed to make the examination, either with the right index-finger, the hand, the speculum, the endoscope, the sound, the bougie, the probe, or any other instrument, or of each one of these in turn, if requisite.

5. *The Index-Finger.*—The index-finger of the right hand, after paring the nail smoothly, and being warmed and well lubricated with either *cacao butter*, *cold cream*, the *white of an egg*, *olive oil*, or *castile soap*, should be gently and gradually *insinuated* into the anus and anal canal. Any attempt to penetrate roughly or rapidly will be very liable to excite resistance from the anal muscles, and the passage of the finger or other instrument in such manner would occasion more or less suffering or after distress, and greatly interfere with the progress of the examination. In the use of the finger, it is well to know, that by introducing it from *behind*, the surgeon is enabled to push it much further into the canal than if he introduced it from *before* or *laterally ;* and it is also worth knowing, that a tumor or a stricture of the rectum, when beyond the reach of the finger, may sometimes be pressed down within reach of it, by the patient making defecating efforts.

6. *Palpation.*—In order to arrive at a positive diagnosis in certain morbid conditions of the rectum or other pelvic viscera, whether in reference to congenital malformations or to morbid growths, &c., the right hand should be used. This method of exploring the rectum is of great importance in some instances, and will avail much in determining with certainty the real state of this or the contiguous organs. The hand, being warmed and well lubricated, should be gradually and carefully introduced into the anus and anal canal, with the backs of the fingers and the knuckles presenting to the hollow of the sacrum, up which it will glide, as soon as the knuckles have passed the sphinctores ani, by dilating them, and entered the rectal pouch. It is remarkable how dilatable the anus and the anal canal are.

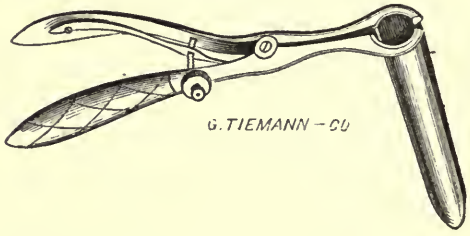
7. *Speculum Ani.*—It is essentially necessary, however, in many instances, especially in some morbid conditions of the

mucous lining of the rectum inappreciable by the touch, to add to these excellent means of exploration the use of the speculum ani or rectal endoscope, which enables the surgeon to judge of the disease by ocular inspection. By the aid of these instruments he is enabled to appreciate the exact size, shape, color and appearance of the lesion in the affected parts —thus being in full possession of the facts as to the actual existence, situation and general appearance of such lesion. The speculum ani is not only made available for diagnostic, but for therapeutic purposes also. It may be used to great advantage in some of the operations on this organ, as well as in making caustic applications to diseased portions of its mucous lining, etc.

The anal speculum or endoscope is contra-indicated in acute inflammation of the anus or the rectum, or when, by the touch, the existence of extensive carcinomatus degeneration of the rectum has been ascertained. In epithelioma, if the symptoms, —such as continued severe pain and a constant discharge of a sanio-purulent matter—show that extensive ulceration has attacked the parts, it is useless and even hurtful to introduce the speculum, bougie or sound, and indeed, in such a case, the less interference, even with the finger, the better.

The speculum which I most commonly use is the bi-valve instrument (represented by Fig. 5). It may be made of polished

Fig. 5.

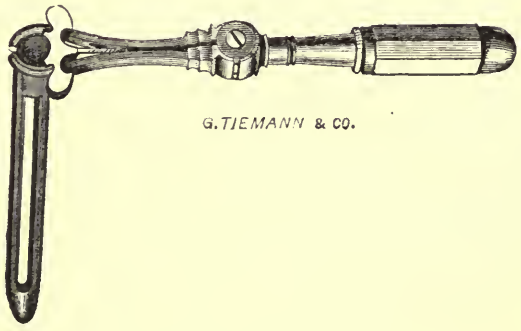


steel or silver-plated. The only objection that can be urged against this instrument is, that in instances in which there is a superabundance of mucous membrane and integument at the anal extremity of the rectum, it too readily permits their protrusion between its blades, and thus more or less prevents an accurate inspection of the parts. No straight speculum ani should exceed four or four-and-a-half inches in length.

I usually make the digital examination first, before using the speculum; the finger dilates the anus and anal canal and prepares the parts for the easy entrance of this instrument. The speculum, like the finger, should be warmed and well lubricated before being introduced; it should then be inserted into the anus, and gently and slowly directed a little forward and upward for about one inch and a half, as if to pass from the perinæum to the umbilicus, in order that it may follow the course of the anal canal; having reached this depth, which is a little greater in the male than in the female, the point should then be inclined backward, first slightly, and afterwards to a greater extent, and thus follow the curve of the sacrum, until the instrument is fully in; it should then be opened and rotated until the whole mucous surface of the lower end of the bowel is clearly brought into sight. Should the view be obstructed in the least, by either mucus, blood or fæces, a small mop, made of fine sponge, and attached to the end of a rod, should be at hand to remove any of these matters. The speculum should then be carefully withdrawn with its blades partially open.

I have found the tri-valve trellis speculum ani (represented by Fig. 6,) a very valuable instrument for the purpose of discov-

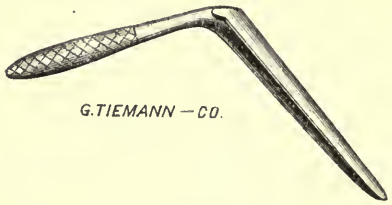
Fig. 6.



ering fissures and other ulcers of the rectum. I devised it a number of years ago, as an instrument to be used in detecting the bleeding vessel in case of traumatic hæmorrhage of the rectum. It is small when closed, and easy of introduction, and when introduced admits of extensive expansion by simply revolving the handle.

As an anal speculum, especially in cases of fissure of the anus, I have also found the simple and highly polished steel instrument, in the form of a large blunt gorget (as delineated by Fig 7), very efficient and valuable. It is passed up into

Fig. 7.



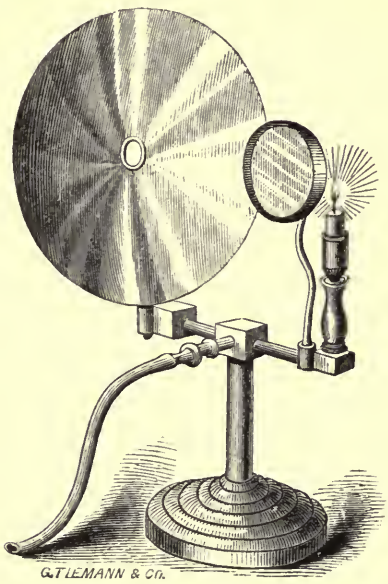
the rectum on the finger with its concavity looking towards the seat of the disease, and when in to the depth of two and a half or three inches, the mucous surface of the canal at that height can be plainly seen reflected on its polished concave surface; at the same time the lower portion of the canal can be most accurately examined by the eye alone, by causing the patient to evert the anus as much as possible. By passing this instrument gently and slowly around the canal, the whole internal surface of it may thus be accurately inspected. It requires a strong and bright light. The idea of using an instrument of such a form was first suggested by the late and eminent Mr. Colles of Ireland, who objected to the various kinds of anal speculæ in common use, and employed for this purpose the large blunt gorget, and found it superior to any other. He subsequently made an improvement on it. In order to introduce it with greater facility, he accurately fitted it to one side of a conical piece of polished box-wood representing in its transverse section a full ellipse, so that when both were joined they presented a perfectly smooth outline. After the instrument thus united was introduced to the proper depth, the wooden plug was withdrawn. (*Dublin Hospital Reports, Vol. V., p.* 155. *Dublin*, 1830.)

The instrument I designed is easy of introduction upon the finger without the use of the plug. A somewhat similar instrument was designed by Mr. Mudge of England, in 1789, for

facilitating the operation for anal fistula. (*Memoirs of the Medical Society of London, Vol. IV., p.* 16. *London*, 1795.)

On a dark day or whenever a strong light is required in making rectal examinations, I always use the portable apparatus (depicted in Fig. 8). It consists of a lamp with a

FIG. 8.

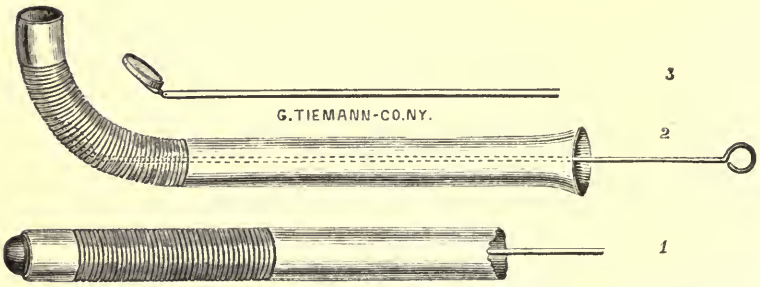


reflector and a lens attached. It can be used for gas, oil or any other illuminating material. This apparatus is indispensable when the endoscope is used.

8. *Recto-Colonic Endoscope.* I have thus denominated the instrument by the use of which and a powerful light, the superior portion of the rectum and inferior part of the sigmoid flexure of the colon may be accurately and minutely examined. It renders accessible to inspection a portion of the intestinal canal, a part of the iliac colon, which has heretofore been shrouded with impenetrable darkness, and which is so often

the seat of disease. This instrument (represented by Fig. 9)

FIG. 9.



[1. The endoscope ready to be introduced, with the conductor *in situ*. 2. The endoscope in the colon, with the internal mirror *in situ*. 3. The internal reflecting mirror.]

is the result of the conjoint labors of the author and the ingenious Mr. Stohlmann, of the firm of Messrs. George Tiemann & Co., surgical instrument makers, New York. It consists of a hollow cylinder, fourteen inches long and seven-eighths of an inch in diameter, made of steel or German silver, the interior of which being highly polished. Four inches of the proximal end is solid, the remainder is flexible, so as to be capable of adapting itself to the curve of the rectum and that at the junction of the rectum and colon. To facilitate the introduction of the instrument, it is supplied with a conductor, consisting of a slender whalebone rod about two inches longer than the cylinder itself, to the end of which is fastened a conical piece of ivory, ebony or hard rubber, an inch and a half long, and of such diameter as to pass into and out of the cylinder with ease, and to project at least an inch beyond the distal end of it. With the conductor thus *in situ*, the instrument is warmed, lubricated and introduced to the desired height, and the conductor then withdrawn. The instrument is also furnished with an internal reflecting mirror, fixed on the end of a wire rod at least thirteen inches long. The mirror being attached to the rod by a movable joint, enables it to be easily adjusted to any desirable angle. The internal mirror is only used when the inferior part of the sigmoid flexure of the colon is to be examined. It must be introduced into the cylinder as far as the angle formed by the junction of the rectum and colon, at which

point, if properly placed and adjusted, the mucous surface of the inferior portion of the iliac colon for some distance beyond may be plainly seen reflected in it, when the focus of light from the external reflector is thrown upon it.

As this instrument was gotten up with considerable haste, it may, upon further trial, be found to need some improvements.

9. *Rectal Eversion as a Means of Diagnosis.* Professor Horatio R. Storer, surgeon to the Franciscan Hospital for women, at Boston, repudiates the anal speculum as a means of diagnosis in the rectal diseases of females, and substitutes for it *rectal eversion.* The *modus operandi* of this proceeding, according to him, is as follows:—"By passing the finger into the vagina, and pressing it backward and downward over the levator ani, the rectum can be everted through its sphincter, like the finger of a glove. This can ordinarily be done to a very great degree, it can always be done to a certain extent. Should the sphincter be unusually irritable, and spasmodically contracting with violence when touched from below, or thus from above, it can be forcibly distended by the thumbs, and temporarily ruptured, as I am in the habit of doing in such cases; the procedure above indicated thus becoming easy. We can in this manner ascertain the presence of a chancre or chancroid, the character of polypi, the extent and number of internal hæmorrhoids, the position of the inner orifice in fistula, &c., with far greater certainty and alacrity than by the speculum, or can be done in the male, while the mere eversion process, provided rupture of the sphincter is not necessary, is attended by very little pain." (*American Journal of Obstetrics. Vol. I., p.* 71. *New York*, 1869.)

This expedient of Dr. Storer can only be made available to the extent of the rectal eversion and no further. If the rectum, therefore, cannot be everted to its full length, the speculum and endoscope cannot be altogether dispensed with. He says the rectum can be ordinarily everted through the sphincter like the finger of a glove. Now, if he means what his language implies, that the entire organ with its several coats can be so everted, I do not agree with him. I cannot conceive how this can ordinarily take place to any considerable extent, or to such an extent as to dispense altogether with the rectal speculum. I maintain that eversion of the rectum, under the most

favorable circumstances, is only partially practicable. The firm union of this intestine with the surrounding parts, the longitudinal direction of its strongest and most numerous fibres, together with the action of the levatores ani muscles, offer too great a resistance ordinarily to the descent of but a very limited portion of the rectum. A small portion of the organ being acted upon by firm and severe pressure from within the vagina, may be made to descend in an inverted state through that part of the canal embraced by the anal sphincters, leaving this lower or embraced portion, however, about one inch and a half unmoved from its situation, and unaltered in its connections with the surrounding parts. If Dr. Storer, however, means by *rectal eversion*, eversion of the mucous lining only of the rectum, then his procedure is a little more plausible and will be found a little more practicable. This membrane, for some distance above the anus, adheres but slightly to the muscular coat, their connection being effected by means of a very lax cellular tissue. The mucous tunic of the rectum, then, in consequence of its great amplitude and elasticity, and its very loose connection, may, indeed, be more readily everted, and to a greater extent than the rectum itself. But neither the eversion of the rectum nor its mucous membrane can ever take place to the extent of superseding the use of the anal speculum as an indispensable means of diagnosis in the rectal diseases of females.

In connection with rectal eversion, Dr. Storer recommends the rupture of the anal sphincter as a diagnostic measure, and speaks of it as flippantly as if the operation and its consequences were as trifling in their nature as the mere breaking of a lady's garter or apron string. From the great capacity of the anus and anal canal naturally for dilatation, I positively assert that they can always be most readily, speedily and safely dilated under the influence of anæsthetics or belladonna, without carrying the dilatation to the extent of rupturing the anal sphincter, or causing any injury whatever to the integrity of the parts. This breaking of the anal sphincter then, merely as a diagnostic measure, as advised by Dr. Storer, is, in my opinion, not at all justifiable under the circumstances. It is bad enough, in all reason, when practiced as a therapeutic measure.

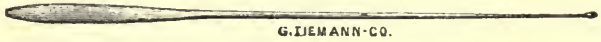
10. *Splanchnoscopy by Translucency.*—This method of exploration is attracting great attention at present, and, if ever perfected, might be made available in the examination of the rectum. The method of illumination by translucency, as advocated by M. Milliot, who demonstrated it to the late *International Congress* in Paris, at one of its evening sessions, consists in introducing into the stomach or rectum, glass tubes, of small caliber, containing two platinum wires, connected with the electrodes of the galvanic apparatus of Middeldorpff of Breslau. It is in this manner that an intense illumination may be transmitted into the visceral cavities, rendering them translucent. At any rate, this artificial illumination, even if it does not result in rendering the walls transparent or rather translucent, might be made available in exploring or in operating upon the rectal, vaginal, buccal and nasal passages.

I have seen it stated, in a late number of the *London Lancet*, that Dr. Richardson exhibited, at the British Society for the Advancement of Science, a lamp which he had constructed for transmitting light through the structures of the animal body. He believed that the idea that this could be effected was given in Priestley's Work on Electricity; that great chemist had observed, on passing a discharge of a Leyden battery through his finger, that the structure seemed to present luminosity; but the operation was painful. A suggestion of Dr. Mackintosh, last year at Dundee, had been acted on by Dr. Richardson, who had observed the motion of the heart and of respiration by direct ocular demonstration, while these organs were under the influence of various bodies belonging to the ethyl and methyl series. Dr. Richardson had so far extended the principle, that he was enabled to transmit light through various tissues of the bodies of large animals. The particular details of all these interesting and elaborate experiments he described. In a child, the bones could be seen in the arm and wrist. The movements and outline of the heart could also be seen in the chest.

The numerous experiments now being made on the subject of the transmission of light through the tissues of the body, rendering them translucent, may ere long lead to the most startling and wonderful discoveries.

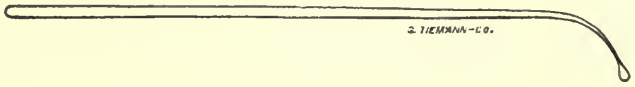
11. *Exploration with the Probe.*—In making anal and rectal examinations, I sometimes use the silver probe alone (Fig.

FIG. 10.



10). It is seven or eight inches long, and is valuable for detecting blind external, internal and complete anal fistulæ, anal fissure, as well as sacculi of the anus. The use of it obviates the necessity, generally, of distending the anus with the finger or the speculum, hence the extreme suffering consequent upon such distention, especially in anal fissure, is entirely avoided. No anæsthetic generally need be employed. In searching for anal fissure I use the probe slightly curved at its distal end (Fig. 11). It should be dipped in olive oil or gly-

FIG. 11.



cerine, and gently introduced several inches up the canal; then it should be brought down gradually, with its curved point pressing upon the side or wall of the canal, and as soon as it comes in contact with the fissure, the patient will at once manifest it by the sensation of pain he will experience. This exploration with the probe may be continued around the whole circuit of the canal, until the fissure or ulcer is detected. In searching for occult or blind internal fistulæ and preternatural pouches of the anus, I also use a hooked probe, for they are most easily detected by such an instrument. About half or three-fourths of an inch of the distal end of the silver probe should be bent back upon itself so as to form a kind of hook (Fig. 12), somewhat like that already recommended for search-

FIG. 12.

ing for anal fissure. The probe thus bent should be passed up the canal three or four inches, and brought slowly back with the point bearing successively on the different parts of the circumference of the rectum. Should an occult fistula or a sac exist, the reverted point of the probe will pass into its orifice and cavity, and render its existence and character at once sufficiently obvious.

SECTION IV.

SOUNDING THE RECTUM.

1. Sounding the rectum and sigmoid flexure of the colon, as the operation may be termed, is sometimes attended with considerable difficulty. It is an operation which requires practice, accurate anatomical knowledge, and a certain number of precautions.

The operator must bear in mind that the rectum in its course through the pelvis lies in close relation with the *prostate gland*, *vesiculæ seminales*, *bladder* and *urethra*, in the male, and with the *uterus* and the *vagina* in the female; and he must also bear in mind the very important fact that this intestine pursues a course by no means *straight*, as its name imports, but that it is more or less curved, both in its antero-posterior and lateral direction, hence in the introduction of the finger, the pipe of the enema syringe, the bougie, the sound, &c., it should be directed at first upward and forward, and then upward and backward. In the child, however, this precaution is not so necessary, for in it the course of this intestine is not so much curved, the name *rectum* being then more appropriately applied than in the adult. The introduction of instruments into the rectum, therefore, requires not only a knowledge of the curve which this intestine takes, but of the axis of the pelvis also. Particular attention should be paid to the disposition or direction of the rectum, as an anatomical fact, from which important practical inductions of the greatest interest may be derived, especially as leading to a much greater accuracy of diagnosis on the part of the surgeon.

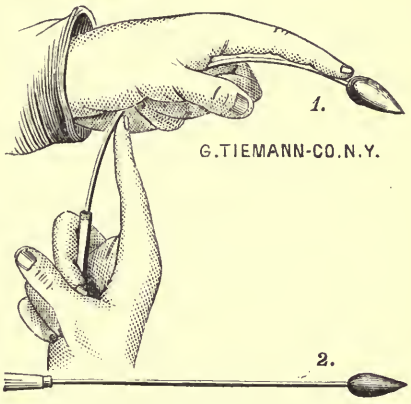
The surgeon, too, must not forget that the mucous lining of the rectum is quite delicate and highly sensitive, and very liable to be injured by any rough manipulation. In consideration, therefore, of these several facts, all instruments that are to be passed along this canal should possess the common properties of smoothness and flexibility, and they should have a

certain degree of curvature imparted to them prior to their introduction, if intended to go up the canal more than three or four inches.

The rectal sound, or rectal bougie, is the proper instrument to be employed to detect contractions, tumors, foreign bodies, or impacted fæces in the passage, when beyond the reach of the finger.

2. *Rectal Exploring Sound.* The instrument which I have long used for sounding the rectum, and which I prefer to any other for this purpose, is represented by Fig. 13. It is com-

FIG. 13.



[1. The method of introducing the sound. 2. The rectal exploring sound.]

posed of a conical piece of ivory, ebony, or hard rubber, two inches in length and two and a quarter inches in circumference at its base, and well secured by a screw to the end of a slender whalebone rod, fourteen inches long. The whole instrument resembles the œsophageal probang. The sound warmed and well lubricated is introduced by inserting the left index-finger into the anus, pressing the whalebone rod a little forward, and to the left side, whilst with the right hand, it is urged steadily upward. It will be perceived that this instrument being conical in form does not, in this respect, resemble the *ball sound* of Sir Charles Bell, (*Diseases of the Urethra, Bladder, Prostate and Rectum. Third Edition, p.* 328. *London,* 1822,) nor the *oblong sound* of Dr. Bushe. (*A Treatise on the*

Malformations, Injuries and Diseases of the Rectum and Anus, p. 284. *New York*, 1837.) My instrument, on account of its form, can be introduced into the rectum, moved about and withdrawn with much greater facility, and with much less pain, if any, than that of either Bell or Bushe. A sound or bougie from half to three-quarters of an inch in diameter is quite large enough for sounding the rectum. If such a sized instrument passes easily and without pain, it may be presumed that there is no permanent obstruction or disease of the organ. I make use of variable sizes of this sound for dilating strictures of the rectum. It is a most valuable instrument for this purpose.

3. *The Rectal Bougie as a Sound.* The bougie is sometimes used for sounding the rectum and sigmoid flexure of the colon, and, in some instances, more accurate information might perhaps be obtained by its use than by the use of the sound already named. In a case of obstruction of the rectum, caused either by a contraction, a tumor or foreign body, if a soft and pliant bougie, especially one made of wax, is pressed against the obstruction, the exact impression of it would be given by the instrument, and thus some estimate could be formed of the nature of the difficulty. In case of stricture, it would give the exact size and form of it. The bougie, however, is not generally well borne by the patient on account of the uneasy or painful distention of the anus it produces in some instances while exploring. In this respect, the rectal sound, it will be observed, has decidedly the preference, inasmuch as it produces no distention of the muscles of the anus after having passed them and during the process of sounding. A good bougie should always admit of being rendered pliant and flexible by being immersed in hot water; yet it should be of sufficient firmness to admit of the gentle pressure necessary to urge it forward without too easily doubling upon itself in case it meets with some obstruction. This quality of the bougie is very important, when the anatomy of the rectum is taken into consideration, which requires that the instrument should be capable of ready adaptation to the peculiar form and direction of the passage, otherwise its introduction would be not only useless, but might be productive of

the most serious mischief: hence, no bougies made of metal, bone, wood, glass, or any other hard or unyielding substance, should ever be used for exploring the rectum. No straight and inflexible instrument can be inserted into the rectum more than four inches without danger from its extremity rudely pressing against either the angles of the intestine, the promontory of the sacrum, the uterus, the bladder, &c.; furthermore, it should ever be recollected that even the best sound or bougie for the purpose of exploring the rectum, is by no means a harmless instrument in rude and unpracticed hands.

When I use a rectal bougie for the purpose merely of searching or sounding the rectum, I generally use one made of white wax, seventeen inches long, and two inches in circumference, and terminating in a smooth round end. This instrument, properly made, possesses sufficient tenacity to prevent its breaking in the rectum, and when sufficiently softened by heat, so much flexibility, without elasticity, that if properly directed it will readily accommodate itself to the curvatures of the passage. Before using, it must always be immersed in hot water until it is rendered soft and pliable, and yet sufficiently firm for the purpose of the exploration. I have, on several occasions, used a number three as well as a number four English rectal bougie for sounding the rectum, and have found it a good instrument for the purpose. The only serious objection to its use is that it is not long enough, when the sigmoid flexure of the colon is to be explored. It must also be immersed in hot water before using. The rectal tube of O'Bernie is also a valuable instrument for this purpose.

4. *Method of Inserting the Sound, Bougie or Tube.* The operation of introducing the sound, bougie or tube, into the rectum, or into the sigmoid flexure of the colon with facility, requires, as before remarked, considerable dexterity and practice. In order that students may become adroit in their manipulations and conversant with the anatomy of the rectum, they should frequently make explorations of it, as well as frequent dissections of, and operations upon it, in the dead body.

The operation of sounding the rectum may be divided into

three stages in accordance with the three natural divisions of the organ already described.

First Stage. In the first stage of the operation, the instrument passes through the inferior third of the rectum. The bougie, previous to insertion, being made pliant by immersion in hot water and well lubricated, should have a double curve given it, if intended to go beyond the rectum into the sigmoid flexure of the colon. The first curve to correspond to the hollow of the sacrum, and the second to the lateral inflection of the sigmoid colon to the left.

The patient, after completely emptying the rectum and the bladder, and being properly placed, an injection of two or three ounces of the infusion of linseed should be thrown up into the rectum, to be retained, in order to facilitate the operation; after which, the point of the bougie directed by the operator's right index-finger, should be inserted into the anus with the convexity of the first curve of the instrument towards the sacrum, and in this manner it should be guided upward and backward for about two inches through the inferior third of the rectum.

As the last inflection of the rectum is so very slight, it is not so important whether the convex or concave part of the bougie be introduced towards the sacrum; by passing it, however, with the concavity backward, the necessity is avoided of changing the position of the instrument in passing the main curve of the intestine.

Second Stage. In the second stage of the operation, if there is no great pain to contra-indicate it, the operator should continue to propel the instrument in the same direction as last mentioned, for about three inches and a half higher, through the middle third of the rectum. The distal end of the bougie will now bear directly upon the hollow of the sacrum, whilst the proximal end will bear toward the left side of the body.

Third Stage. In the third stage of the operation, in order to avoid the promontory of the sacrum, and to adapt the instrument to the main curve of the rectum, its position must be changed, by describing the segment of a circle from left to right, with the proximal end, by turning it upward and at the same time continuing to propel the bougie for about five and a half inches further. By this manœuvre the instrument will

have been carried through the superior third of the rectum to the commencement of this intestine.

Fourth Stage.—With the design now of introducing the bougie or tube into the colon, which may constitute the fourth stage, the proximal end of the instrument must be slightly depressed, and at the same time the bougie should continue to be propelled for five or six inches further into the sigmoid flexure of the colon. Should there be any doubt as to the bougie having passed into the sigmoid flexure of the colon, that doubt may be removed by removing the pressure from the proximal end of the bougie, when if it has not entered the colon but doubled on itself, it will slowly recoil. An evidence, however, which almost invariably attends the passage of the bougie or tube into the sigmoid colon, is the escape of more or less gas at the moment of entrance.

I would here remark that the sacral promontory and the inferior part of the sigmoid flexure of the colon, are the two most prominent points which oppose the natural ascent of the instrument. The degree of resistance, however, and the peculiar sensation communicated to the hand by the instrument when manipulated in the manner directed, will always enable the intelligent and careful operator to recognize a real obstruction, from the ordinary obstacles which oppose its ascent. At the termination of the sigmoid flexure of the colon, and the commencement of the rectum, so far as my examinations have gone, there will be found in almost all cases a slightly narrow neck or contraction, which seems to possess to a certain extent the properties, and performs somewhat the office, of a sphincter. It is at this point or spot that the bougie or tube is momentarily arrested, and requires a little pressure and perseverance to make it pass. I would here remind the operator, too, that the colon is occasionally found to incline to the right instead of to the left side; should he therefore meet with any very ambiguous resistance at the commencement of the colon, the instrument should be withdrawn a little, and again passed forward, with its direction more or less changed, and in this manner endeavor to find the natural course of the intestine.

The introduction of the bougie into the colon most always produces an uneasy sensation over the surface of the abdomen, more especially in the umbilical region, not amounting to

pain, however, unless there should be more or less disease in this portion of the colon.

In introducing the bougie into the sigmoid flexure of the colon, I sometimes place the patient on his back, across the bed or table, with his hips as near as possible to the edge, the thighs abducted and semi-flexed upon the abdomen, and the shoulders elevated. The bougie is then introduced into the anus, as before directed, and passed upward, with the point directed backward and toward the left, until it reaches the projecting ridge of the sacrum, at which it is generally arrested, when it should be withdrawn a few inches, and while it is firmly pressed against the posterior margin of the anus, it should then again be pressed forward, when it readily ascends beyond this point and into the colon.

It is the opinion of some surgeons that the operation of introducing the bougie or tube into the sigmoid flexure of the colon is highly dangerous, whilst others are of opinion that it cannot be done. I have introduced my bougie and tube with perfect facility six inches into the iliac colon in numerous instances, even in cases in which there was more or less disease of some of the parts traversed by the instrument, and I have never known the slightest injury or inconvenience to result from so doing.

I prefer the bougie or the tube to the sound for exploring the sigmoid flexure of the colon; indeed, I have never used the rectal sound for that purpose, but have confined its use solely to the rectum.

As an example, however, of what may be accomplished by way of introducing tubes not only into but through the iliac colon, and even into the right lumbar colon, I will here cite the very marvellous case reported by Professor Storer, of a lady who was suffering from ulceration of the ascending colon in the neighborhood of the cæcum. In this instance a colonic tube was introduced into the anus, passed up the rectum, into and on through the sigmoid flexure of the colon, up the descending colon, across the transverse colon, and down the ascending colon, until its extremity could be felt by external palpation in the right inguinal region, at the seat of the disease, after having traversed a distance of from four to five feet. Through this long and tortuous tube the ingenious Professor

injected a strong solution of the nitrate of silver. The manner in which this wonderful feat was accomplished, is, we regret to say, entirely left to conjecture. (*American Journal of Obstetrics, Vol.* I., *p.* 74, *New York*, 1869.)

5. *Particular Directions and Precautions.*—I will here refer to several points in the manipulation that must be observed in the introduction of the sound, bougie or tube into the rectum and sigmoid flexure of the colon.

Great care is necessary to keep the point of the instrument always moving upward in the axis of the canal. This the experienced explorer will generally be able to decide, merely from the sensation communicated to his hand. We can only suppose that the point of the instrument keeps in the axis of the canal by the facility with which it moves on; and the delicacy of touch necessary to regulate his judgment of this will be entirely lost, if the instrument is too firmly grasped by his hand, or too firmly pressed against any part of the canal. No force should therefore be employed if the instrument encounters firm opposition, but careful pressure may be maintained for a few seconds; should this increase the pain, however, and the instrument remain stationary, it should be withdrawn. Occasionally when the instrument meets with firm opposition, and much force is applied, it bends upon itself, and communicates to the inexperienced hand an impression that it has passed an obstruction, and that it is moving on. When such is really the case, by relinquishing the pressure entirely from the instrument, it will be observed to slowly recoil.

Sometimes the point of the instrument, when not moving in the axis of the canal, becomes hooked in the lax walls of the rectum or in the loose folds of its mucous lining, and pushes up before it the same, in the form of a cul-de-sac, so that the operator, if not experienced, will be apt to imagine he has encountered a stricture, when in reality none exists. Indeed, in some instances, it requires considerable adroitness to prevent the intestine from being thus caught up in sacs by the point of the instrument, and requires some nicety of observation to distinguish the *yielding* resistance which such a sac offers, from the resistance of a stricture. However, should the opposition experienced be a sac of intestine which the instru-

ment has temporarily caused, it should be withdrawn a little, and again passed up gently, with its direction slightly altered, and, by this manœuvre, it will keep in the channel, and at least not sacculate it at the same place. Sometimes the bougie or sound comes in direct and firm contact with the promontory of the sacrum, and an ignorant operator imagines that this also must be a stricture. It is very certain that occasionally practitioners are thus misled, and assure their patients that they have stricture or some other obstruction, when there is none whatever. It is useful also to bear in mind that sometimes a mistake may occur when the upper part of the intestine, being distended with fæces, is forced down, and to a certain extent turned upon itself. The point of the bougie being directed against this projecting point, may also give rise to the idea of a stricture.

During the process of exploration, violent expulsive efforts of the intestine sometimes take place. Should these occur, it would be best for the operator to yield somewhat to them by waiting a little, and then to take advantage of their intermission in order to pass the instrument higher up.

In very delicate, nervous and irritable subjects, especially in those in whom there exists more or less irritation or chronic inflammation of the mucous membrane of the rectum, the introduction of the sound, bougie or any instrumental interference, will frequently cause an irregular spasmodic action of the intestine, and consequently its sudden contraction upon the instrument at different points in its passage. The constricting portion will often be found to vary at each introduction of the instrument. On one day it will be found at one place, whilst on another at quite a different one. Some days it will be entirely absent, whilst on others it will be much more active; all depending upon the health and peculiar condition of the patient, or upon vitiated and stimulating secretions from the bowels. This condition of the intestine must, of course, be first corrected by judicious remedies, by strict diet, by emollient enemata, &c., before the examination can be satisfactorily determined. The spasmodic actions or contractions of the bowel, in some instances, continue for a considerable length of time, and are no doubt often mistaken for organic or permanent stricture of the rectum, and treated as

such, to the great injury and inconvenience of the patient. Such cases have repeatedly fallen under my own observation.

In the withdrawal of the instrument, the same gentleness and care should be observed, in conducting it slowly and cautiously, as in its introduction, so as not to suffer its point to strike against the angles of the intestine or against the bladder or the uterus.

I would here observe, that in order to lessen, as far as practicable, the moral and physical distress that are the ordinary accompaniments of sounding the rectum in females, that this operation may be performed under the bed covering, and of course without the least exposure.

In conclusion, I would remark, that when the bougie or sound meets a real obstruction in the rectum, the important fact then to be determined is, what are its true cause and nature. An obstruction of this intestine may arise from numerous and various causes. It may be a spasmodic or a permanent stricture, adventitious adhesions, a foreign body, an accumulation of hardened fæces, a prolapsus of the mucous lining, a tumor or tumors, an enlargement of the prostate gland; and in females it may be from either a retroversion or an anteversion of the uterus encroaching upon some point or other of the rectum, or from an enlargement of the ovaries, pressing upon the same, &c. The qualified surgeon, however, when he meets an obstruction or a resistance, is enabled by his anatomical knowledge at once to comprehend and to surmount it.

APPENDIX.

ON THE

LIGATION

OF

HÆMORRHOIDAL TUMORS.

BY

WILLIAM BODENHAMER, A.M., M.D.

ON THE LIGATION

OF

HÆMORRHOIDAL TUMORS.

[*Explanation.* The following article was originally intended for publication in a medical periodical, but the author believing that if it had any merit, by presenting it in the form of an *addendum* to the preceding little work, it might, perhaps, prove more convenient and useful to the student; he, therefore, determined to offer it to the profession in its present form.]

At a meeting of the New York Medical Journal Association, held on the 19th of March, 1869, and reported in the *Medical Record* of October 1st, 1869, page 356, the subject of ligating hæmorrhoidal tumors, was introduced by Dr. Post, who remarked that—"When a patient from the country could stay but a week or two, he commonly employed the ligature instead of the nitric acid, for the removal of piles. The severe pain attending its use was diminished, by having the ligature very strong and drawing it very tightly. If one side of the pile was covered with skin, it might be well to incise this, though it was not his habit. The tumor would slough off in a week or ten days."

Dr. I. E. Taylor said that, "the ligature would give little pain, if it included only mucous membrane, but if any portion of the skin were included, the pain would be severe."

"Dr. Post thought the mucous membrane more sensitive than that of almost any other part."

"Dr. Carroll had operated on a lady, where the pain was excruciating until the ligature came away, though this was made as tight as he could draw it, and no skin whatever was included, the tumor being quite high up. The patient was not nervous, but could bear pain well."

"Dr. Hubbard described Dr. Dixon's method of tying piles, in a case he had witnessed; and Dr. Carroll remarked that several of the irregular practitioners had some peculiar skill in this matter; an acquaintance of his had his piles tied by one such, with no pain to speak of, and had gone regularly to his business every day; the operation effected a cure."

I have not the honor of being a member of the "New York Medical Journal Association," and, consequently, can only through this medium, compare my own observations with those of some of its members, as above quoted. I would here remark, however, so as not to be misunderstood, that although not a member, I nevertheless highly approve of the objects of that society. Nothing has contributed more to the advancement and to the elevation of the science of medicine, than the establishment of well regulated medical societies. These excite a generous ardor and rivalry in cultivated and liberal minds, and rouse even envy itself into useful emulation. The principal part of our knowledge must ever be derived from comparing our own observations with those of others. In this view, the utility of medical societies, which afford an opportunity for the mutual communication of our thoughts, must be sufficiently apparent. The great improvements which have already resulted from the formation of such societies are well known to the medical world.

The declaration made by Dr. Carroll—that several of the irregular practitioners of our city have some peculiar skill or know something more or something superior in relation to the operation of ligating hæmorrhoidal tumors, than is known or practiced by members of the regular profession, strikes one with some surprise, and induces one to ask the question, why is this? Now, taking it for granted that this is so, and without stopping to answer the question, why it is, I will at once, with a view to aid in removing this reproach against the regular profession, endeavor to contribute my mite of experience upon this subject, which I consider an important one, with the hope that others of the regular profession, especially those of the "Medical Journal Association" will likewise contribute of their abundance to the same end, until this particular stigma upon the escutcheon of our profession, shall be entirely effaced. This should be done at once, for the operation, as before remarked,

is an important one and worthy of investigation, and one which affords much scope for ingenuity; and furthermore, I consider it one of the best of maxims, that every man should, in some way or other, leave the world benefitted by his life.

Having been in the constant practice, for about thirty years, of removing hæmorrhoidal tumors, almost exclusively by the silk ligature, I have necessarily acquired more or less knowledge and experience in relation to the operation. In my opinion, if it is judiciously and properly performed, it is the safest, most certain, and most effectual of all known methods, and this opinion is now gradually becoming the settled conviction of the profession at large.

The old method of tying piles, that which is recommended in the books taught in the schools, and usually practiced, is (after the bowels have been evacuated and the tumors protruded as much as possible) to seize each tumor by either tenaculum or forceps, and draw it down fully out of the anus, and apply closely to the base of the part thus drawn down, a strong heavy silk or hempen cord, and then the same drawn and tied as tightly as can be; or a curved needle armed with a double ligature, is passed through the base of the tumor, so as to divide it into two, and the cords tied as tightly as possible on each side. After the tumors are all tied, they are returned within the anus, and an enema of starch and laudanum administered, the patient required in the meantime to maintain the horizontal posture, to live on meagre diet, and to avoid having any fæcal evacuation for six or eight days. Sometimes immediately after tying the tumors, they are then amputated closely to the ligature. This, in short, is the usual process now practiced in the ligation of hæmorrhoidal tumors, and from the very nature of the case, must necessarily be attended with more or less danger, and with severe pain and inconvenience.

The great objection to this method of operating is, the extreme suffering which follows and continues for a considerable time, and the confinement to either bed or room for several days. It is said, too, by some authorities, that the operation is attended with great danger from *tetanus*, *phlebitis* or *pyæmia*, &c. This danger, however, has been and is, in my opinion, greatly exaggerated. The few fatal cases reported were never

verified by a *post-mortem* examination, and consequently are deserving of but little confidence. I believe when danger, extreme pain or failure attends the operation, it is generally referrible to the unsuitableness of the ligature, and the injudicious manner in which it has been placed upon the tumor. I have, by my peculiar method, operated in thousands of instances, and have yet to encounter the first serious accident.

The circumstance, then, of the danger, pain and inconveniences attending the old operation, led me, about twenty-five years ago, to seek for information in relation to it, with a view if possible to remove some of the obnoxious features of it, or so to modify it as to make it less objectionable and serious; without at the same time rendering it any less efficacious in the cure of the disease. I first began by making some experiments upon both internal and external hæmorrhoidal tumors, when in a quiescent state, expressly with a view to ascertain whether any one point or portion of the tumor was more sensitive than another; and more especially whether the mucous membrane, or other tissue from which such tumor proceeded, was more or less sensitive than the tumor itself or its covering. The experiments were conducted by means of a peculiar forceps, expressly made for the purpose. The apex of the tumor was first seized by the instrument, and firm compression made; the middle portion next, then the base, and lastly a portion of the lining membrane of the rectum, to which the tumor was attached, was included in the blades of the forceps. I found that in proportion as the compression reached the base of the tumor the pain was increased, and when a portion of the mucous membrane of the rectum or other tissue was included in the blades of the forceps, the pain was very severe. I have ever since, in operating, been very careful so to adjust the ligature as not to tie it too close to the base, and that nothing but the tumor itself should be included in its grasp. Now the question naturally arises, what is the cause of this difference in the sensibility of the natural textures from which the tumor proceeds, and those of the tumor or foreign growth itself? The most rational inference which occurs to my mind at present is, that the former are more abundantly supplied with nerves and nervous influence than the latter. Be this as it may, however, the fact is as I have stated it, and it is in the

power of any student to verify it. But on this, as on many other points of pathology and physiology, we are sometimes much better acquainted with the *quo* than with the *quomodo;* In other words, we know the facts, but we cannot well explain them. My researches on this subject have plainly taught me that so far as the natural tissues are concerned, the fine and delicate skin immediately without the anal orifice is the most sensitive; that the muco-cutaneous coat immediately within the anal orifice is next in point of sensibility, and that the mucous membrane of the rectum is the least sensitive of the three. I, therefore, do not agree with Dr. Post, when he says he thinks the mucous membrane more sensitive than that of almost any other part. I, however, have found the mucous membrane of the rectum much more sensitive than the mucous membrane covering the tumor. This must not be forgotten. Indeed the foreign body and its covering, unless entirely external and covered with true skin, are much less sensitive than the three natural textures previously named.

I now propose to offer some improvements in the operation of ligating hæmorrhoidal tumors, the success of which has been invariable, and warranted by an experience of upwards of twenty-five years.

By my method of operating, the tumor to be ligated is never seized by tenaculum nor forceps, and pulled down; for if this is done, a portion of the elastic mucous membrane of the rectum, to which the tumor adheres, also comes down with it, and therefore is almost certain to be included in the grasp of the ligature—hence the additional pain and suffering which necessarily follow; for the operator cannot distinguish the true base of the tumor from any other part when drawn down in this manner, for all the parts generally have the same appearance. I always require my patients to extrude the tumors simply by defecating efforts, or by the efforts produced by means of an aperient or a relaxing enema. If one or all these means should fail to protrude the tumors, I employ a bi-valve speculum ani, introducing and arranging it in such manner that the tumor which I design to ligate should fall between its blades; then, with suitable instruments, it can be ligated within the canal, just as easily as if it were extruded or external. I scarcely ever take up more than one tumor at one time,

and never employ a heavy silk cord with a hard twist in it, such as saddler's silk, which is the article often used for this purpose, but use a fine silk ligature, well waxed, with scarcely any twist in it, somewhat like floss or dentist's silk; for in proportion to the size of the ligature and the hard twist in it, will be the increased pain it will occasion, and the length of time it will take the tumor to slough off. As before observed, I am careful so to adjust the ligature as to exclude everything but the foreign body itself, and only make the ligature sufficiently tight to cut off the circulation—nothing more nor less. This can be known and adjudged by the appearance of the tumor whilst the ligature is being tightened. I am also careful not to place the ligature very close to the base of the tumor, as this produces more pain, and is not any more effectual in removing the whole of it. The small portion of the base of the tumor below the ligature, will also sooner or later completely slough off. When the tumor is very large, or too large for one ligature, I divide it into two or more sections, according to its size, and multiply the ligatures, including but a small portion of the tumor in each. This is done by arming a suitably curved needle with a double ligature, passing it through the base of the tumor, and if necessary repassing it, and tying each ligature separately—thus including in the stitches every part of the tumor, and underlaying it, as it were, with a double uninterrupted suture. When part of the tumor is covered with true skin, or muco-cutaneous tissue, I usually incise this upon the same circle which is to receive the ligature afterwards, by which more or less suffering is avoided. I sometimes, when the tumor is entirely external and covered with true skin, and objection made to the knife or curved scissors, ligate it subcutaneously, which causes it to shrivel and gradually to disappear. By this operation the integument is not interfered with, and much pain, suffering and inconvenience from the ligature otherwise applied are avoided. The subcutaneous ligation of external hæmorrhoids, consists in encircling the base of the tumor with a ligature passed immediately beneath the skin. This is accomplished by the use of a proper needle, describing a considerable curve, and with it to puncture the tumor at a suitable place, and to carry a ligature subcutaneously half round the same. The needle is then to be brought out at this point, and

re-introduced at the point of exit, and carried round the other half to the original point of entrance, and then tied. If the tumor is large it may be divided into two or more sections as before described. This is the operation which is sometimes employed for the removal of nævi.

The *modus operandi* of the ligature is this—it removes the tumor or foreign growth by two processes: first, by depriving it of its due supply of blood, and secondly, by making its way through the base of the tumor by ulcerative absorption. Now, while it is obvious that the first of these effects may be accomplished by the application of the finest and softest ligature, it is equally clear that the larger and harder the substance of the ligature is, the longer the time it will take, and the more extensive the inflammation, pain or irritation it will produce in accomplishing the second. I repeat, then, that when a strong silk cord is used as a ligature, which is comparatively a rough substance, especially when hard twisted, it will, by its mechanical attrition, produce more inflammation and pain, and continue them longer, than when the ligature is finer, softer, not much twisted and not drawn too tightly. I therefore again disagree with Dr. Post, who maintains that "the severe pain attending the use of the ligature is diminished by having it very strong and drawing it very tightly." Sir Astley Cooper says that the pain which the ligature produces may be mitigated by not drawing it too tight. This excellent advice, however, is liable to be abused, inasmuch as it is not sufficiently definite. The ligature must be drawn tight enough to interrupt all kind of circulation and physiological action in the tumor; if this is not accomplished, the tumor will not perish, or perish very slowly, and more or less sensibility will remain in it. The desirable end, the complete destruction of the tumor, can be attained, however, without making the ligature as tight as it can be. The amount of strangulation should be just sufficient to arrest the passage of the fluids. The tumor, thus deprived of its vitality, first becomes blue or livid, and then softens, shrinks and loses its volume, and acts in the same manner as any dead foreign body which must necessarily come away through the eliminating powers of the system. When the entire physiological circulation of the tumor is suspended for twenty-four hours, the principal object of the operation is

attained. After this, the final result will be the same, whether the ligature remains on till the tumor drops, comes off accidentally, or is intentionally removed. When there is pain, after a certain period, the pain is not in the tumor itself, but in the contiguous natural textures not included in the grasp of the ligature.

As true hæmorrhoidal tumors vary in locality, structure, numbers, size, vascularity, sensibility, &c., so do they require modifications of treatment. Those in which, more than any others, ligation is more especially indicated, are the internal ones, which are florid, soft and highly vascular, which protrude readily and bleed freely; also those internal ones which are indurated, dark, firm, with little sensibility, protruding at each evacuation, and attended with a free mucous discharge. Those round and sometimes blue tumors, located at the margin of the anus, and covered partly with mucous and partly with muco-cutaneous tissue, should, when large, be ligated, after incising that part covered with the muco-cutaneous tissue. When any of these are very small and quiescent, they may be let alone, but when any of these small ones are hard, distended and painful, they should be punctured with a lancet and their contents completely let out. Those tumors that are altogether external, or completely without the anus, and covered with true skin, should be removed by the knife or curved scissors, or ligated sub-cutaneously.

I am never in the habit of ligating hæmorrhoids when they are in an irritable or inflamed condition, but wait until the irritability or inflammation has spontaneously subsided, or has been subdued by proper treatment. It often occurs, that among several tumors which are in a quiescent state, there will be found one highly sensitive and irritable. This one may be easily distinguished from the rest by its florid appearance, or by its being tense, tender and painful upon pressure. If the operation is performed when the tumor or tumors are irritable or inflamed, the pain and suffering will be greatly augmented. I sometimes remove the inflammation, the irritability or the sensibility of the tumor or tumors by the application of a solution of the nitrate of silver, applied by means of a camel-hair pencil, and immediately after apply olive oil to the same. Two or three of these applications in as many days

are usually sufficient. The solution should be of such strength as not to produce a slough, not to abrade or to injure the surface. All that is required is the sedative power of the caustic, without its injurious effects. If applied of a certain strength, say from ten to fifteen grains of the crystals to one ounce of distilled rose water, it will diminish the sensibility and irritability in a most remarkable manner. The patient, in the meantime, should live on bland and unirritating diet, and his bowels should be relieved entirely by enemata of the infusion of linseed, to which a little castor or olive oil should be added.

Now, if what I have stated in relation to the ligation of hæmorrhoidal tumors be true, and the statements can easily be verified by competent persons, my method of operating is far superior to that practiced by surgeons generally, and at least equal, if not superior to that practiced by some of the irregular practitioners mentioned by Dr. Carroll. It is much safer, very much milder, and equally as certain and effectual. It is seldom that my patients, during the whole course of treatment, are ever confined for a moment to either their rooms or their beds, but are enabled at all times to be up and attend to ordinary business.

Very much might be said profitably in drawing a parallel between ligation on the one hand, and the several surgical measures adopted for the removal of hæmorrhoidal tumors, on the other—such as excision by knife or scissors, écrasement, the actual cautery, the potential cautery, Dupuytren's combination of forceps, scissors and actual cautery; the same modified by Mr. Smith, of London, of clamp and knife or scissors, and actual or potential cautery; M. Amussat's method of clamp and caustic potash; Houston's method of nitric acid; the galvano-caustic method of Middledorpff; and the method of M. Richet, of cauterizing the tumor in several sections by means of a peculiar forceps brought to a white heat; all of which find advocates in able authorities; but this article is already extended much further than at first designed. I cannot, however, resist making one single remark more, by way of conclusion. That is, that thousands of persons who are daily suffering from this affection, who should at once undergo surgical or radical treatment for the same, are deterred from so doing from a great dread they have of the formidableness,

severity and danger of the operations; or from a belief they entertain that this disease can never be radically cured; or that it is salutary and designed to ward off some other more serious affection, and therefore should not be cured; or that it is never local, but always constitutional, and cannot be cured by any local measure, &c.—hence such patients, receiving but little information and encouragement from the regular profession, many of whom themselves entertain similar erroneous notions, generally fall into the hands of empirics or irregular practitioners, or are in the constant use of some of the one thousand and one quack remedies found in the drug shops, and recommended in the papers, or by some of their numerous kind friends. Let it then be our united aim to rescue this affection from out of the hands of the quacks, who have too long already monopolized it, to the exclusion and the disgrace of the regular profession.

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"Dr. B. has devoted an immense amount of labor and time in the production of this valuable work, for which he richly merits the thanks and the gratitude of the entire medical profession."—*Eclectic Medical Journal.*

"Congenital vices of conformation constitute many of the most unfortunate disorders to which the human frame is liable. Some of them are incurable, either causing early death, or allowing life to be prolonged in suffering and deformity (*Spina Bifida, Extrophy of the Bladder, Deformities of the Limbs, Phocomele, &c.*). Others are curable, but demand for their relief the highest resources of the medical art (*Hernia, Cleft Palate, Hare Lip, Club Foot*). The congenital malformations of the rectum and anus include representatives of both these classes. Although of not infrequent occurrence, they are not sufficiently numerous to permit the general possession of experience in their management among practitioners; so that a practical treatise on the subject, embodying the requisite details of diagnosis and treatment, is of great value to the profession. The able work of Dr. Bodenhamer before us has this merit. It is concise, full and practical; and in addition to this claim, possesses that of being the only complete and practical work on congenital malformations of the rectum and anus which 'has ever been published in this, or in any other country.'"—*Berkshire Medical Journal.*

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$1/2 + 3$

Montellano, J
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