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Gallipolis, Ohio, U.S.A., Nov 12<sup>th</sup> 1887

Dear Sir:-

It is with no little hesitation that I address you relative to a subject about which you know so much, and I so little, but a sentence on page 26. t. of the American edition of your "Recent History" is my excuse. You there say:-

"With respect to the alimentary canal, I have met with an account of only a simple rudiment, namely, the seriform appendage of the caecum."

I desire to call your attention to a structure in the terminal portion of the large intestine (*intestinum rectum*) which properly seems to fall in the class of rudiments — I allude to those duplications of the intestinal walls known as the valves of Houston. In 1865-6, while dissecting in the University of Michigan, I found in my subject the mucous membrane of the rectum thrown into a spiral arrangement which commencing on the right side of that organ at its junction with the sigmoid flexure of the colon, passed downwards, backwards and to the left until the side of the canal opposite the point where the fold commenced was reached. In this situation the duplication was as large as on the right side above, where it commenced. The same was true of a point corresponding with the base of the bladder on the internal aspect of the anterior wall of the viscus. From this situation the valve could be traced at first downwards and backwards to the posterior wall of the rectum, and then downwards and forwards to a point about three-quarters of an inch above the anal orifice on the left side where it seemed to terminate in one of the columns of Morgagni. The valve gradually enlarged and became more and more prominent as its course from the left side along the posterior wall and around the right side was traced from the column of Morgagni to the base of the bladder. In the latter situation it was more than half an inch broad, and this breadth

was preserved along the anterior wall and up the side of the rectum until it joined the duplication on the left side, with the exception of one point where for about an inch and a quarter, the duplication was very narrow indeed — perhaps not more than the eighth of an inch wide. This defective spot in the spiral arrangement of the lining membrane seemed to be situated on the left side, and was immediately in front of the broad and well-marked valve placed below and on the side opposite to the point where the duplication was first manifested at the junction of rectum and colon. The duplication of the mucous membrane could be traced from this defective point spirally around the left side and posterior wall of the rectum to end on the right side at the termination of the colon, where it blended with the lining membrane of the part — Between the valves a narrow portion similar to that <sup>between</sup> the valve on the left side and the one opposite the base of the bladder could be seen on the posterior wall of the intestine. In other words, from one of the columns of Morgagni, on the left side of the terminal portion of the rectum, to a point on the right side of the junction of the colon and rectum there was a duplication of the lining membrane of the latter organ — a duplication varying in width, but always persisting — which pursued a spiral course and made one and a half circuits of the intestine. The free edge of this spiral duplication of the lining membrane of the rectum was directed inwards — the thickness of the valves varied in different situations. The structure was thickest and firmest where the fold was broadest — these situations were superiorly, on the right side at its commencement; opposite the base of the bladder on the anterior wall; and at a point midway between the two on the left side — while between these points of special development (especially on each side of the one located on the left wall of the rectum) were the

situations where the duplications were least marked. It is to be regretted that this interesting specimen had been removed from the body, and had its relations with neighboring parts entirely severed, before the peculiar character of its lining membrane was noticed.

Since that time — nearly twelve years — I have been able to make critical examinations of the rectum in thirty-four (34) cases. In numerous instances I have seen the rectum either after it had been removed, or have examined it on the cadaver without taking it out. But in the thirty-four cases (34) alluded to, I have examined it so far as possible in its natural situation, and then taken it out and subjected it to a thorough investigation. In five (5) cases the appearances have resembled those just described, and in seven (7) there were separate projections meriting the name of valves. In all thirteen (13) cases (including the one described at length) there were duplications of the mucous membrane on the anterior wall, opposite the base of the bladder, and at the junction of rectum and colon on the right side, while in twelve (12) cases the valve on the left side above the base of the bladder was also distinctly marked. In three (3) of the seven (7) cases in which the valves were separate, there was a valve about an inch above the anus on the left side of the rectal wall — in these cases the valves opposite the base of the bladder on the left side, above, and superiorly, at the junction of rectum and colon, were all well marked. In one (1) of the remaining four <sup>(4)</sup> cases of this group there were but two valves — one, at the base of the bladder, and the other at the commencement of the rectum on the right side — while in the other three (3) cases, the separate projections were located at the base of the

Bladder, the superior extremity of the rectum, on the right side, and on the left side between these points ~~and~~ <sup>at</sup> the usual place. In five (5) cases there were duplications of the lining of the intestine opposite the base of the bladder, on the left side of the rectum above, and on the right side at the upper extremity of that organ; and these duplications were connected together by narrower and thinner, yet equally well-marked folds of mucous membrane. In twenty-one (21) cases there were no folds in the lining membrane which persisted when the membrane was removed.

I have not had occasion to make observations on the cadaver recently, yet the demands of practice have rendered me familiar with the following facts; and of late, I have been able to confirm them almost daily. If, in examining for disease of the rectum, the patient is placed profoundly under the influence of an anaesthetic, and examined with a modification of Sims' speculum, it is possible to obtain an excellent view of the whole internal surface of the rectum as high up as its termination in the sigmoid flexure of the colon. Atmospheric pressure, in this method of examination, operates in such manner as to distend the portion of the intestinal wall occupying the most dependent position. It also serves to obliterate all merely accidental folds. Consequently, when the mucous membrane of the rectum can be seen traversed by folds, the sharp free edges of which project from an eighth to half an inch in depth, and pursue an oblique direction, it is easy to identify them with the

rudimentary valves such as have been supposed to. The valve opposite the base of the bladder is the only one that can be observed satisfactorily — the others are so high up that the angle under which they are viewed is not great enough to enable the observer to identify them with certainty. An examination with the speculum will reveal their value to the eye when it is impossible to determine its existence with the finger, and from the frequency with which I have discovered traces of this structure by per secular examination, after failing with the sense of touch. I am convinced that careful inquiry will show that that structure is far more common than heretofore imagined.

The first anatomist to give anything like a correct and complete description of these valves was the late Mr John Houston, of Dublin, who, in 1830, published a paper in the Fifth Volume of the Dublin Hospital Reports, entitled "Observations on the Mucous Membrane of the Rectum," in which he called special attention to them. In this communication he stated that the tube of the rectum does not form one smooth, uninterrupted passage, but that, on the contrary, it is made uneven in several places by valvular projections of its mucous membrane extending across its ~~passage~~ canal. Physiologically, he considered the valvular projections necessary to support the weight of fecal matter, and prevent its sliding towards the anus and exciting a sensation demanding its discharge; pathologically, he believed they explained the resistance given to the introduction of bougies — that their arrangement indicated the necessity of

employing a spiral-shaped, instead of a straight bougie; that they were often mistaken for strictures, and by leading to the frequent passage of improperly-shaped bougies, had sometimes brought on the very malady intended to be removed. I can find no evidence in Mr. Houston's paper, that he was aware of the fact, that these valvular projections are occasionally connected together by narrower and thinner duplications of the mucous membrane, thereby converting these folds into a spiral membrane, circling round the inner wall of the rectum. Lest I fail to correctly interpret his ideas I will quote a paragraph from his communication to be found on page 141, vol. V, of the Dublin Hospital Reports, 1830. He says:

"In regard to the sacculated form which the rectum acquires by the presence of these valves, the gut somewhat resembles 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 instance, the caecum of the rabbit, the large intestine of the serpent and dog-fish, a continuous spiral arrangement traverses the cavity from end to end, and gives to the alimentary matters a protracted winding course towards the anus."

The Case of George Bush, of New York, whose excellent treatise on Diseases of the Rectum and Sigmoid, published in 1837, is still one of the most valued authorities on those subjects was led by Mr. Houston's paper to re-investigate the analogy of the rectal mucous membrane. A series of careful examinations led him to declare, most unhesitatingly that the folds to be observed were accidental; that the tissues were naturally lax, and their duplications, in no sense valves; and that so far as the performance of the physiological functions ascribed them by Mr. Houston, was concerned, that objection was in vain. The same conclusions, practi-

cally, was reached by Dr Rodenbrier, I knew York, in his work on the "Anatomical Exploration of the Rectum." Both observers acknowledge the presence of the walls of the Rectum of loose folds of its mucous lining, but both hold them to be accidental in origin, variable in situation, and of no special or pathological importance. Lee, Smith, Van Wagoner, Allingham, Curling, Quain, Squire and other recent writers on Diseases of the Rectum make no allusion to these structures. I will soon be compelled to make some reference to them in the series of articles on Diseases of the Rectum which I am contributing to the *Lancet*, and, in view of the facts already mentioned, I determined to write you, and after detailing the foregoing facts, to ask you if I would not be right in regarding these duplications of the lining membrane of the terminal portion of the large intestine in man, as rudiments? It seems as if the spiral arrangement, in the form first observed by me, was extremely rare; that several independent, valve-like structures were more common; while, in the majority of persons, there was either no trace of these structures, or that a single duplication near the base of the Sigmoid, was the only evidence of the arrangement to be seen. In view of the fact that modern ideas of the physiology of the Rectum excludes that viscus from any share in the duty of sustaining and supporting the feces under ordinary circumstances, no valid claim can be advanced at the present time on behalf of these rudiments as a structure calculated to assist in bearing the weight of the feces, formerly supposed to be sloped away in the terminal portion of the lower bowel. I have found the spiral arrangement in perfection in the large intestine of the Squirrel — I have already cited the examples of this structure in the animal Kingdom mentioned by the Question. In view of the physiological

uselessness of the arrangement in man, its variability and comparative rarity, the conclusion seems almost irresistible to me that these duplications are rudiments, that generally they are suppressed, either in whole or in part, and that when they do appear, they occur as an illustration of that law of reversion, for a knowledge of which I have to thank your writings.

Trusting my communication may appear to you of sufficient importance to merit an answer, I beg to subscribe myself

Very Sincerely  
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