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Caecum (Typhlon) with Ascending Colon and Part of Transverse Colon Considered as a Chamber: Superior Colic Ventriculus (Holotyphlon)

by

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BEFORE writing upon the nature of disease associated with this part of the Alimentary Tract, or even thinking of possible allergy, of vitamin (imbalance) (or of toxic) absorption, the structural values of the area require study.

It seems probable that fluids (gases and liquids) are here removed and retained by the body, rather than allowing loss. Also, in spite of citations that in Man little real nutritive absorption takes place in this area, we see the portal system richly connected.

A. Chauveau, S. Arloing, and George Fleming (1) state: "The caecum serves as a reservoir for the enormous quantities of fluid ingested by herbivorous animals. The greater part of this fluid in its rapid passage through the stomach and small intestine escapes the absorbent action of the villi and accumulates in the caecum, into which it may be said to wash the alimentary mass it comes in contact with; it thus dissolves the soluble and assimilable matters this mass may yet contain and so favors their entrance into the circulation, through the immense absorbing surface formed by the mucous membrane of the large intestine.

"The aliment undergoes still further change, and digestion is completed in this viscus (caecum) principally in the Herbivora."

In Man, we know that the ileocecal valve is closed by distention of the Caecum. This delays entrance of matter from the ileum. Gas, or soft mushy material filling the caecum must be passed onward before more material is received from the small intestine. In many animals (2) the exit from the caecum (horse) is about two inches only from the ileocecal valve, and the orifice of exit to remainder of colon is very small. Slow maceration and delayed passage is needed here, in animals, and in Man, but in Man the delayed passage occurs from ileocecal valve to mid-colon, or to splenic flexure. Exact recognition of the structural entity of this Superior colic ventriculus (in man) will be desirable, and its physiology and pathology will then be obtainable.

The stomach (ventriculus) is developed by dilatation of the prima via. It then rotates. So, also, the caecum dilates, and then rotates.

The Lien (spleen) is produced in the posterior mesogastrium. There may be small accessory spleens, elsewhere as in liver (Hepar) and in mesentery. At the caecum (typhlon) we find the node of Lockwood (3) (4) (5) in the ileo-appendiceal angle. The absence of villi in Intestinum crassum is significant. It is stated they occur on the ileal side of the cusps of the ileocecal valve, and default on their caecal faces.

We may inquire whether a defect in digestion of the small intestine causes a mass in the caecum of an improper character, which by its greater delay, further holds up more material from entering through the ileocecal valve, or whether defective digestion in the caecum is the real cause of this delay.

When the digestive action within the caecum is in abeyance it and much of the colon, may be no more than a channel of exit (called a "sewer"). However, that its normal state is not merely a channel of exit may be held true in this study. The appendix, too, as a special area may be actively valuable (6).

Further, in comparative anatomy, the area of caecum (typhlon) extends beyond the level of the entry (ileocaecal valve of Bauhin). But in human anatomy we term the "ascending" colon all that area from the level of the valve, improperly, it should be noted, as the caecum (Superior colic ventriculus) extends as far as a relative narrowing. We find the "descending" colon empty, usually, after death (7) showing the limit of the chamber in the area of retained material.

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No attempt can be made to lay down general routine study of the upper colon. The caecum is singularly isolated. But the use of charcoal, in powder, is sometimes excellent, it acts on gases, and putrefying matter. Combine some digestive enzymes and a fractional dose of Potassium nitrate; enema clears out lower bowel, and it is wise to wait the appearance of charcoal in the feces before purgation. Essence of pepsin, in frequent doses will prove a valuable associated treatment. And at the proper intervals, give citrate of potassium, combined with syrup of lemon and a little glycerin in water. The continued exhibition of carbo lignis powders (charcoal) every two hours gives results, until a special general treatment can be determined.

The problem of gas in the caecum and colon indicates the real nature of the digestive default. In analysis, the function of ascending colon differs from that of descending colon (8).

First, the location of this chamber, Holotyphlon, is here considered, and, secondly, a determination of its activity.

In general, clinicians are able to locate the Pyloric valvula, and the Ileocecal valvula, by listening to the sound of the sudden outflow. To elicit this sound, like a stream squirting from a nozzle, for an instant, give a drink of water, or milk, and place the ear over the probable area, the ear resting upon a thin silk or cotton handkerchief upon the bared skin of abdomen. A sound like "slish" will occur, soon after swallowing the fluid, heard at the pyloric area.

It is very interesting to observe that in a short interval, a succeeding ejection takes place at the ileocecal orifice.

Several factors may account for lack of success in noting this sound, many will occur to mind; but overloaded stomach, or greatly distended caecum, may, equally, interfere.

The singular interest in this simple procedure, is that when obtained, we have positive evidences. Many reasons have been given for failure of the ileocecal valve to operate in close sequence, reflex interference, or individual dilatory response. In a day when no x-ray existed, such simple procedures were much admired. And, now, many additional conclusions can still be available, with a richer laboratory equipment. In fact, careful study of the abdomen includes auscultation at several areas, for borborygmi, splashes, and other evidences of intestinal action. At different periods, according to amount of food taken, or interval, we can still employ to advantage the auscultatory method. Giving liquids at regulated times in this connection will enlarge the technique.

The ileocecal valve is often described in texts as directed toward the right body flank. The terminal ileum tends to the right. But dissections of over a thousand caeca (human) show the frenula are placed to exert a transverse tension, the right frenulum passing across the dorsal wall of the caecum. The ostium really opens to the front, although the caecum extends ventrally upon the ileum. The posteromedial taenia of the ascending colon may split to receive the terminal ileum, may pass ventrad to it (about an inch and a half proximad to the ileocecal orifice (Tulpius, Bauhin, Young) or, usually, extends dorsad to the terminal ileum, (which is one of the reasons authorities suppose the orifice points dextrad). From the longitudinalis of the ileum a muscular band separates off to pass to the base of the processus vermiformis (epityphlon) and joins the taeniae which enclose the root of the epityphlon. Normal peristalsis may depend upon this arrangement.

The third portion of this note now turns to the actual relations, human and comparative.

Analysis.

A previous note (Bulletin, N. Y. Medical College) (6) on the consideration of the Appendix (Epityphlon) as functioning, at least in part, in receiving and absorbing gases from the intestinal canal, may be further extended to include the idea that the Caecum in combination with the Ascending Colon and the Transverse Colon as a chamber, the *Holotyphlon,* together, are important in removing not only liquid matter, but gaseous products, of essential value.

It is evident that during digestion we rarely pass flatus per anum. Unless this flatus be retained, some chemical loss would occur.

The production of solid or semisolid faeces suggests changes in or absorption of the fluids.

In the bird, such as chicken, there is practically no length of large intestine (Intestinum crassum). The chicken possesses two caeca (called paired) about one inch from the anal orifice. These caeca are dilated and sacculated, with lumen at entrance greatly restricted. They are rarely filled with solid matter. In the unborn chicken they are well developed. The sulfur in the yolk would, possibly, create gas which is reabsorbed in the caeca, for if emitted in the egg-shell compartment, this gas would suffocate.

Sulfur in appreciable quantity, in man or in any animal, would be a loss to the body metabolism. If reabsorbed, it could be used again and again.

The gas in a dilated intestinal canal may be an important element. I have often wondered what gas occupies the intestinal canal, when dilated under ether anesthesia. How is it produced?

The Processus vermiformis has been greatly studied. That it is placed just at a point to *receive gases* during digestion, can be noticed and its structure is one which maintains a lumen.

The orifice (Gerlach) is guarded by a crescentic flap, around which taeniae are invested to sustain the relation, and a longitudinal band of muscle from the ileum is carried to the orifice of the Epityphlon.

Various authorities have written concerning the comparative uselessness of what they term the "sewer," (Large intestine).

We can realize that in Herbivores (Fleming and Chauvaeu) the Caecum has a period of second digestion (so that it acts like a stomach in being a Chamber). In man, we do not definitely describe a period of delayed movement of food while in the Caecum and upper colon. After digestion has occurred in man in the small intestine (Intestinum tenue) there will remain an amount of material which is required in suc-

cessive chemical processes, and these elements are regained from the flow toward exit, before an important loss to the body can occur. I suggest "Holotyphlon" as a name for this chamber, as far as the splenic flexure.

The Caecum, by many authorities exhaustively examined, in the cat (Reighard and Jennings, Chauveau) shows a constant lymph node, termed by Chauveau a definitive "Peyer's" patch. This node (Lockwood) (5) in man is constant within the peritoneum, forming the inferior ileocecal fossa, just behind the bloodless fold of Treves. But such a lymphatic node in the Ox or the Horse is denied generally. The Processus vermiformis (W. F. Campbell) is a highly lymphatic structure, excessively so, related to tonsillar tissue, which partially explains caecal involvement in respiratory ailments. Bailey says of the Vermiform appendix that the lymph nodules are the most conspicuous feature, and lie mainly in the submucosa; the nodules are oval, or spherical or distinct and arranged like a Peyer's patch, with apices and base. The muscularis of the submucous tissue may pass through the superficial portions of the nodules. The processus, therefore, may resemble terminal intestinum tenue. Fluids of the caecum tend to be subjected to a form of the digestive activity, further, and in the herbivores, the caecum (Chauveau) (1) operates as a chamber of digestion, which, evidently, now that the small intestine has digested and assimilated certain elements, continues the activity in a way which could not have occurred in the stomach. The alimentary canal, (a succession of canalicular treatment of food, and of chambers), shows elaboration directed towards retention at various stages. Gases are not desirable in the canalicular portions, except to dislodge hard masses, possibly. In the chambers there will occur more opportunity to collect, alter and reabsorb gases. In Man, speaking generally, the Processus vermiformis is called rudimentary, recessive or of little importance. It should be regarded as a highly specialized area. Nevertheless, considered with the caecum, and in view of the fact that this narrow tube is not produced fully in many human beings, or is absent (30 instances), (9) (10) it is assumed it has relatively little to do. But gases may readily enter it. Its restricted lumen allows the approach of gases to the wall. Its tissues have some affinity for the lymphatics of Nose and Pharynx.

In the herbivores, Chauveau observes that the lumen of exit from the caecum to colon could scarcely be relatively smaller. This insures the retention of fluids, as well as of solids during caecal digestion. Chauveau describes the four longitudinal muscle bands of the caecum as present in only its middle portion, disappearing toward each extremity. At the small orifice of the caecum leading to the colon, these four longitudinal bands reappear, connected at the ostium, and follow the colon, so that there is an arrangement of caecocolic orifice similar to that presented by the converging taeniae, in man, at the orifice of Gerlach's valve into the processus vermiformis, one suited to control of ostium, and to conveyance of muscular action in peristalsis. This similarity should not lead to the idea that the human "epityphlon" represents the herbivore caecum. But gives analogy, (rather than homology) in part. John B. Deaver used to deny acute "Typhlitis" in Man, at a time (1898) when the subject of Epityphlitis was a young and more or less improvised discussion. Gas readily passes into the Colon and everyone was familiar with the colic, and distention, in the large intestine, especially as in children. The peculiar part played by the Epityphlon, even yet not clearly delimited, was associated with cases of impacted "orange seeds." Some of these objects turned out to be merely oval inspissated faecal particles probably due to failure of the "succus entericus." (E. T. Reichart and others). This inspissation in man, may give rise to hard plates held by the caecal mucosa, and causing ulceration in areas. *This reduces the area of fluid resorption,* and the treatment of liquids and gases, and may be associated with a retrograde change in the walls of the appendix. (11) In man, in contrast to the lower forms here compared, the reduction of lumen of the large intestine is deferred to the area of the splenic flexure.

This significant fact shows that caecal digestion, gas, liquid, or solid, such as it may be, in man, is allowed all the area of the caecal (non-appendiceal) part of the large intestine, prolonged through the ascending and the transverse colon, but not fully continued into the descending colon. (Such an anatomic construction further sheds light, upon the relevance of *epityphlic resorption of gases*). In this elongated chamber, the Holotyphlin, we see a true caecal stomach. Studying the functional valve (mid-colic) attributed to Cannon, who definitely found such physiological evidence in experimental animals, we see an area probably one of change in the parasympathetic distribution (the sacral fibers distributed upward from the inferior mesenteric arterial tree). One cannot deny this arrangement continuing the caecum functionally, and the narrowing of lumen at, or near, splenic flexure is practically constant. Such as it be, fluids, (liquids and gases) are definitely restricted at the splenic flexure and functionally forced backward towards the orifice of the Epityphlon, since they usually do not re-enter the small intestine. The alkaline reactions of the small intestine may change into acidity in the large intestine. Such conditions assume a separate phase, accompanied by concomitant anatomy. And the upper colon is supplied by superior mesenteric (Flint's phylogeny rule). In addition to the very great reduction of lumen at the splenic flexure, there is a pronounced angulation, with a lip at the angle. Distention occurs proximad to this. [By the canalicular and chambered alternations previously described here, in some persons there is a dilatation called the Omega loop (Piersol, 1895). This region of iliac colon occasionally becomes of great size, and terminates at the Pelvic sphincter (O'Beirne). Needless to discuss this development.] It is enough to describe that of the Caecum in relation to appendix and to state plainly the apparent value or function of its mechanism in relation to gases, and continued absorption, although modified, as far as the splenic flexure.

Summary

Having shown, in man, and in comparative animal types, the area which may be called that of the Superior Colic Ventriculus (Holotyphlon) it is evident that the Physiology and the Pathology of this portion of the alimentary canal is a very important matter; (to surgeons, dealing with the "acute abdomen," less immediate interest in previous conditions is possible).

A better handling of the colon, however, before acute or chronic lesion develop may become possible, especially if we are directed to the area as a definite region of slower progress. The study of faeces as a routine affair is still not common. Also, in acute respiratory conditions the colon demands attention. (12)

Disturbances lower in the alimentary tract cause reflex changes higher (Edward Martin). Constipation, obstipation and various excretory functions are probably concerned with difficulties in this region. Those who have seen animals (horses or oxen) became paralyzed from improper feeding, know as well as all veterinarians do, what this nerve collapse implies. In man, from childhood to old age, extreme conditions develop. Because a classical tradition denominates the large intestine (colon) as a simple entity, we have omitted to discriminate among its actual physiologic subdivisions, as we might. (7)

This note, resulting from over a thousand careful dissections, could be followed by considerable detail, known it is true to all of us, but as yet quite in its infancy as to medical application; in conditions of colon complicating other ailments, especially.

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12. Enemata, in treatments; followed by special therapy. Importance of Citrate of Potassium, for effect upon mucosa. Importance of Nitrate of Potassium for effect upon vascular supply. Importance of carbo lignis (charcoal) for local effect. *Therapeutics.* Horatio C. Wood.

Why the Failures in the Treatment of Allergy

by

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THOUGH that group of physical phenomena which we now somewhat loosely designate as *allergy* has been known to scientists ever since the days of Louis Pasteur, the phenomena themselves, as well as clinical features with which they are associated, are of comparatively recent recognition. Hans Zinsser's "Harvey Lecture," delivered in 1914, was an eye-opener to even the most advanced practitioners of medicine, and it was a long time before the results of the investigations he and others had carried on, began to show doctors how many of the common ailments whose etiology had been explained, might be controlled and abolished by nothing more complicated than dietary limitation.

It was while working in the Massachusetts General Hospital in 1914, many months before Zinsser spoke, that I came in contact with a man of 40, who had been attending the clinic for 6 years, vainly seeking permanent relief for attacks of sneezing, with alternate blocking of the nares, and discharge of a copious watery secretion. He was a baker by trade, but when questioned as to whether the attacks were more frequent, or worse, while at work, he replied he was "so bad all the time" he noticed no difference while in the bakery.

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Other physicians who had previously treated him had, upon receiving this reply, abandoned the idea of an occupational disease. But inasmuch as so many other lines of treatment had failed, I resolved to attempt something entirely different. At my request he brought me samples of all the flour used in his bakery. There were three of these samples—what he called a "high" grade, a "low" grade, and a "regular" flour. Preparing a separate paste from each sample, using water only, I made four "vaccination" scarifications over the biceps area of one arm, inoculating three with the three flour pastes, and keeping the forth scarified spot as a control. Within three minutes, reactions began in all three inoculated areas—there was rapidly increasing redness and swelling and intense itching, with a wheal-formation soon reaching 2 cm. in diameter. The control spot remained unaffected.

The intense local reaction reached its maximum in about thirty minutes, thereafter decreasing to disappear entirely after an hour and a half. There was no constitutional disturbance of any kind. I told the man to take a vacation from the bakery and to omit all bread from his diet. He followed directions and all his nasal symptoms disappeared as if by magic. Permitted to return to work, but to eat no bread, his symptoms