Original Articles.

A ROENTGENOLOGICAL CONSIDERATION OF THE RELATION OF INDIVIDUAL TYPE TO INTESTINAL STASIS.*

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To venture forth, through the mediumship of a descriptive communication, into the vastity of such a question as that of ileal stasis can hardly be considered, at the present day, to be entering upon ground untrodden, since the would-be investigator is destined to come upon the imprints of innumerable feet, some deep, as might be expected, others shallow. It is the enduring hope, however, of any subsequent explorer that he may, by chance, discover some corner as yet untrodden or that he may investigate some small stream tributary to the greater one described and charted by others. Even if he were not thus so fortunate, may it not be his mission to extol the importance of the smaller tributary as it adds its volume to the onflowing of scientific enlightenment?

Thus to trace more deeply the course of such a contributory stream, upon the broad map of our understanding, it is the writer's hope. It has been given him, perhaps, to outline with freshened pen its devious boundaries, already firmly drawn.

To speak more concretely, one may doubt if the discovery of a great river has created in the world geographic an enthusiasm more profound than that which has been stimulated in the realms of medicine by our growing intimacy with the pathology of the alimentary tract. This is made possible, in great measure, by our equally growing familiarity with the diagnostic possibilities of x-rays. From the days of Cannon's classical observations upon the alimentary function in cats, our progress has been without hesitation or pause. Many have been the contributions to our rapidly-developing conception of things alimentary, and workers in the roentgen field have been the proud bearers of the guiding torches. Among those who have lighted our way most radiantly, some are here today, and by his association with them upon the deliberative records of this society the writer at once becomes doubly honored.

Intestinal stasis! Casual consideration of its mere definition will give but little idea of all it embraces. To recall to one's memory the instances where patients have presented proven intestinal stasis is but to create the mental picture

of a small army of individuals who are the victims of nearly every variety of subjective symptoms. This multiplicity of symptoms is far in excess of the relatively small group forming the classical complex of chronic constipation. The developments of our increased knowledge prompt us now to include, as manifestations of intestinal stasis, the periodical hunger pains and epigastric pressure-points of tenderness which we were wont to associate with duodenal ulcer and which we now know may not be ascribed to ulcer—in the strict sense of its floridity. We must also include in the gamut of such manifestations the pain of the familiar gall-stone attack. It were better, perhaps, in the light of present understanding to designate such distress as a "gall-bladder attack" rather than a gall-stone attack, or else to adhere solely to the term "biliary colic." We must include epigastric or abdominal pain due to jejunal constrictions, or inhibitions of like nature. We must not forget the ileal stases with or without their prevalvular kinks. We must not neglect to include the swelling and the tenderness of the perityphlitis. Intestinal static influences must embrace as well the neighborhood symptoms of the chronic appendices, to say nothing of the not impossible periappendicular manifestations after the removal of the appendix.

Distal to the ileocolonic valve, intestinal stasis comes into its own, so to speak, and it manifests itself in the cecum, as has been said, in the ascending colon, and by influencing the relation between these two, as well as along the colonic path, with especial reference to the two flexures, concerning which more will be said; thence onward,—the distal rectum, only, forming the limitation of possibility for its mischief-making proclivities.

So much for the anatomical opportunities offered for the production of stasis, which may be classed as immediate,—its primary foci, so to speak. Is it to be wondered that many and diverse are the symptoms which may arise locally, to say nothing of the element of pain which may be referred from the primary point? The function of this paper is to deal, however, not with the question of referred pain but with that of transferred mischief—engendered and sustained by intestinal aberrations producing stasis. Such mischief, however, though secondary to the causative factor, is made up of pathological entities.

The term "chronic rheumatism" is not merely that form described in the text books under this appellation as the sequel of the subacute mono- or polyarticular type which is described in turn as the sequel of the long-recognized acute rheumatic fever. "Chronic rheumatism," as a term, is here employed in its broadest, most ill-defined and popular sense. The term may embrace, with equal pertinence, the muscular type, the infectious articular type, both single and multiple, the manifestations often classed as rheumatoid arthritis, as osteo-arthritis and as

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chronic gout, under the all-embracing term of "arthritis deformans."

To single out "chronic rheumatism," so called, as occupying an interrelational position with intestinal stasis, is merely to select one of a long series comprising the sequelae of prolonged infectious or chemical absorption or intoxication resulting from such alimentary delay. It was here selected, as being important, in spite of the fact that the subject is far from being a new one, first, because articular mischief is of such common occurrence as to come almost daily under the observation of all; second, because articular change, if tangible and evident, will provoke prompt complaint from the patient, especially from those of the female sex; and third, the length of this paper will permit of a consideration of but one of the great group of functional perversions secondary to aberrations of metabolism.

It is now generally recognized that either the tonsils or the teeth may equally well act as an *atrium* for the entrance of bacterially noxious material, thereby destined for systemic absorption. The gastro-intestinal tract, however, much more often comes under the observation of the roentgenologist and, therefore he, like any especially-trained investigator, is compelled and impelled to employ his own view-point and his deductions therefrom. The writer, consequently, realizes the limitation of his field of vision as he gazes at the situation through his own relatively small aperture, but reiterates his desire to deal with a clinical question as broadly as he may, although surrounded by clinicians who have balanced this matter, as between diagnostic cause and therapeutic effect, with the utmost nicety.

So much for explanatory preamble.

The possibility of secondary joint infections as well as deposits of a chemical nature following chronic intoxication or autointoxication from tonsils, teeth or alimentary tract is now well recognized in every medical community. This general recognition has been stimulated by the literary contributions of various authors working from the view-point of the dentist, the rhinologist or the orthopedist. Infections from the alimentary tract, involving the joints as depositories, deserve and demand especial recognition on account of the fact that their etiology has been so thoroughly recognized through the agency of roentgen rays. Basing their clinical deductions upon the roentgen evidence afforded them, a group of practitioners, especially Goldthwait of Boston, have not only demonstrated the co-relation between alimentary (especially intestinal) stasis and certain non-tuberculous joint-manifestations, but they have been able to recognize certain types of joint-aberration as arising from infection and others from chemical influences. Of this, the literature of the last few years contains much. To mention, also, those who have demonstrated, from the stand-

point of the roentgenologist, the manifold possibilities of delayed intestinal digestion is but to name the foremost roentgenologists of the day. The literature upon this aspect of the subject is, likewise, anything but meagre. By even a cursory perusal of this mass of published work a horde of questions arise in one's mind. For example: Why are some individuals constantly constipated, although as to age, temperament, physique and activities they are diametrically at variance with the general conception of the picture of constipation? Why, in some instances, does it seem that non-tuberculous joint-disease may be hereditary, so called, and in others not? Why, as Codman asks, is it that some patients, who are obviously not distended, complain of distress from gas? Why do offspring of the same family present the same general subjective manifestations of constipation, although their environment and their detail of living has been different for years? These questions are by no means all that surge into the contemplative mind and their answers must be sought.

Therefore, today, the writer ventures to suggest, at least in so far as the arthritic cases are concerned, a deeper search into the possible causation thereof. Through the continued good offices of x-rays we daily recognize the congenital veils and Jacksonian membranes, the Lane's kinks, and pericecal adhesions, but is the nomenclature, after all, a clear one? When we say a membrane or band is congenital, can we eliminate the co-existence of an acquired post-inflammatory adhesion? Our true classification, the writer feels must go behind and back of our roentgen appearances, and his impression has been strengthened by many suggestions made by Goldthwait, with whom the writer has had the good fortune to go over a considerable series of cases.

In the *Johns Hopkins Hospital Bulletin* for November, 1912, R. B. Bean, associate professor of anatomy in Tulane University, New Orleans, presented the records of some striking observations made by him with reference to human morphology based upon his studies when in residence in the Philippines, as well as upon some comparative studies as between the white and black races in New Orleans. He arrives at a most ingenious ontological nomenclature. He has been able to classify man's form into subdivisions based upon the two fundamental embryonic tissues, epithelium and mesothelium. He finds that each form is most susceptible to affections of those organs which are developed from its respective embryonic tissue. That form arising from epithelial embryonic tissue is most susceptible to affections of the lungs, nervous system and alimentary tract; the one springing from the mesothelial, he finds is more susceptible to affections of the circulatory system and kidneys, therefore, one he terms the epitheliopath and the other, the mesotheliopath. By certain physical characteristics, namely, the ear, the

physiognomy and the stature, he is enabled further to class the epitheliopath as the hyper-onto-morph and the mesotheliopath as the meso-onto-morph. The hyper-onto-morph, which is the form interesting to us today, he found to be either tall and slender, or small and delicate, with broad forehead and small chin, eyes wide open and close together,—in short, the fundamental European form. In this epithelial type, or hyper-onto-morph, he found the intestine to be short, twelve to fifteen feet, while in the mesothelial type it was long, twenty to twenty-five feet. He often amazes his students, at a dissection, by predicting the length of the intestine by means of the conformity of the external ear. Into an explanation of this classification it has thus been necessary to enter here as a basis for a possible theory as to the causation of so much alimentary disturbance in a certain well-known type of patient. All practitioners know the type: the lean and tall, or the small and delicate nervous and high strung, often very active in habit, but many types possessing a sort of purposeless activity, unstable, querulous, oftentimes irritable; many, possibly, with a muddy skin tending toward sallowness. This corresponds to that which Sir Frederick Treves has called the carnivorous type of human conformation and habitus, as opposed to the larger, more flabby, more sluggish, more peaceable of mind and less nervously developed type, which he calls the herbivorous type. Even the clinical history, in the human carnivora, so to speak, is characterized with relation to their alimentary aberration. Oftentimes the deficiency has been observed from youth, and almost invariably we hear that it has been existing for a long time and possibly, the patient may say, since the days of childhood. Is it not possible, that, in this type we may find an abiding place for chronic gastro-intestinal aberration which can be based clearly upon a congenital hypothesis? This "carnivorous" type corresponds closely with the *hyper-onto-morph* of Bean's classification, in other words, the type susceptible to affections of structures which are highly developed from epithelial embryonic tissue, namely, the lungs, the nervous system and the alimentary tract and the type in which an anomalous length of intestine has been so constantly found by him.

Goldthwait's attention has been drawn to this type of individual; the carnivorous type, if you please, or the hyper-onto-morph or the epitheliopath, by the statural or structural characteristics it presents and through which it naturally appeals to the orthopedist. He has been able to recognize the type through its faulty position, round shoulders, its lack of poise, its contracted chest, prominent scapulae and relatively protuberant abdomen. Family habits of carriage or occupational resistance to proper poise may, of course, be found in individuals varying widely in weight and general physical attributes, but this complex of clinical postural de-

fects is sufficiently constant in relation to many of those classified formerly as "neurotics," as to be striking indeed. It will be seen on consideration that the "neurotic" type, so called, conforms accurately with one subdivision of Bean's classification as well as that type of individual presenting that which Goldthwait calls the congenital type of visceral ptosis, which he is able to trace back through early life. The faulty attitude and posture, often combined with rapid growth, become sooner or later associated with poor digestion, characterized by fickle appetite, foul breath preceding attacks of vomiting, as well as intestinal flatus and colic. That there is an embryonic basis for this type of individual Goldthwait believes. Only on this ground can we give reason for the gastro-intestinal appearances which we often see in young children. Many children, he declares, are born embryonically too soon, while the stomach is as yet incompletely differentiated from its tubular embryonic form and the colon not yet mesenterically adherent to the posterior abdominal wall in its ascending and descending portions. Thus the colon offers, in extrauterine life, insufficient support to a stomach in itself lacking in sufficient embryonic development. Only when the child begins to assume the erect posture do the results of this developmental arrest begin to assert themselves. Arbuthnot Lane's classical contribution upon the formation of developmental adhesions give dependable support to this very question. It has remained for the roentgenologist to illustrate, through his daily observations, the practical application of this hypothesis. Conditions which can be directly traceable, it is believed, to the congenital type of visceral ptosis have been described in the published reports of the foremost observers. Those way stations in the alimentary tract which have been of the greatest interest to roentgen workers are within areas of co-relationship between movable and fixed points. For instance, the relation of the stomach to its cardiac and pyloric fixed points, the relation of the terminal ileum to the relatively fixed point of the cecum, the relation of the colonic flexures to their posterior mural fixed points, the relation of the transverse colon to the fixed points of the colonic flexures, and so on. In certain cases (and after a moment's thought it will occur to many that such cases are often seen in the human "carnivora") x-rays, as well as auscultation and percussion will reveal the long-hanging bag of the so-called ectatic stomach. The writer has come to speak of this as the "inverted goose-neck" stomach and its conformity will at once arise in the memory of all those who have observed it with any frequency. At the lowest point of this stomach, the stagnant food lies in the form of a residue of greater or lesser extent. We are wont to speak of the walls of such a stomach as atonic. Atonic they undoubtedly are, but the atony is often seen to be out of proportion to a lack of tone elsewhere in the individual. Is it

unreasonable to assume that this elongated viscus may thus be susceptible to ectatic influences on account of a lack of embryonal development? In other words, that it has not advanced to a sufficient degree beyond its fundamental tubular form? What roentgenologist has not unexpectedly come upon the existence of such viscera!

Around and just distal to the pyloric orifice we come upon a region of even greater moment, in which the congenital influence is just as important, if not more so. The duodenum is another fixed point and will not give way to the influences of dragging and gravity without assuming great distortion of its normal contour. If there is pull and drag there is usually an inhibition of blood supply which in turn sets up a local anemia, in time, possibly, gangrene and then a process of ulceration. Why, indeed, should not duodenal ulcer be common? Again, distortion of the duodenum by pull and drag produces defects of emptying as they do defects of filling,—another chance for the absorption of bacteria! Moynihan has said that it is now generally accepted that gall-stones are caused by infection. Gregory Cole writes that the indirect roentgenological evidence of gall-stone is really more valuable than the direct evidence. He believes that the deformity of the duodenal cap (the first portion) "and the pars pylorica . . . are stronger roentgenological indications for surgical procedure than the presence of calculus in the gall-bladder." Of course this is so, and unless the cholecystic and pericholecystic conditions thus indicated are recognized, the patient is not going to get well! Cole goes on to say that "it is immaterial whether the infection is due to gall-stones, typhoid or some unknown cause, or whether it has been of sufficiently long standing to allow the formation of gall-stones." The writer stands here today as the champion of the "unknown cause," which indeed may have its incipency *in utero*! He believes that acute cholecystitis is relatively, of itself, rare and that to classify it as an acute exacerbation of a chronic cholecystitis is infinitely more correct. Thus can we wonder at the occurrence of adhesions? Can we marvel when we see, as we do, the evidence of such adhesional influences in young people? Moreover, such influences in old or young are far-reaching. Cole considers the adhesional effect of gall-bladder disease upon the hepatic flexure as important. The writer thoroughly agrees and believes, as he will endeavor to show, that, so influenced, the hepatic flexure offers even greater opportunities for bacterial growth and absorption.

The ileocolic region offers the next great center for delayed traffic and here the individual's alimentary powers not only have to contend with a movable point dragging or twisting upon another which is relatively fixed, but also the situation is here made more favorable for septic absorption by certain *normal* motor manifestations. The discovery of anastalsis in certain

lower animals by Cannon and Case's verification of the occurrence of antiperistalsis in man, not only in the proximal but in the distal colon, offers a check to prompt elimination from viscera influenced by postural or adhesional drag. If the ileocolic valve is incompetent, as Case and others found in the proportion of one to six, the situation becomes all the worse.

It is the occurrence of developmental variations in the length of the colonic mesentery or, as has been said, an arrest in embryonal progress tending to the normal disposition of the mesentery which is of so much importance in this congenital type. The question of atony need not enter primarily into the matter nor the question of adhesional influences until after birth or until the erect posture is assumed by the growing individual. Here arises again the phenomenon of perverted relationship between fixed and relatively movable points, in this instance at the right and left flexures. Two normal conditions are to be met with in the bowel which tend to emphasize the bad effects of increased angulation. Such aberrations near the hepatic flexure are accentuated by the effect of the physiological tonic constriction ring in the transverse colon just to the right of the median line, described by Cannon in cats and by Case in man. On the opposite side, the anatomically high placement of the splenic flexure marks a steep grade of ascent thereto from a transverse colon, which may be but loosely supported by a long mesentery. It is not hard to appreciate the effect on the flexural bowel by such drag and pull. Blood supply is deficient and anemia and possible gangrene ensue. Nervous stimuli are deficient and perfect haustration is lost. The mucosa is broken down and to its ulcerated surface fecal masses adhere, setting up undue putrefaction and absorption of the products thereof. The writer believes that there is a chance for much study, in a way roentgenological, of the colonic flexures, not merely as mere angulations, but as receptacles or reservoirs, if you please, for content-stagnation, with its manifest effect. Quimby of New York has considered well the matter of colonic angulation, although he discusses the matter of mechanical inhibition to its function as a phylogenetic manifestation rather than an ontogenetic one. The writer feels that the presence of putrefactive masses and gas within the flexures constitutes a handicap to its proper physiologic filling and haustration and that we can recognize and describe roentgenological flexural filling defects as well as those presented, for instance, in the duodenum. The situation is a bit more complicated, to be sure, but the possibility promises much in the way of diagnostic refinement.

To revert to the peripheral joint-manifestations of auto-absorption, with which this paper deals, it must not be assumed that intestinal auto-intoxication produces joint lesions alone or that other sources of infection do not share with the hollow viscera the questionable honor of

creating joint manifestations. Again, to speak concretely, it may be but accidental, in our above described congenital type, that the *joints* show secondary change at all; the symptoms may be far more diffuse, corresponding generally to those of the chronically constipated. Conversely, the picture of congenital stasis may present as well suspicious teeth and tonsils. The pharyngeal and cervical glandular manifestations have been a classically described symptom of Still's multiple infectious arthritis in the young.

It has been found that certain types of arthritic pathology, of which, possibly the so-called hypertrophic form may be taken as an example, are, apparently, engendered by an interference with the normal intestinal chemistry by which bacterial reproduction is controlled. May it not be an open question, as Goldthwait says, as to whether or not those joint changes, which we have previously ascribed to metabolic deficiency, may be classified in the same general gamut; in other words, may not our so-called metabolic aberration be merely the middle ground between our mechanical and supportive alimentary defects as a cause and our joint manifestations as a result?

A table which I shall presently take the liberty of showing represents a comparison, with reference to their cardinal signs and symptoms, as set forth in the writings of four standard observers, between certain chronic intestinal conditions of a physiological inhibitory nature and a certain so-called "constitutional disease" presenting joint manifestations. It is not asserted that the contents of this table are conclusive or even striking, but to the writer they are at least suggestive of the possible existence of a common source for many instances of all these afflictions just as all European peoples can trace their origin to the Aryan race. Deep consideration of this hypothesis will at least convince one of the futility of attempting to control, in the hope of success, the progress of these cases by local therapeutics. It is a question indeed as to whether or not the originator of the term "constitutional disease" "builted better than he knew," since he must have failed to appreciate a morphological basis for such manifestations.

What is the full significance of the congenital predisposition to systemic infection as it occurs to the mind of the general practitioner? How can he best apply his influence to the betterment of such conditions? The whole matter should be for him a part of that great problem we are facing today—preventive medicine. It is the general practitioner to whom we look for true picket-duty in the great conflict against disease by means of the accoutrements of prevention with which we are seeking constantly to arm ourselves, and the peripheral sensory nerves of any army are the outposts thereof. It is the general practitioner who is destined to first scent the hostile smoke and who must always combat the initial attack. Properly to pursue his picket-duty, he must be constantly on the alert to recognize among those with whom he comes daily in contact and in whom disease is merely waiting for the chance to assert itself, a type, a point of vantage, as it were, in which our common enemy seeks to gain a foothold. Such a foothold may be in the little child who, by virtue of congenital circumstance is about to offer this vantage ground. From this possession, the influences hostile to health can be wrested only by the upbringing of that child in such a manner that from year to year the situation becomes more and more untenable for the enemy. The mode of attack is a matter without the province of this paper to discuss, but the writer will say that there must be formed immediately a triumvirate for prevention, which shall be made up, first, of the general practitioner; second, of the roentgenologist; and third, of the surgeon, the orthopedist or the general therapist, as the case may demand. The function of this triumvirate is obvious and the duties of each member are clear and well-defined enough. Its chief task, however, shall be to recognize a type, or status, a diathesis, if you please, which heretofore has too often failed of recognition. To this status, or type, the writer ventures to give the name of *abdominal viscerosis*, and a full recognition of the existence of such a status will be justified in full by the number of abdominal viscerotics which can be treated properly only through a clear sensibility of the true nature of their predisposition.

	Chronic Rheumatism (Strict Sense)	Arthritis Deformans	Gout.	Gall-Stone.	Constipation.	Visceroptosis (Glénard)	
						Type 1	Type 2
Age	Past middle life	30—50	30—50	Over 40	Age of less- ened activ- ity	No bear- ing	
Sex	Male	Female	Male	Female	Female	Women	Usually female
Habitus	Slothful	No especial bearing	Slothful	Lack of ex- ercise (Strümpell)	Slothful	No bear- ing	Active
Hereditary influence	Rare in youth	Hereditary	Hereditary	"Has been observed in the new- born" (Strümpell)	Hereditary congen- ital	No bear- ing	Young

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DESCRIPTION OF PLATES.

(The process of reproduction reverses the right and left aspect in these illustrations.)

PLATE 1 represents a portion of the intestinal tract in a child of nine in whom a most pronounced degree of constipation has persisted ever since birth. The bowels from early infancy have failed to move normally and have been assisted with the usual routine of mild laxatives and soap suppositories. Within the last several months a train of symptoms has slowly arisen which demanded professional attention. The child complains of headaches, is undersized, is called nervous and easily cries. The breath is foul and there is periodically a series of unaccountable vomitings. The case has been recognized as one of weak digestive powers and has been generally accepted as such. This plate illustrates the situation at a six-hour interval, post cæcum. Much advancement has been made in spite of the evident aberrations in the course of the large gut. In other words, the subjective manifestations seem to rise from the colonic abnormality rather than any difficulty affecting other portions of the intestinal tract. The general course of the large intestine at this time is shown merely to offer the suggestion of a general mesocolon evidently congenitally aberrant. This case lacks the multiplicity of visual evidence which can be presented by others, but it is shown on account of the often unexpected disposition of the large intestine in the young.

PLATE 2. The same case at nine hours.

PLATE 3 represents the case of a young person of eight who was apparently much below this age in point of development and, to whose physician, two cardinal objective symptoms were presented. On the one hand, an extremely foul breath, and on the other, a clubbing of the finger tips. Beyond this there was nothing presented of great moment except a degree of constipation which the young parents thought to be inevitable in a child of this age, associating, for some unknown reason, a condition of constipation with childhood. The Röntgenological evidence of the distribution of food in the intestine at a twenty-four-hour interval, post cæcum, presents distinctly the type of condition described by Goldthwait and Jackson, namely, "delayed traffic" to the extent that there exists in this case at the hepatic flexure, or thereabouts, a degree of extraneous material which is believed to be the direct result of local putrefaction. It is this material which is most visually to be recognized as gas in overabundance which the writer believes accounts for many cases of so-called "fling-defect" at the flexures. The delay in the ileum is also seen. The mass-movement in the distal transverse colon is irregular and actually slow. This child has not been treated except by means of abdominal external support and general attention to hygiene. She has distinctly improved, the foul breath having totally disappeared.

PLATE 4. represents the case of a boy of seven in whom the chief objective symptom was an intermittent diarrhoea, the attacks of which were severe and profound. Subjectively much pain persisted, not only in conjunction with the diarrheal attacks, but also during the interim between them. This pain was referred especially to the right iliac fossa, but was also felt upon the left side. The original diagnosis was that of an appendix with recurrent attacks.

The record here shown is one in which the exposure to x-rays was made at a six-hour interval, post cæcum. There is a degree of residue within the ileum which perhaps is not unreasonable at this hour in a child of this age. The colon is seen to be distended. Its haustration is irregular, with the presence of much gas, which greatly distends the lumen of the colon. The course of this gas indicated to the observer that, possibly, there might be a congenital aberration in the length of the mesocolon with reference, possibly, to the mesocolon of the transverse section as well as in the immediate region of the descending colon.

On operation it was found that the transverse mesocolon was unduly short whereas the mesentery acting as a support for the descending colon was of undue length in comparison. The child presented generally the type of so-called congenital abdominal "viscerosis" although its growth had not, up to the time of the examination, been very rapid. Constant headache and gastro-intestinal attacks, however, suggested the Röntgen examination.

PLATES 5 and 6. These were made from a series in two cases representing two sisters and illustrating similar counterpart cases which are often seen in members of the same family. These girls, at the time of examination, were respectively twenty-four and eighteen years of age. The first case presented no gastric symptoms whatever, but a marked and increasing constipation for the last four years. More or less ileocecal discomfort, but no attacks which have been clinically diagnosed as due to an appendix nor has she been operated on for an appendicitis. She has had no especial headache nor periods of mental or nervous depression.

The abnormality seen by x-rays, at a six-hour interval, post cæcum, is one chiefly of an aberration in relation between the right half of the transverse colon and the ileocolonic structures. Since the history of constipation began she had suddenly a severe pain in the right knee which is persistent, although no other joints present any undue manifestation. The knee is swollen and is limited as to normal motion, but is not unduly hot or tender. The patient wonders whether or not this knee may be due to dancing and it would not give her concern except for its persistency.

The other case presented in many details the same picture as that of her sister, who was previously examined by the writer about four years before. Subjective symptoms in this case, however, were much more severe than in the other. Constipation was marked and was attended with more subjective manifestations than were to be noticed in the case last described. The interrelation between the proximal colon and the right half of the transverse colon is characteristic and subjective. For this condition, which was believed to be of an adhesional nature, she was operated and a series of broad bands were freed. The sister first described has been put upon a course of albolene and at last reports was doing fairly well.

These two cases illustrate to the writer's mind the likelihood of similar manifestations appearing in the same family and the occurrence of a marked condition in either mother or one child of a family, should, he believes, put the practitioner on his guard for such manifestations in others. These two girls could not be said to be pursuing a dissimilar mode of life. They were the children of fairly wealthy parents and, it is presumed, were under the same family influences. These two cases, therefore, are perhaps not so distinctly exemplary of congenital influences as are the following:

PLATES 7, 8, 9, 10, 11. These are records of two sisters who, although having great physical similarity, nevertheless, have for some years pursued devious habits of living. At a six-hour interval, post cæcum, (7) one will see that although the ileum should be by no means empty normally, nevertheless, the proximal ileum in this case presents a more copious distribution of food than should be seen even at this interval. At a nine-hour interval, (8) a great deal is to be gathered in the way of diagnostic information. The stomach still contains a marked residue which is consistent with its pronounced ectatic form in the early exposures, not shown here. The transverse colon is low in position; its hepatic angle is accentuated. Evidence of ileal stasis is to be seen. The appendix is, apparently, by virtue of its position, involved in the general adhesional process. At twenty-four hours, (9) the engorgement of the cecum and all of the colon proximal to the hepatic flexure is to be noted. But erratic and sporadic mass-movements have, apparently, taken place distal to the hepatic flexure.

The other case presents very much the same situation. The plate shown is that of a nine-hour interval, post cæcum, (10). The stomach in this case contains an appreciable residue which, to the writer's mind, as in the other case, is due not only to the degree of ecstasis present, but also to periduodenal or peripyloric inhibitory adhesional influences. There is ileal stasis, although the interval is but nine hours, post cæcum. At twenty-eight hours, (11) the cecum is seen to be engorged, the influence to which end is, possibly, located around its distal portion. Much gas is contained at the right flexure and the relation between ascending and right transverse colon is clear enough.

The two cases illustrate well, as examples, the carnivorous type of being. These girls are lean, almost, in the case of one, emaciated, pinched features, extremely active sensorium; sallow, swarthy skins and, as a whole, distinctly of the type we have been in the habit of calling "neurotic." One, however, lives in the apparent quietude of home life with opportunities for regular eating and habits of excretion. The other works as an operative

in a manufacturing establishment. She is obliged to eat somewhat irregularly, or rather to eat insufficiently during hurried opportunities. A strong suggestion of family tendency toward alimentary visceroprosis is offered here.

PLATES 12, 13, 14, 15, 16, 17 represent a series of six intervals made from a larger series, in a case which is interesting, as exemplifying, it is believed, a certain type of intestinal stasis. The appearance herein shown, while less demonstrative than many records of other observers will, it is believed, be familiar at once to the Röntgenologist just as the symptoms presented by the individual will be familiar to the clinician. This patient, a woman of thirty-five, has been annoyed by a manifestation of constipation through the influence of which she has gone without motions for days. This affection has been existent for many years. She is unable to move her bowels without the assistance of artificial means which, of course, has gradually lost its effect. Much headache, much muscular stiffness—she becomes very despondent at frequent intervals—gives no history of definite rheumatism, but is much annoyed by neuralgia, particularly of the facial type. Considerable abdominal soreness and tenderness on pressure.

The Röntgenological findings, as presented by these plates, are extremely interesting. At an interval eight hours after the meal (12) the ileum is found to be normally empty—the cecum engorged, as well as the ascending colon below a level corresponding to the iliac crest. Above this level there seems to be an effort toward advancement into the right flexure proper. From twenty-three hours, post cæm, (13) to thirty-two hours, (14, 15, 16, 17) this advancement has subsided and the entire mass of food is packed into the cecum and ascending colon below the above mentioned level. It is believed that here we have one of those situations wherein anastalsis, being in the ascendancy, is acting as an inimical influence to the passage of food and resulting in an engorgement of the cecum. There is presented little evidence of advancement, but there is suggested the existence of an inhibitory entity, possibly of an adhesional nature, which is shown beautifully at a twenty-seven hour interval (16). At a thirty-two-hour interval, post-cæm, (17) again there seems to be an effort at advancement over the right flexure. The constriction-band at this moment seems to have caused a distinct separation between the distal and proximal masses of content. This case, I believe, shows well as an example of those instances where normal peristalsis, interfered with pathologically, is unable to overcome the influence of antiperistalsis and whose antiperistalsis, though primarily normal, becomes here secondarily abnormal.

PLATES 18 AND 19. These are also indicative of conditions found in cases similar to those already described. At a six-hour interval (18) gastric residue exists. A strong suggestion of the reduplication of the large bowel is seen and this suggestion is converted into a certainty when the record made at twenty-four hours (19) is presented. Here the flexure is filled with the effects of content-decomposition in a "filling-defect" made inevitable by the presence of these influences. A suggestion of a possible constriction-band is offered in the distal cecum. The case was one which can be clinically listed as that of an abdominal viscerotic of a marked type.

PLATES 20 AND 21. These present the case of a gentleman who is virtually a cripple from arthritic manifestations of which he has been the victim for years, although his early life was free from such influences. He presents at nine hours, post-cæm, (20) a comparatively good arrangement of the large bowel, with the exception of the presence of much decomposition at the area of greatest apparent stagnation. His cecum is, to a great extent engorged, although the ileocecal valve is sufficient as to function.

PLATES 22 AND 23. These are a part of a series in a lady of fifty who presented, to the writer's mind, the evidence of extra- and periduodenal adhesional influences strongly affecting the contour of that portion of the intestine as described by Gregory Cole. She has presented for years the history of gall-stone attacks. It is likewise believed, as shown by these records, that the hepatic flexure is also involved within the adhesional influence and, consequently, gives rise to the usual symptoms of back-pressure proximal to it which are seen before you. A comparison with the flexure at the splenic angle will show you the apparent comparative freedom of this structure.

PLATES 24 AND 25. These plates illustrate a case of distinct "hyperomomorph." The woman presented, besides the usual symptoms met with in patients of this stamp, a general painful condition which was diagnosed as muscular rheumatism. The condition, as here seen, is simply a repetition of records which have already been described above. Especially to be noted is the relation of the position of the mid-portion of the transverse colon to the flexural fixed point on the splenic side.

PLATES 26 AND 27. These illustrations present the general peri-appendicular picture in a case which was referred primarily as one of chronic appendicitis. The position of the filled appendix will be seen, but its stereoscopic portrayal naturally elicits a true appreciation of its relationship to the cecum. The ascending colon is tortuous and the transverse colon is, for a certain distance, reduplicating upon it. The cause of the attacks, to say nothing of the general intestinal disturbance, is clearly manifest in these portrayals.

PLATE 28 is presented as illustrating, in large part, abdominal visceroprosis of congenital origin. The symptoms are largely those of constipation in a young individual, intermixed with diarrhea. Subjective symptoms were especially manifest, extending over a considerable period of time. It presents a ptosis by which the median portion of the transverse colon sinks well into the anatomical pelvis. The right and left flexures are acutely angulated and the history suggests that there may be here a distinct aberration in the length of the mesocolon. It is but one of many examples which constantly come to the attention of the Röntgenologist and which are more often testing the acuteness and keenness of the general practitioner

A FURTHER STUDY OF CANCER.*

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FURTHER experience confirms the general truth of the writer's views, expressed in "A Study of Cancer," (BOSTON MEDICAL AND SURGICAL JOURNAL, Jan. 15, 1914.)

Without again going over the argument, the main points in the theory are as follows:

- (1.) Cancer a disease of disordered nutrition.
- (2.) The probable origin of the growth is in a highly specialized cell or cells which for some reason or other (possibly always trauma) have undergone a retrograde metamorphosis to the point where the power of reproduction, common originally to all cells but lost in these highly specialized cells, has reappeared.
- (3.) This reproduction of such reverted cells is caused by a relative hypo-function of certain ductless glands.
- (4.) To produce cancer, such hypo-function must be primarily in a ductless gland derived from the same blastodermic layer as are the cells from which the cancer originates. For example, cancer of the breast implies hypo-function of some ductless gland or glands derived from the ectoderm,—the breast epithelium being ectodermic in origin.

(5.) In some vital manner, sugar metabolism and calcium metabolism are involved in the disordered nutrition resulting in cancer.

(6.) The ductless glands at fault in each case have some vital relation to sugar metabolism or calcium metabolism or both. As bearing on the last two points it has been shown that cancer patients in general have a hyperglycæmia, though rarely a glycosuria. Diabetes and cancer are rarely present together. Cancer patients, like tuberculosis patients, have in general also a poor calcium metabolism, the "pre-cancerous" condition resembling in many respects the "pre tuberculous" condition.

Whether the theory be true or not, it seemed not only fair but obligatory to act as though it were indeed true in inoperable cases unless and until something more promising appeared. Two methods of attack suggested themselves. First, to use sugar or calcium or both medicinally on the ground that the hyperglycæmia is an effort of nature to cure and that the failure of lime metabolism might be helped by lime administration. Second, to supply the theoretically failing ductless gland secretion if possible.

With regard to lime, we have done very little because of our ignorance. The writer has collected a mass of material on lime metabolism and the relations to it of the ductless glands but is not prepared to venture any opinion in that direction.

The sugar metabolism literature is bewildering. It furnishes, however, a number of sug-

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