CHRONIC INTESTINAL-STATIS

With special reference to its
Surgical Treatment

THESIS

Submitted for the
M.D. Edinburgh.

By

RONALD MCDONALD CAIRNS
M.B., Ch.B., Ed. 1920

Late House Physician and House Surgeon
Royal Infirmary, Edinburgh.
The subject of Chronic Intestinal Stasis is a wide one, has given rise to much discussion, has led to an immense amount of investigation and research, and can certainly be termed one of the most topical subjects of present day medical literature. Yet in spite of the amount of investigation it has received, it can safely be said that but little is known of the true nature of the condition, its etiology is still somewhat obscure, the differential diagnosis of its various forms presents many difficulties and its treatment remains a matter of much controversy amongst the authorities on the subject.

It is of frequent occurrence, but its prevalence rather inclines to be directly proportional to the degree of civilization, as is evidenced by Colonel McGarrison's experience in the Himalayas, where bowel complaints, referring in particular to stasis and its subsequent effects, are extremely rare.

Similar evidence is obtained from many other experienced medical men, who have been engaged in practice for any considerable time among the comparatively primitive races.
Its incidence is not confined to any class, or either sex, nor is any particular period of life more prone to its occurrence, which is probably more frequent than one is at present inclined to believe. In many cases the condition may exist without demonstrable cause, or there may be some pathological condition, e.g. some lesion of the neuro-muscular system of the intestinal tract, or definite obstruction to the onward passage of the intestinal contents from various causes, or it may be dependent upon the quantity or quality of the food ingested.

From a medical point of view the main interest attached to the subject centres round the phenomena arising from self-poisoning of intestinal origin, so-called auto-intoxication. The effects of the latter are far reaching and many of the chronic diseases of mankind have been ascribed, correctly or incorrectly, to its influences. In his "Observations on Purgative Medicines" published in 1805, James Hamilton gave a remarkable list of diseases which he considered were the direct outcome of constipation, and few subsequent writers on the subject have failed to add to what is now a most imposing list.

Ebstein (1) and Lane (2) are two of the most outstanding recent authors on the subject, and the latter includes almost every chronic pathological lesion from cancer to flat-foot/
flat-foot among what he considers the sequelae of intestinal stasis. The remarkable feature of the condition, however, is the fact that although some patients present symptoms of the action of the intestinal toxin, or toxins, from such a comparatively trivial provocation as even twenty-four hours delay in the action of the bowels, others may have faecal impaction for days or even weeks and yet show no signs of intoxication.

In the present thesis the writer proposes to put forward some original views on the seeming immunity to intestinal toxins in patients suffering from apparently symptomless intestinal stasis, and to discuss the present day views on the subject of chronic stasis of the intestinal contents, citing illustrative cases from personal experience.
II.

ANATOMY, PHYSIOLOGY AND COMPARATIVE ANATOMY
OF THE INTESTINAL CANAL.

In considering the subject of Chronic Intestinal Stasis only a brief review of the topographic anatomy is necessary and no attempt is made to enter into a full discussion of the abdominal and pelvic organs.

The stomach is normally located about two-thirds on the left and about one-third on the right side of the abdomen, immediately below the diaphragm. The oesophageal opening is to the left, near the median line, while the pylorus lies below and to the right, in the transpyloric plane, on the level of the lower border of the first lumbar vertebra. The organ consists of four coats — serous, muscular, consisting of an outer or longitudinal layer, a middle or circular and an internal oblique layer, submucous containing the vessels and nerves, and mucous with its secretory glands, from without inwards. The capacity of the stomach, in the average state, rarely exceeds 40 ounces, or 1 quart. (3)

The small intestine extends from the pylorus to the ileocaecal valve, which is situated at the junction of the ileum with/
with the caecum. Anatomically it is divided into three parts; the duodenum, or first part, 11 inches in length and comparatively fixed in its position, and the jejunum and ileum, which together make up the remainder of the 22\(\frac{1}{2}\) feet of small intestine. The second and third parts are not sharply defined from one another, lie in irregularly arranged convolutions, while only the proximal and distal ends of this section of the alimentary canal are comparatively fixed in position in regard to the posterior abdominal wall.

The small intestine has also four coats and differs from the stomach only in that the muscular coat consists of longitudinal and circular fibres and lacks the gastric internal oblique muscular layer.

It is considerably larger at its commencement than in its more distal parts and Gant (4) estimates its capacity at 4 quarts.

The large intestine consists of the remainder of the intestinal tract and extends to the anus. It can be differentiated from the small intestine by its larger diameter, its comparatively constant position and arrangement, thicker walls, sacculated appearance, and by its longitudinal bands and appendices epiploicae. It is between 5 and 6 feet in length, and like the small intestine there is a general tendency for its diameter to decrease as one passes from the caecum/
caecum to the rectum. Its capacity is practically the same as that of the small gut.

It is sub-divided into the colon (ascending, transverse and descending), iliac colon, pelvic colon, rectum and anus. The colon has its beginning in the caecum in the right iliac fossa and extends to the level of the left iliac crest, where the colon terminates and the iliac colon commences.

The caecum is a blind pouch and its diameter is greater than that of any other part of the colon. The ileo-caecal valve, which is situated in the posterior part of the inner caecal wall, is so arranged as to prevent regurgitation from the large into the small intestine and its mechanism is partly mechanical, in virtue of the pouting lips of the orifice as seen from the caecal side and partly neuro-muscular through the ileo-caecal sphincter. Immediately below this orifice is the opening of the vermiform appendix, - a blind tube 3 to 5 inches in length and of the same general construction as the other parts of the large bowel. The caecum passes distally into the ascending colon, the posterior surface of which is free from peritoneum as a rule and consequently fixed. The latter portion proceeds upwards to the liver, where it describes a sharp turn (hepatic flexure), which marks the commencement of the transverse colon - a section of the gut which loops/
loops across the upper part of the abdomen to the spleen and is possessed of a mesentery (transverse meso-colon), longest in the centre while the extremities of this division of the intestine are practically adherent to the subjacent structures for a few inches. In the neighbourhood of the spleen the colon turns sharply downwards (splenic flexure) and becomes the descending colon, (fixed posteriorly in a similar manner to the ascending portion) which extends to become continuous with the iliac colon at the level of the crest of the ilium.

This latter segment of the bowel passes inwards and downwards, attached posteriorly to the iliac fossa, and terminates at the inner border of the psoas muscle by dipping into the pelvis and becoming the pelvic colon, which is described by some authorities as being S shaped. It has a well-formed mesentery and varies greatly in length. These two factors account for its uncertain location in both health and disease, an inconstancy aggravated by the variety of positions determined by its various degrees of distension. The coats of the pelvic colon are similar to those of the rest of the colon but the pelvic portion differs from other parts in that in its most distal portion the three longitudinal bands spread out and lose their individuality.

The rectum extends from the pelvic colon to the anus and is/
is subdivided into the ampulla and anal canal, the line of
demarcation corresponding to the level of the medial borders
of the levatores ani muscles. The pelvi-rectal junction
forms an angle, less acute when the pelvic colon is distend­
ed, and is the site of the sphincter of O'Beirne.

Houston's cusps are situated in the ampulla and composed,
as a rule of the mucous, submucous and a varying amount of
the circular muscular coat of the rectum.

The muco-cutaneous junction is known as Hilton's white
line, and beginning just above, in the anal canal, are the
columns of Morgagni with the semilunar valves or crypts at
their bases.

The rectum has the usual four alimentary coats but as
these vary somewhat from those in other parts of the large in­
testine they merit special attention.

The peritoneum surrounds the rectum in its first part
but is gradually reflected on to the bladder, its lowest point
of attachment being to the anterior wall, 2½ to 3½ inches from
the anus. The muscular coat is extremely well developed and
the circular fibres are more numerous at certain points - the
sphincter of O'Beirne, at the bases of Houston's valves,
whilst a collection of its fibres forms the involuntary intern­
al sphincter embracing the upper part of the anal canal, the
lower part of which is surrounded by the voluntary external
sphincter.
sphincter. The submucous coat is sufficiently lax to permit of a certain degree of free gliding movement of the mucosa over the subjacent tissues. The mucous coat is thick, very generously supplied with blood vessels and contains an extraordinary number of mucus secreting tubular glands.

The anus is the alimentary outlet, and the anal papillae, situated at the lower ends of the columns of Morgagni can be seen externally.

The arterial blood supply of the stomach is derived entirely from branches of the coeliac axis of the abdominal aorta, the superior mesenteric artery supplies the small intestine, caecum and the proximal part of the ascending colon, the inferior mesenteric artery the remainder of the large bowel and the upper portion of the rectum receives its blood supply through the superior haemorrhoidal artery, which anastomoses freely with the branches of the middle and inferior haemorrhoidal arteries, derived respectively from the internal iliac and internal pudic arteries.

The veins correspond to the arteries and with the exception of the middle and inferior haemorrhoidal veins, which return some of the blood from the haemorrhoidal plexus of enlarged and freely anastomosing veins situated in the lower rectum to the internal iliac, the venous return from the entire length of the gastro-intestinal tract passes into the portal/
portal system.

The musculature of the gastro-intestinal tract has a double nerve supply, from the cerebro-spinal and the sympathetic divisions of the nervous system. The former are excito-motor in nature and the latter inhibit intestinal movements, but in accordance with the law Elliot has formulated concerning a hollow viscus the motor nerves to the involuntary intestinal sphincters are derived from the sympathetic system.

The gastro-intestinal tract, proximal to the ileo-caecal junction is supplied by the vagi; the remainder by the pelvic nerves derived from the sacral cord. The sympathetic supply can be divided in a similar manner, - the stomach and small intestine receiving their fibres from the splanchnic nerves, derived ultimately from the lower dorsal and upper lumbar portions of the cord and having their cell station in the solar plexus, the colon and rectum being enervated through the fibres originating in the lumbar region of the cord, with their cell station in the inferior mesenteric plexus.

A summary of the anatomy of the gastro-intestinal system would be incomplete without reference to the following muscles which make up the pelvic floor, a structure important because of the partial support it gives to the pelvic organs and the part it plays in the act of defaecation, - the internal and external/

( 10 )
external anal sphincters (vide supra), the transversus perinei, retrococcygeus and the levatores ani.

**Physiology.**

Intestinal stasis can be defined as a condition in which the contents of the alimentary tract are delayed for an unusual period of time within that tract and, as Gant (5) points out, every pathological process is, in view of this fact, only a modification of a physiological one. Consequently an outline of the physiology of the intestines is essential in connection with the study of this disease.

Food is received into the alimentary system, during its transport through the tract is acted upon by the various digestive ferments, the useful products of these changes absorbed and the residue eliminated. The gastric contents are retained until the acidity reaches a certain level, when the pylorus is reflexly opened and small quantities pass through into the first part of the duodenum, the pylorus closes behind and remains closed until such time as the chyme, in its new position, is rendered alkaline. Then the cycle of events is repeated. The passage of the food, in the intestine, is effected through the agency of peristalsis, which is herewith summarised.

The movements of the small intestine consist of:

(a) Peristaltic/
(a) Peristaltic waves, only a few inches in length, accompanied by contraction of the bowel above and dilatation of the part immediately below, which occur independently of the central nervous system, but depend upon an intrinsic nervous mechanism, the plexus of Auerbach, situated between the longitudinal and circular muscle layers, composed largely of nodal tissue, apparently analogous to the cardiac nodal centres. Perforating branches of this plexus form Meissner's plexus in the submucous coat but the actions of these plexuses is affected by the extrinsic nerves, by purgatives, by distension of the gut, by the stimulation of electricity, massage, and vibratory appliances and by strong emotions.

(b) Rhythmic segmentation, in which, at regular intervals, simultaneous constriction of the gut appears, within a few seconds each segment is halved and the corresponding halves of adjacent segments unite to form a new series of segments. These movements are generally considered myogenic in origin, their function is the thorough mixing of the food and ferments and to facilitate absorption, and unlike the peristaltic waves they have no translatory effect.

(c) Pendular movements of the individual coils of gut described by Starling.

The contents of the ileum reach the ileo-caecal valve, as a rule about one hour before any chyme passes through into the/
the large bowel facilitating more thorough digestion in the small intestine, and thus, so far, it has been noted that intestinal stasis in the first part of the duodenum and in the terminal coil of the ileum is a physiological factor essential to adequate digestion. When the latter has proceeded to the necessary degree the ileo-sphincter relaxes, but as Rendle Short points out the efflux is not nearly so active as when food enters the stomach, affecting the sphincter by a nervous reflex.

The valve also subserves another function. Normally it prevents regurgitation of the caecal contents into the ileum but if the normal tone of the sphincter be deficient Case\(^8\) has demonstrated that there occurs a varying degree of back-flow.

The caecum and ascending colon are filled in a passive manner by the chyme forced through the ileo-caecal valve. The resultant distension of the colon stimulates its contraction and so-called antiperistaltic waves occur, originating generally in some part of the proximal half of the transverse colon, having much the same churning action as the similar contractions observed in the pyloric end of the stomach.

It is now generally agreed that the contents of the colon are propelled forward by mass peristalsis, first described/
described by Holzknecht, by which the contents of one section are carried onwards by a massive wave of peristalsis, of which the patient is normally quite unconscious, to a more distal part. This contraction is preceded by the loss of the normal haustral segmentation of the bowel, which returns immediately on its completion, and is activated by a gastro-colic reflex and to a certain extent by the action of defaecation.

The thorough mixing of the colon contents and absorption is aided by local contractions in the sacculi of the bowel, but these movements are much more commonly observed in animals than in man. The contents of the colon move forward until they reach the pelvi-rectal flexure, which, in virtue of its angle and the tonic contraction of the sphincter of O'Beirne, offers a definite obstruction to the onward passage of the faeces, leading to an accumulation in the pelvic colon. The latter, as it becomes more and more filled gradually rises upwards and to the right, rendering the pelvi-rectal flexure less acute.

The call to defaecation is due to the sudden increase in intra-rectal pressure caused by the forcing of some of the faeces through from the pelvic colon into the rectum, the result of active peristalsis in the colon and inhibition of O'Beirne's sphincter reflexly activated by the entrance of food into/
into the stomach. This reflex is normally strongest after breakfast in view of the fact that the stomach is then normally empty and the pelvic colon considerably distended. If the response to the call be neglected the desire is diminished and finally lost owing to relaxation of the muscles of the rectum, but it is again revived, although not quite so strongly, by the further passage of faeces into the rectum after the next meal. It should be noted that under normal circumstances the rectum should always be empty until immediately prior to defaecation.

In performance of the act there are three stages, firstly that described above, involuntary in nature under ordinary conditions, but which can be voluntarily produced by straining and thus raising the intra-abdominal pressure, forcing some of the contents of the pelvic colon into the rectum, secondly the purposeful increase of the pressure within the abdomen brought about by depression of the diaphragm, contraction of the muscles of the abdominal wall, the pressure of the thighs against the belly in the normal posture assumed, assisting the propulsion of the faeces caused by the strong peristaltic action of the colon, aided also by the firm resistance of the pelvic floor due to the contraction of the levatores ani muscles, the relaxation of the anal sphincters and the varied actions of the lesser muscles of the/
the floor of the pelvis. The completion of the act is voluntary in nature and is due to occlusion of the rectum by the powerful closure of the levatores ani muscles and the external sphincter. Gant\textsuperscript{(12)} firmly believes that an important mechanical factor in defaecation is an invagination of the pelvic colon into the rectum but Hurst\textsuperscript{(13)} does not agree that such a process normally occurs.

Owing to the voluntary termination defaecation may be complete or incomplete, but in the former case there is sufficient evidence to show that the contents of the large bowel, distal to the splenic flexure, are voided during the act, while there is a considerable onward movement of the material in the remainder of the colon.\textsuperscript{(15)}

The healthy individual passes 4 to 6 ounces of faeces daily, containing as a rule about 75 per cent of water and 25 per cent of solids composed of food debris e.g. cellulose, bacteria, epithelial detritus, and various mineral salts.

Flatus is present in the alimentary tract both in health and disease, although generally in larger quantities under the latter circumstances, varies with the variety of the food and by producing distension of the bowel notably aids the production of peristalsis.

Reviewing the subject of absorption it may be said that the stomach plays a very unimportant part, only negligible quantities/
quantities of water, alcohol etc. being absorbed through its mucous membrane.

In the small intestine carbohydrates, proteins and fats, or rather the products of digestion derived from these substances, are absorbed on an extensive scale, while during the passage of the faeces through the colon large quantities of fluid are extracted, rendering the faecal material, fluid in the small intestine, of a semi-solid or firm consistence by the time it reaches the rectum. The rectal mucous membrane possesses remarkable absorbent properties, readily takes up water, and definitely absorbs glucose, long-pancreatised milk and certain drugs.

Furthermore, it is now generally agreed that toxic substances, of unknown origin, arising from bacterial or chemical changes are absorbed from the bowel. Gant\textsuperscript{(14)} is of the opinion that this toxic absorption takes place through the colon but Lane\textsuperscript{(15)} holds the view that "very little poisonous material is absorbed from the large intestine unless there be a superadded infection of its mucous membrane" and believes that the chief sources are the stomach and small intestine in cases of stasis in these parts, resulting in infection of the food, consequent upon the damming back of the intestinal contents. Intestinal movements have already been referred to and the double nerve supply to the gastro-intestinal tract noted.
Chemical substances, e.g. the hormones derived from the thyroid gland, the spleen, the intestinal mucosa, and such drugs as stimulate peristalsis on subcutaneous injection, have been shown to have an action on Auerbach's plexus, while adrenalin has been demonstrated to have a stimulating action on the sympathetic ganglia.

The gastro-intestinal movements, however, depend mainly upon local stimulation of the axons of the plexuses of Auerbach and Meissner, by mechanical and chemical irritating substances contained in, or produced by, the contents of the bowel.

Mechanical irritants are coarse fragments of food, and distension of the bowel by the bulk of food ingested and the gases produced in the intestine, and are more important in connection with the large bowel, while chemical irritants act chiefly upon the small intestine and consist of sugars, organic acids, oil and its derivatives, and the products of putrefaction, including the gases so formed.

Strong emotions also affect the movements, which in addition can be promoted by cold, or inhibited by heat, such thermal stimulation being applied by means of drinks, enemata or local application to the abdominal wall.

The rate of passage of food through the alimentary canal varies considerably, even in health. Although caecal auscultation/
ation after a meal, palpation of the abdomen, sigmoidoscopy, rectal examinations etc. yield valuable information in the investigation of the movements of the intestinal contents. The only reliable method of determining the absence or presence of intestinal stasis is by means of a series of x-ray examinations after the patient has taken a meal intimately mixed with two to four ounces of barium sulphate, according to the adiposity of the subject. Hurst was a pioneer in x-ray work in connection with constipation and his figures have been regarded as the standard. The average times taken for the shadow to appear are four hours to the caecum, six hours to the hepatic flexure, nine hours to the splenic flexure, eleven hours to the iliac colon and twelve hours to the pelvic colon. These figures represent the average of considerably divergent times and consequently it is necessary to establish a standard by which a definite diagnosis of stasis can be made in different parts of the alimentary tract. To procure as true a picture as possible of the intestinal conditions obtaining in any particular case it is essential that the bowels should be well opened but that no aperients should have been administered during the 48 hours immediately prior to the examination, and also that no food be taken until after 6 hours have elapsed from the giving of the barium meal.

If, under these conditions, examination with the fluorescent/
escent screen 6 hours after the meal demonstrates the presence of some barium in the stomach, gastric stasis can confidently be diagnosed. Ileal stasis is present if there be no trace of the meal in the caecum after 6 hours, but is more frequently detected by the shadow still remaining in the ileum after 24 hours.

Should the examination show most of the barium still in the caecum and ascending colon after 24 hours there is probably stasis in this position, but should this condition be observed after 48 hours delay can be diagnosed with certainty, even if a small amount has travelled by mass peristalsis to a more distal part of the colon.

If the splenic flexure has been reached in 24 hours and after the lapse of a further 24 hours the main part of the meal is still proximal to this point, delay in this position can be diagnosed.

Lastly, if the greater part of the barium has collected in the pelvic colon after 24 hours and does not excite a desire to defaecate, dyschezia, a condition in which the final evacuation of the intestinal contents is interfered with in some way, is present.

It should be observed that in diagnosing stasis more stress is laid upon the time of disappearance of the meal from any particular part of the tract than upon the time of its arrival there.
The comparative anatomy of the digestive system forms a most interesting study. It is particularly to be noted that mammals constitute the group in which the large bowel is most developed, while the stomach and small intestine, with some exceptions, and comparatively speaking, do not vary to any marked degree.

Tracing the animals through the different orders one finds that the large intestine is very poorly developed in fish, but in toads, frogs etc. it has become more important. Reptiles show a further development of the colon with the presence of a rudimentary caecum in some cases. Birds, probably in an attempt to lessen the dead weight during flight, have only a short, straight large bowel, but at the junction of the small and large intestine there are generally two caeca, absent in some, mere tiny outgrowths in others, while in the nocturnal birds of prey they are remarkably well developed. In running birds, which more closely resemble mammals in their habits, the caeca are relatively largest; at the same time it is most interesting to note that bats, mammals which live like birds, are provided with no caecum and there is very little differentiation between their large and small intestines.

With regard to mammals Gegenbaur writes as follows:

"The hind-gut/"
"The hind-gut is longest in the mammalia, where it forms the large intestine, and is distinguished as such, from the mid-gut, or small intestine. Owing to its great length, it is arranged in coils, so that the terminal portion only has the straight course taken by the hind-gut of other Vertebrata."

The physiology of the large intestine in man has already been studied. It was noted that the colon acts mainly as a reservoir for the refuse of the food, absorbs fluid from the latter but altogether plays only a minor part in digestion. In such animals as show no marked differentiation between the large and small intestines, e.g. the bat, it has been shown that the colon is possessed of glands similar to the small intestine and functions in a similar manner; while it has been considered as extremely probable that the caecum, when it is present in a well developed condition, as for example in the horse, also plays a not unimportant rôle in digestion.
ETIOLOGY AND DIFFERENTIAL DIAGNOSIS OF THE VARIOUS FORMS OF CHRONIC INTESTINAL STASIS.

Chronic intestinal stasis is a subject into which many and varied etiological factors enter, and in order to treat the condition successfully it is most important that the underlying causes be closely studied. To gain a comprehensive knowledge of the various factors some method of classification of the different forms of intestinal stasis has to be adopted and to this end several systems have been suggested. Most continental authorities divide the cases into two classes - atonic and spastic; but the classification adopted by Hurst\(^{(24)}\) allows of a more detailed and scientific subdivision of the varieties of the disease.

He divides all cases into three distinct classes,

(a) Colic Constipation, by which is understood some delay in the passage of the faeces through the colon, and which is subdivided into those cases resulting from deficient motor activity and those due to excessive force being required to propel the faeces to the pelvic colon.

(b) Dyschezia, a term used to denote the inadequate performance/
ance of defaecation, depending upon two main etiological factors - inefficient defaecation and obstacles to efficient defaecation.

(c) Constipation due to a deficiency in the quantity of the faeces.

This classification is extremely comprehensive, except that it does not include true cases of ileal stasis, apart from delay in the colon, but this subdivision can easily be treated along with section (a).

Any two or all of these main etiological factors may co-exist in the same patient, but generally one is by far the most important and alone requires treatment.

A. Colic Constipation resulting from deficient motor activity:-

- Diminished motor activity of the colon may be due to
  1. Weakness of the intestinal musculature
  2. Weakness of the intestinal reflexes
  3. Inhibition of the motor reflexes
  4. Spasm of the intestinal musculature, in which case diminished motor activity should be interpreted as indicating diminution of the efficiency of the intestinal musculature.

(1) There may be actual cases of inherited weakness of the intestinal musculature, but this is questioned by several authorities. Apparent cases, in many instances, could be traced/
traced to the loss of muscular tone consequent upon frequent over distension of the gut resulting from indifference to proper bowel hygiene and it must be considered quite feasible that such a tendency could be transmitted from parent to child.

Constitutional weakness may actually cause intestinal stasis through inefficiency of the musculature, or may be a predisposing factor in that the weakness of the voluntary abdominal muscles interferes with efficient defaecation, while these patients, as a rule, do not indulge sufficiently in healthful and invigorating exercises and their diet tends to be of an unstimulating character and insufficient in quantity.

Chronic invalidism is a frequent cause of constipation. If confined to the house, lack of exercise is an important factor, while the difficulty experienced in evacuating the bowels in the recumbent posture tends to produce costiveness in bedridden patients. Debility, resulting from the presence of anaemia, tuberculosis, cancer and accompanying senility, has a marked effect on the intestinal and voluntary musculature, and the results are aggravated by the bland diet so often administered and by the opium products so frequently prescribed in some of these cases.

In fevers there is diminished secretory activity of the intestine, rendering the faeces less in quantity, while the lessened/
lessened secretion, or lubricant, together with the abnormal loss of body fluids entail more difficulty in the propulsion of the faeces. The irritability of the inhibitory nerves has been shown to be increased when the blood is hot, and the depression present in fevers and usually found in chronic invalids interferes considerably with the motor efficiency of the intestine.

In diseases of the intestinal mucous membrane, as, for example, typhoid fever, cholera and dysentery, the structure, and consequently the functions, of the intestinal musculature and the nervous plexuses may suffer, and in the obese constiveness is common as a result of fatty infiltration of both the involuntary and the skeletal muscles.

(2) Deficient reflex activity of the intestines may be due to a diminution in the excitability of the afferent nerves passing from the intestinal mucosa to Auerbach's plexus, to weakness of the intestinal reflexes from this plexus centrally or to depression of the central nervous system.

Long continued irritation of the intestinal mucous membrane, whether due to excess of unsuitable food, the pernicious practice of oft-repeated unnecessary purgation, the continued intake of astringents, either entering the body through the agency of tea, or administered medicinally by the oral or rectal routes, chronic alcoholism, chronic constipation or the infection/
fection of the bowel by organisms, leads to a varying degree of catarrhal colitis, which is instrumental in lessening the excitability of the nerve fibres passing from the mucosa to Auerbach's plexus.

Weakness of the intestinal reflexes may be due to deficient gastro-ileal and gastro-colic reflexes brought about by insufficiency in the quantity of food taken, whereby the optimum distension of the gut is not attained. The same applies to stasis caused by too little food reaching the lower bowel, owing to abnormally complete absorption, or a diet poor in those substances which leave a considerable residue of indigestible material. In the physiological introduction it was noted that certain substances circulating in the blood, including the hormones derived from various glands and from the intestinal mucosa itself, had a direct stimulating effect upon Auerbach's plexus and therefore it is quite rational to believe that a diminution in these secretions could lead to lessened motor activity of the bowel. In the case of the thyroid gland this correlation between stasis and hypo-secretion has been observed by Rolleston.

Depression of the nervous system, as found in patients suffering from melancholia and hypochondriasis, is an important factor in the production of constipation, so much so that Gant ascribes a large number of the undoubted cures from/
from chronic constipation effected through the agency of 
Christian Science as being due to the removal of the harm-
ful psychic influenzas.

(3) Inhibition of the motor activities of the small and 
large intestines may be brought about directly by stimulation 
of the sympathetic nerves to the bowel, for example by lead, 
in cases of chronic poisoning by that metal in which abdomi-
al colic is not a prominent feature, and by certain intra-
abdominal lesions such as acute pancreatitis and retro-peri-
toneal haemorrhage. Depressing emotions, by inhibiting the 
activity of sympathetic nerves, diminish movement of the 
bowel throughout its length. It is well known that one can 
have temporary constipation, occasionally amounting to com-
plete obstruction, through reflex inhibition resultant upon 
painful stimulation of the sensory nerves in disease or in-
jury, especially when such lesions affect the intra-abdominal 
organs. A degree of stasis of the small and large intestines 
at the same time, together with the marked relief obtained by 
the administration of sedatives, form peculiar features of all 
cases of colic constipation due to inhibition of the motor 
activities.

(4) French and German writers consider that a large pro-
portion of their cases of chronic constipation are spastic in 
nature, but Hurst (28) and Gant (29) look upon uncomplicated 
primary/
primary spastic constipation as being rather uncommon. The irregular and tonic contraction of the muscular coats may be the outcome of a deranged nervous system, as in neurasthenia, or cases of overwork or sudden mental shock. On the other hand they may be the result of irritants either from within the bowel, as faeces, aperients or unsuitable foods, or toxic substances circulating in the blood, as is the case in the colic of chronic lead poisoning. Excessive indulgence in tobacco may cause entero spasm through the paralysing effect of nicotine on the sympathetic ganglia, and some authorities ascribe the tabetic abdominal crises to spasm of the colon. The faeces are usually scybalous in character, or altered in shape by the attendant spasm of the anal sphincters, and commonly the stools have a coating of mucus derived from a resulting secondary colitis.

Accumulation of faeces is common, leading on one hand to fragmentary constipation, by which is understood the frequent passage of small quantities of faeces, and on the other, to painful defaecation brought about by the abnormally dry faeces and anal spasm.

Enterospasm may be recognised by palpation, when a tender, excessively contracted colon may be felt and an x-ray barium meal or enema examination provides an easy, but most reliable, means of diagnosis. By means of these investigations, together with the absence of pyrexia or that of an irregular mass/
mass, or any characteristic distribution of the pain, entero-
spasm can usually be distinguished from such conditions as
appendicitis, neoplasm or colic of the renal or biliary var-
ity.

**Colic Constipation due to excessive force being required**
for the propulsion of the faeces:-

Cases falling into this class could really be classified
as instances of chronic obstruction, with increased activity
of the bowel above the point of narrowing of the intestinal
lumen, whether this be absolute or relative, and relaxation
below. On the whole aperients do not produce satisfactory re-
sults and enemata are mainly relied upon to relieve and, in some
cases, cure the condition.

Relative narrowing of the gut is brought about by ob-
struction by faeces or foreign bodies within the bowel. In
the former case the faeces may be excessive in quantity, or they
may be abnormally hard and dry, because of a deficiency of fluid
intake, or excessive loss of water, either by absorption from
the bowel or excretion through the kidneys or skin. True for-
egn bodies, which generally give rise to ulceration and per-
foration if impacted, are a less frequent source of obstruction
than enteroliths or gall-stones.

**Absolute narrowing of the intestinal lumen may be the re-
result of stricture, angulation, extra-intestinal pressure or
chronic**/
chronic intussusception. Acute intussusception, and such conditions as imperforate anus, do not come within the scope of the present thesis.

Congenital narrowing of the intestinal lumen is a rare condition, complete occlusion being much more common and resulting in acute obstruction. Acquired stenosis may be due to malignant disease of the bowel, cicatrisation of tuberculous ulcers, tuberculous infiltration of the bowel wall, or the inflammatory mass complicating acquired diverticula of the colon. Hurst (30) considers that strictures never follow the healing of ulcers of specific, dysenteric or enteric nature. Neoplasm of the intestine is very much more common in the rectum and pelvic colon than in the remaining portions of the bowel, and can usually be diagnosed by palpation, x-rays, the presence of cachexia and symptoms of chronic intestinal obstruction. Hyperplastic tuberculous infiltration is a rare condition, usually situated in the ileo-caecal region, giving rise to pure ileal stasis, and cannot be distinguished clinically from carcinoma.

Angulation, or kinking of the bowel, may be present, with or without peritoneal adhesions. The latter bandless cases are generally confined to the pelvic colon and result from this portion of the gut being abnormally long, the excessive mobility of the gut producing sharp angulations.

Again/
Again in visceroptosis, the lowering of the level of the central part of the transverse colon accentuates the hepatic and splenic flexures and in some cases produces a certain amount of stasis at these abnormally sharp kinks, although the faecal delay is usually due to dyschezia in marked cases of visceroptosis.

Peritoneal adhesions, in relation to chronic intestinal stasis, have been the source of much discussion and many varied opinions. One can, at least, separate from the others those cases of adhesions, which are obviously secondary to intra-abdominal inflammation. It is admitted that such lesions can, and do, give rise to chronic, and sometimes acute, intestinal obstruction. Apart from these peritoneal irregularities, which are inconstant in position and in relation to the gut, there are definite membranes, found in certain patients, the attachments of which are remarkably constant. Tracing the bowel distally, the first, often referred to as Lane's kink, is found in relation to the terminal coil of the ileum. It arises from the under surface of the ileal mesentery, passes under the bowel and is attached to the bowel at a point opposite to the mesenteric attachment. In the erect posture it produces an angulation at this point, together with a degree of rotation of the bowel.

A veil like membrane, generally known as Jackson's membrane/
membrane may pass from the parietal peritoneum at the outer side of the ascending colon over the ascending colon, or caecum, or both, to be attached to the anterior surface of the ascending large bowel or the great omentum.

Bands of additional support may strengthen the suspension of the hepatic and splenic flexures, and the two limbs of these loops may be united by adhesions.

The descending colon may have extra peritoneal attachments corresponding to those of the ascending colon, but the presence of these membranes in this position is relatively very infrequent.

The fixation of the iliac colon varies, but it may be firmly adherent at its extremities, forming a loop, the distal end of which is securely fixed to the pelvic brim by a band.

The pelvic colon may be similarly affected, but most commonly is bound down at its origin and termination. The appendix is, in some cases, caught in one or both, of the first two bands referred to, or occasionally may act as additional support to an unduly mobile caecum by being anchored to the under surface of the mesentery of the terminal ileum.

Lane considers these bands are developed to support those portions of the bowel which are most liable to become ptosed.
ptosed and consequently to be subjected to a varying degree of strain, and regards the process as a "crystallisation of the lines of force." In support of this theory he states that "these resistances to not exist at birth" but "that their development can be observed during the several decades of life". (31) Gray, (32) on the other hand, claims that he has frequently demonstrated the presence of these bands in foetuses. The fact that the abdominal organs are not supported normally by their peritoneal attachments but by virtue of the intra-abdominal pressure is a further point against Lane's theory.

Keith (33) agrees with Lane in considering that there is a connection between posture and the formation of peritoneal adhesions, but advances the theory that the latter are a direct outcome of an inherent quality possessed by the peritoneal cells of forming adhesions as the result of some unknown irritant.

Some believe that the bands and membranes result from a process of physiological evolution and are due to the normal fixation of the mesenteries proceeding too far. Virchow (34) regarded them as a result of localised chronic peritonitis incident to inflammation of the bowel or neighbouring viscera. That such adhesions do occur is undoubted, but they are, like all scar tissue, composed of opaque fibrous tissue showing no definite/
definite arrangement nor attachments. On the contrary, the bands and membranes discussed above are translucent, their vessels and lymphatics run parallel to each other and to the line of support, their attachments are remarkably constant, and they are limited to one aspect of the intestinal circumference.

Charles H. Mayo, among others, believes Jackson's membranes is caused by late rotation and descent of the colonic segments, but, as Jackson himself recently stated, the evolution of these adventitious bands has not been satisfactorily explained. The writer is of the opinion that, although the causes underlying the actual beginning of the peritoneal cell proliferation are unknown at present, the resultant bands are shaped, and their attachments governed, by the principles of Lane's mechanical theory.

The diagnosis of the presence of adhesions is, in most cases, comparatively difficult, but if localised pain and tenderness be present at a point, immediately proximal to which stasis has been demonstrated, and especially if the part involved be abnormally fixed on palpation under the x-ray screen, the possibility of adhesions has to be considered.

It is possible that adventitious bands are designed to subserve some useful function such as support of an otherwise abnormally mobile portion of the bowel, or the prevention of regurgitation/
regurgitation of the faeces, but in some cases their over
development may hamper the passage of the bowel contents.
However, in the case of multiple adhesions, resulting from
such a lesion as tuberculous peritonitis, intestinal stasis
is by no means invariably present; bands are found at opera-
tion which have not produced any signs, and it must be ad-
mitted that the division of these abnormal structures has
not given uniformly good results. Moreover, if the adhesions
are to be regarded as giving rise to stasis and chronic ob-
struction, the absence of intestinal colic has to be account-
ed for and even the question of hypertrophy of the proximal
part of the bowel is a point of contention. Keith (36) re-
ferring to peritoneal adhesions, states that he has never
seen a specimen so constricted as to have caused an obstruction
- if the neuro-muscular mechanism of the bowel had not also
been affected, - and considers that if obstruction, partial or
complete, does occur it is a result of the defect in the motor
mechanism of the bowel and is not purely mechanical in origin.
It is possible that in the distal portions of the bowel, where
the faeces are much more solid, adhesions may interfere with
propulsion either mechanically or by causing an irritative
spasm of the circular muscle fibres. The etiology of appendi-
citis may be concerned with involvement of the vermiform pro-
cess in the ileo-caecal bands, but the disparity of opinion
leads/
leads one to the view that the correlation between peritoneal adhesions and chronic intestinal stasis has been considerably overrated.

Because of the general mobility of the intestine, extraintestinal pressure usually only exerts an influence on the fixed portions of the bowel and the gut contained within the pelvic cavity. Such pressure can be brought about by tumours, enlargement of an abdominal viscus, or displacement of an organ. Chronic intussusception is considered a rare cause of constipation in adults and usually consists of an invagination of the pelvic colon into the rectum. Gant, who considers a similar temporary invagination an important factor in normal efficient defaecation, regards an abnormal degree of intussusception as a comparatively frequent factor in the production of chronic intestinal stasis.

B. Dyschezia.

In this group of cases the passage of faeces is normal as far as the pelvic colon, and stasis is due to imperfect defaecation. This eventually leads to accumulation of faeces in the rectum, but there is a group of cases in which the rectum acts normally and the pelvic colon alone acts as an abnormal reservoir.

If x-ray examination shows a normal rate of passage as far as the pelvic colon, but delay in emptying this portion of/
produced, together with an increase in the volume of the rectum. The faeces which collect become hardened owing to abnormally long retention and an undue amount of force is required for their eventual expulsion. When the rectum is emptied the muscular coat is not allowed sufficient time in which to recover its normal tone, consequently, in view of the fact that the degree of intra-rectal pressure required to produce the call to defaecation is the same in cases of dyschezia as in normal individuals, an abnormally large quantity of faeces has to be present in the rectum before the desire to empty the bowel is produced. Normally the rectum is empty except for a few minutes prior to defaecation, but in dyschezia the constant overdistension of the wall leads to progressive weakness of the propulsive powers of the muscular coat, resulting in the establishment of a vicious circle.

Inefficient defaecation may thus be due to habitual disregard of the call to defaecation, depending upon laziness, inability to obey the summons immediately, ignorance, uninviting lavatories or unpleasant accompaniments of the act, such as pain or haemorrhage from the bowel.

Weakness of the defaecation reflex leads to similar results, and may be present congenitally, or be acquired through organic or functional nervous disease, or by reason of reflex influenzes/
influenza, or a deficiency in the bulk of faeces. In the congenital variety the excitability of the rectal wall is deficient but generally develops to the normal standard as the child grows older. It may be overcome by the mechanical raising of the intra-rectal pressure by the insertion of a finger or a cone of soap, but in the latter case there is, in addition, a chemical stimulation. Glycerine and water enemata, gradually decreasing the proportion of glycerine as the condition improves, form a reliable remedy, but should the lesion be overlooked or disregarded it may be the starting point of dyschezia lasting throughout life, with secondary retention of faeces in more proximal portions of the bowel, and catarrhal complications.

The involuntary muscles of defaecation are under the control of the ganglion cells of the peripheral nerve plexuses, with the possible addition of an influencing centre in the conus terminalis. Lesions of either of these defaecation centres, but especially of the former, would give rise to dyschezia. In tabes dorsalis inefficient defaecation is comparatively common as a result of the involvement of the afferent nerves from the lower bowel, passing centrally in the posterior columns of the spinal cord.

In hysterical subjects dyschezia is sometimes a genuine complication. At some time, or other, the patient has probably/
ably suffered from an attack of constipation but has failed to realise its temporary nature and the suggestion has become perpetuated in a belief that he, or she, is unable to open the bowels regularly and efficiently. Medicinal treatment, by auto-suggestion, generally aggravates the symptoms of these patients and the best results are obtained by the employment of psychotherapy. Proper and adequate defaecation may be rendered impossible through the presence of reflex influenzes, such as would accompany a focus of inflammation in a viscus situated within the pelvic cavity. Any deficiency in the bulk of the faeces, whether due to diminished food intake or abnormal absorption from the bowel contents, would cause a lapse of several days to occur before sufficient faeces collected in the pelvic colon to produce the call to defaecation on their entry into the rectum.

Probably one of the most common causes of dyschezia is weakness of the voluntary muscles of defaecation, which can be conveniently divided into three groups:— (a) muscles of the abdominal wall, (b) muscles of the pelvic floor and (c) the diaphragm. The abdominal musculature may not be capable of efficient raising of the intra-abdominal pressure because of its subjection to stretching by any increase in the volume of the peritoneal cavity brought about by pregnancy, tumour, abnormal deposit of fat, or ascites, or undue laxity following/
following the sudden relief of these conditions. It may also suffer as a result of malnutrition, obesity, lack of exercise or organic nervous disease.

The natural position assumed by primitive races during defaecation is a squatting attitude when the pressure of the thighs upon the abdomen aid materially in the performance of the act, but with the modern high seated water-closets this posture becomes impossible and the efficacy of the abdominal contraction is diminished.

The muscles of the pelvic floor, during parturition, are invariably stretched and sometimes injured, and if this damage be excessive, or if sufficient subsequent rest be not allowed the tonicity of the muscles will permanently suffer.

Forzible lowering of the diaphragm occurs during defaecation, but this may be rendered impossible, or the range of movement decreased, under certain conditions. In the presence of a weak abdominal wall there is an accompanying fall in intra-abdominal pressure and the diaphragm tends to assume the position it occupies during inspiration. The same effect would result from an increase in pressure above the diaphragm, such as would occur in emphysema, and naturally temporary paralysis of one or both halves of the diaphragm, such as accompanies pneumonia and pleurisy, would interfere considerably with the act of defaecation.
Obstacles to Efficient Defaecation.

Adequate evacuation of the intestinal contents may be interfered with by the abnormal characters of the faeces or by obstruction of the pelvic colon, or more distal bowel.

The faeces may be excessively hard and dry, or may be more than usually bulky, or both, resulting in the production of some difficulty in defaecation. A hard mass in the rectum may produce a true ball valve, the collection being forced, during straining, against the proximal end of the anal canal.

Obstruction of the pelvic colon, or more distal bowel, may be the result of varied conditions. There may be present an actual narrowing of the rectum, or anus, or both, as in malignant disease of the rectum, most commonly situated in the ampulla and occurring usually in adults over 40 years of age, although the writer has seen a case of true rectal carcinoma in a girl thirteen years of age.

Fibrous stricture commonly follows extensive operations, such as Whitehead's method of excising the total pile bearing area in cases of haemorrhoids. The healing of syphilitic and gonococcal lesions in the lower bowel is considered a fruitful source of narrowing of the rectum, but this theory is mainly supported by the Continental authorities. Inflammation of the submucous coat, following abrasions of the mucous membrane and any extensive injury to the rectum, generally results/
sults in a benign stricture. The anal canal, in some patients, is congenitally narrow, but the presence of the abnormality is rarely recognized before the fluidity of the infant's stools decreases with advancing months. At first glance this condition is readily confused with anal achalasia, in which the normal relaxation of the anal sphincters is inhibited, but in the latter case the true diameter of the outlet may be roughly judged by the amount of anal puckering. Forcible stretching of the sphincters, together with treatment of the dyschezia already produced, gives uniformly good results.

Gant (39) is convinced that chronic inflammation of Houston's valves, resulting from the irritation produced by unusually hard faeces, by interfering with their normal pliability and mobility, plays a very important role in the causation, or aggravation, of chronic constipation, but Hurst (40) and Tuttle (41) do not believe there is any foundation for this supposition.

Obstruction at the pelvi-rectal flexure may be the outcome of hypertrophy or achalasia of the sphincter of O'Beirne. Abnormally hard faeces weigh down the terminal part of the pelvic colon and by rendering the pelvi-rectal flexure more acute, and in addition by possible direct pressure on the anterior wall of the rectum, result in some delay. Once the contents/
contents of the colon reach the rectum their ultimate evacuation is normal. This alteration of the angle of the flexure sometimes becomes permanent because of adhesions, which may follow inflammation of the colon secondary to irritation by unduly dry faeces or be a sequela of inflammatory mischief in the pelvis. If obstruction at the flexure be suspected, sigmoidoscopy should invariably be performed in order to determine the cause of the delay. Should this prove to be due to structural change aperients give little benefit and enemata only if introduced beyond the site of the lesion. Manipulation, under x-rays, after the giving of a barium enema, in many cases, yields valuable evidence as to the presence or absence of adhesions, or the definite location of a tumour.

Dyschezia is frequently directly traceable to spasm or achalasia of the anal sphincters, the costiveness being more marked in the former condition. These abnormalities may occur as functional disturbances in neurotic individuals or be caused by local irritative lesions, such as anal fissure, or ulceration, inflamed haemorrhoids, tumour formation etc. If the spasm be chronic, hypertrophy of the sphincter ani is liable to develop and the constipation which originally was responsible for the development of the fissure, haemorrhoids etc. will be aggravated and a vicious circle formed.

After/
After parturition an anterior rectocele may interfere with efficient evacuation, and Gant reports cases in which a deviated coccyx, of the absence of that structure together with the situation of the anal outlet at the lower end of the sacrum, produced marked dyschezia owing to the formation of a pocket in the rectum and subsequent faecal impaction. In the presence of such a condition as a polypus of the mucous membrane of the pelvic colon chronic invagination of the mucosa of the colon into the rectum may occur. If the condition be slight the invaginated membrane will recede immediately after defaecation, but if more advanced the intussusception becomes permanent and comparatively frequently leads to catarrhal proctitis and even prolapse of the rectum. Gant is of the opinion that not only does the mucosa invaginate but the entire thickness of the wall is involved and even goes so far as to state that this piston like action is a normal and valuable aid to defaecation and is only abnormal if excessive, occurring apart from defaecation, or if the bowel does not recede after the completion of the act.

It is difficult to see how retroversion of the otherwise normal uterus can affect defaecation, but should the organ be enlarged and congested, and especially if it be pregnant, evacuation will be both difficult and painful because of its pressure on the rectum. In retroversion of the gravid uterus, however,
however, retention of urine is liable to occur before the onset of bowel interference. The enlargement of any other pelvic structure - prostate, fallopian tube etc., malplacement of any of the pelvic contents, or tumour formation, could quite feasibly act in a similar manner as an obstacle to efficient defaecation.

C. Constipation due to a deficiency in the quantity of faeces.

In this class of constipation the passage of the fluid contents of the small intestine is comparatively normal in rate, but some slight delay is encountered in the colon and is most marked in the distal portions of the bowel, because in this position there is an insufficiency in the quantity of faeces to excite the necessary peristaltic activity.

The deficiency may result from a lessened intake of food, as in obstruction or painful lesions of the upper alimentary tract, or loss of appetite brought about by various conditions, or the fault may lie in the fact that the food partaken of does not contain a sufficient proportion of those articles which leave a considerable residue.

Constipation also accompanies excessive digestion of food, and once started is aggravated as a result of still further absorption owing to abnormal retention of the bowel contents.

Primary/
Primary excessive absorption may occur because of the presence of what is aptly termed a "greedy colon". The absorptive activity of the large bowel varies in different individuals and if abnormally marked - "greedy colon" - even cellulose is more or less completely digested and rarely appears in the stools.
IV

SYMPTOMS OF CHRONIC INTESTINAL STASIS.

The writer proposes, first of all, to review the present day opinions and theories concerning the causation of the symptoms and later to outline the signs of toxic infection, together with reference to the disorders of the alimentary and other systems frequently associated with intestinal delay.

Some persons are found to suffer from malaise, headache, vague abdominal pains etc. etc. if defaecation be delayed for even such a short period as 24 hours, while others appear to enjoy perfect health in spite of the fact that well-marked stasis can be demonstrated in their bowel. From this it is obvious that there is some other element at work, apart from coprostasis, or mere retention of the intestinal contents. Lane\(^{44}\) holds that this unknown factor consists of auto-intoxication, brought about, as a result of the damming back of the faeces, stagnation of the ileal contents, with ascending bacterial infection of the latter. Normally the chyme in the lower end of the ileum is sterile, or practically so, and this invasion, by organism from the large bowel, produces changes/
changes in the contaminated contents with the result that the portal circulation is flooded with poisons, toxins or organisms, in amounts in excess of what can be neutralised or destroyed by the protective agencies of the body - the liver and excretory organs. These harmful substances enter, and for a certain period remain in, the general circulation and produce effects on the various organs of the body - in other words, paint the clinical picture of toxic intestinal stasis.

Metchnikoff\(^{(45)}\) was of the opinion that the symptoms were brought about in a similar manner, but rather emphasised the possibility of organisms or poisons, or both, passing directly through the intestinal wall, owing to a breach of mucous surface.

Gant\(^{(46)}\) frankly admits that he considers that no one has as yet been able to give a satisfactory explanation of the incidence of the toxic symptoms but also advances the view that it may be a result of some lesion of the mucosa.

"Though there is very little direct evidence that such a condition as intestinal intoxication exists, yet many of the results of constipation are more easily explained by this theory than in any other way". In these words Hurst\(^{(47)}\) summarises his views on the subject. He is inclined to believe that the poisons at work in the body are absorbed consequent upon/
upon abnormally long retention of the faeces in the bowel and that the efficiency of the antitoxic properties and activities of the liver plays an important part in determining the presence or absence of auto-intoxication.

Many workers have attempted to isolate and identify the toxin they thought to be at the root of the trouble, but so far no specific causal agent has been isolated. The possible poisons would be derived from the organisms in the bowel, or toxins derived from the digestion, decomposition or putrefaction of the food. Cultivation of ileal chyme in healthy persons is practically sterile, but in subjects of intestinal stasis yields a growth of numerous micro-organisms, the commonest of which is Bacillus Coli and its mutants, but short chained streptococci are not infrequently found. The ileum forms an ideal habitat for the rapid growth of the organisms, which are here supplied with moisture, warmth and an abundance of various types of food stuffs. Facultative anaerobes are normally found in the colon, with members of the coli group predominating. The bacterial growth is most prolific in the caecum and ascending colon and on passing distally the number of organisms decrease, they are more strictly anaerobic in type, and by the time they reach the rectum the large majority are dead. The surviving ones cannot be taken as representing the type of infection of the productive/
productive caecal region. Organisms entering the body by the mouth have practically no effect on the intestinal flora, as they are mainly destroyed by the gastric acidity.

Hurst (49) does not attach much importance to the bacterial toxins, as he considers that none of the intestinal organisms liberate soluble toxins, nor is it probable that their endotoxins, which would be set free by dissolution, would be capable of producing symptoms. It is only fair to mention however, that certain authorities consider that bacteria and their toxins are responsible for auto-intoxication. Mutch (50) claims that infection with Staphylococcus citreus gives rise to Still's disease, and the presence of Bacillus aminophilus results in a constant sub-normal blood pressure, but Mellanby (51) offers contradictory evidence.

The toxins produced by the splitting up of, or the action of organisms upon, food remain to be considered.

Volatile fatty acids and most of the products of the bacterial decomposition of carbohydrates and fat are absorbed and rapidly oxidised and altered, so that they are not likely to be the substances responsible.

Proteins, by digestion, give rise to amino-acids, which are conveyed to the liver and there reconstructed, but the action of certain strains of intestinal organisms results in the formation of products of protein digestion considerably more/
more advanced than is normal. These toxic end-products are absorbed and rendered useless and innocuous by the liver, if this organ be not diseased, but even the possibility of this source of intoxication is not universally conceded. The observation that the toxic symptoms of chronic stasis are relieved by the elimination of the protein elements of the food is, however, a point in its favour. None of the other end-products, normal or abnormal, have been found to be toxic in the amounts in which they are found in the bowel.

Adami advances the view that, owing to a lesion of the mucosa, resulting from chronic irritation, intestinal organisms may pass through by a process of "subinfection", giving rise to a condition of bacteraemia, which would account for the chronic inflammation of various organs, found in association with intestinal stasis.

Again, attempts have been made to ascertain the presence, and possibly the extent, of bacterial decomposition in the intestines by testing for the appearance of indican and ethereal sulphates in the urine, and the quantitative comparison of the latter with the inorganic sulphates. But Hurst states that marked stasis may be present without any urinary indication, while an excess of these substances may quite possibly be ascribed to excessive absorption due to abnormally long retention of the intestine contents.

On/
On considering the whole subject it must be admitted that the acceptance of the theory of the presence of intestinal auto-intoxication is practically essential in order to account for the development of the various symptoms and associated conditions of chronic intestinal stasis. Such widespread lesions, to be considered subsequently, must inevitably be the result of a generalised infection or intoxication, as a purely local cause is incompatible with the distribution of the accompanying pathological changes. If auto-intoxication be present, the bowel is naturally the only focus from which it could primarily arise, and evidence has been submitted in this section to show that poisons are elaborated in the intestinal tract which could be held responsible. It has been noted that several authorities suggest that a lesion of the intestinal mucosa would favour an increased escape of toxic substances through the bowel wall, and Keith (54) has recently supplied information demonstrating that macroscopic and microscopic pathological changes do occur in the wall of the gut in cases of stasis. He divides the colons he has examined into two classes. The first shows evidence of intense inflammatory infiltration, and has been termed the "soggy" type. All the coats of the bowel are affected, but the interglandular retiform tissue of the mucosa shows the greatest change. There is a marked proliferation of/
of the constituent corpuscular elements, while the superficial cells of the mucous membrane, together with those lining the glands, are irregular and abnormal in structure, but anything in the nature of ulceration is very rare. The cells of Auerbach's plexus are degenerated and the rest of the wall shows evidence of chronic inflammation. These changes occur in the colon but are most marked in the lower end of the ileum and caecum. In the second group the inflammatory changes are not so marked, but the lymphatic vessels are dilated and large cells, containing dark-brown pigment, closely related to melanin and to adrenalin, are found in the mucosa.

But the inflammatory changes cannot be idiopathic and a primary cause of this pathological condition must be sought for. More than likely, it will be found that these changes are secondary to chronic intestinal stasis and are produced either by the passage of the toxins through the wall, or by the chronic irritation set up by retained faeces. Once established, the damage to the mucosa may permit of the more ready permeation of the poisons, but, at present, there is no experimental evidence on this subject.

Granted that harmful and toxic substances enter the portal circulation it has been noted that one of the normal functions of the liver is to render these poisons innocuous and
and harmless and to prevent the general circulation be­
coming flooded by such substances as would exert a deleter­
ious effect on the distant organs and tissues of the body.
This action of the liver is confirmed, in animals, by the
experiments carried out by Nencki and Pavlov\(^{(55)}\) on dogs
with an Eck's fistula, whereby the portal blood passes direct­
ly into the inferior vena cava and is diverted from the liver.
These animals showed signs of toxic infection, and quickly
died if placed on a protein diet. The protective property of
the liver would naturally depend upon the efficiency of the
antitoxic properties of the organ.

Can any evidence be put forward to suggest that in cases
of chronic intestinal stasis, accompanied by toxic symptoms,
the failure of the defence of the general tissues of the body
is dependent upon some affection of the liver, whereby its
capacity for dealing with the injurious material is diminished?
Sugars are absorbed from the intestine as monosaccharides and
can be rapidly stored in the liver and muscles, but, with the
important exception of laevulose, the rate of storage does not
equal the rate of absorption, resulting in a rise of the blood
sugar.\(^{(56)}\) Gideon Wells\(^{(57)}\) states that the laevulose toler-
ance is normally rather variable, that usually 50 to 70 grams
of laevulose may be administered, per os, without promoting
laevulosuria, but Maclean and de Wesselow\(^{(58)}\) have determined
that/

\(\text{(55)}\)
that 30 to 50 grams can be given by the mouth and do not raise the blood sugar in healthy subjects with an intact liver, while if the liver be defective the rate of storage is lessened, and an increase of the blood sugar results. This work forms the basis of the modern laevulose test for hepatic efficiency and anti-toxin function. A post-prandial leucocytosis is a normal physiological and established fact, but Widal\(^{(59)}\) pointed out that when the liver is affected this leucocytosis is replaced by a leucopenia, accompanied by a fall of blood pressure. He ascribes this condition as being due in all probability, to the entrance of the products of protein digestion into the general circulation and considers the process to be analogous to anaphylactic reaction. This test, known as the haemoclasis crisis, may also be regarded as being due to a failure of the anti-toxic power of the liver. The writer has applied these two tests to each of a series of seven cases of chronic intestinal stasis and associated conditions, the notes of which are given in the Appendix.

In the case of the laevulose test the blood sugar was estimated by Bang's micro-method; 40 grams of laevulose were given by the mouth and after a lapse of 55 minutes a second blood sugar reading taken.

With the second test (haemoclasic crisis) the leucocytes were/
were estimated, care being taken that no food had been ingested for the four hours prior to the count, 7 oz. of milk were drunk and another count taken twenty minutes later.

The results are herewith tabulated, together with an indication of the presence or absence of toxic symptoms:

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Sex</th>
<th>Age in years</th>
<th>Notes</th>
<th>Laevulose Test. Blood Sugar</th>
<th>Haemoclasic Crisis</th>
<th>Toxic Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st. Reading</td>
<td>2nd. Reading</td>
<td>1st. Count</td>
</tr>
<tr>
<td>1.</td>
<td>Male</td>
<td>60</td>
<td>Colonic Stasis</td>
<td>0.11%</td>
<td>0.19%</td>
<td>9,720</td>
</tr>
<tr>
<td>2.</td>
<td>Male</td>
<td>46</td>
<td>Colonic Stasis</td>
<td>0.08%</td>
<td>0.12%</td>
<td>12,960</td>
</tr>
<tr>
<td>3.</td>
<td>Female</td>
<td>19</td>
<td>Colonic Stasis</td>
<td>0.09%</td>
<td>0.13%</td>
<td>10,960</td>
</tr>
<tr>
<td>5.</td>
<td>Female</td>
<td>24</td>
<td>Visceroptosis</td>
<td>0.09%</td>
<td>0.14%</td>
<td>10,200</td>
</tr>
<tr>
<td>6.</td>
<td>Female</td>
<td>13</td>
<td>Colonic Stasis</td>
<td>0.09%</td>
<td>0.17%</td>
<td>10,380</td>
</tr>
<tr>
<td>7.</td>
<td>Male</td>
<td>49</td>
<td>Marked caecal and Colonic Stasis</td>
<td>0.12%</td>
<td>0.12%</td>
<td>5,940</td>
</tr>
<tr>
<td>8.</td>
<td>Male</td>
<td>32</td>
<td>Catarrhal Colitis</td>
<td>0.12%</td>
<td>0.14%</td>
<td>9,360</td>
</tr>
</tbody>
</table>
Case No. 4, a female, aged 27 years, suffering from intestinal stasis and rheumatoid arthritis had to be discharged from Hospital, before the tests of her hepatic efficiency could be carried out, owing to the acute onset of marked mental symptoms. Six cases of stasis, accompanied by toxic symptoms, are included in the list and each one shows a degree of lessened anti-toxic power of the liver, while case No. 7, which a barium meal x-ray examination proved to have considerably more delay than any other of the series, evidently possessed a liver performing its functions normally, and this patient alone presents no signs of a general poisoning of the body tissues.

The writer is led to the conclusion that in chronic intestinal stasis a toxin, of intestinal origin, is undoubtedly elaborated, but should the guarding property of the liver be normal, no toxic symptoms result. Hepatic damage, probably due to poisons conveyed to the organ, and varying inversely with its resistance, allows of the entry of the toxins into the general circulation, but here again there is another possible line of defence - the thyroid gland and the emunctories.

The thyroid gland, and possibly other organs to a lesser extent, possess the property of neutralising and destroying poisons, but only to a slight degree. Once the toxins have/
have entered the general circulation their effect may be diminished if the excretory organs are efficient. The kidneys would act beneficially, but if, or when, they become diseased retention of poisons would occur. Toxic substances are probably excreted to a very slight degree by the skin, yet in sufficient quantity to account for the foul odour of the perspiration occasionally met with in chronic intestinal stasis.

It was once thought that the foul breath which accompanies constipation could be ascribed to the excretion of toxic substances by way of the lungs, but Haldane and Lorrain Smith have shown that the unpleasant odour is due to decomposition occurring in the mouth, owing to inefficient oral hygiene, and definitely proved that volatile toxins are never excreted by the pulmonary channel. It is only reasonable to suppose that the emunctories themselves will become affected, rendering the deleterious results more marked.

It would be interesting to refer, at this point, to the arguments advanced by the opponents of the theory of intestinal auto-intoxication.

These have been conveniently collected by Gant and are:

(1) The responsible poison has never been isolated nor its mode of action determined.

(2) Persons/
(2) Persons may occasionally have marked stasis and yet present no symptoms of toxic infection.

(3) Liquid, or moisture, favours absorption of toxins and therefore constipated patients should be protected against intoxication, instead of being liable to it.

(4) Many of the symptoms, attributed to intoxication persist after the constipation has been cured.

(1) The first point can be immediately dismissed, as it only proves that our present modes of research are probably unsatisfactory, but it is reasonable to suppose that the toxin acts in a cumulative manner.

(2) This phenomena is explained by the absence of liver damage in this class of sufferer. This resistance to toxins may be inherent in the liver.

(3) Moisture is found above the point of the stasis, and the effect of constipation is the damming back of the contents and keeping them for a longer period in contact with the more absorbent surface of the proximal bowel, together with an ascending infection of the material.

(4) It is very probable that the damage done to the liver is a result of chronic hepatitis, and that, even should the constipation be cured, the liver efficiency can never be restored.

Recently Gross has succeeded in showing that chronic intestinal
intestinal stasis can be produced experimentally in animals by feeding them on a diet deficient in vitamin B₁₂, but this probably only results in the establishment of delay and the toxic symptoms are secondary to the stasis.

Quite apart from the results of auto-intoxication, symptoms may be caused reflexly by irritation and distension of the bowel, but these effects are minor in character. The slight headache and vague abdominal discomfort, which some persons experience if their bowels fail to open at the usual time and which disappear a few minutes after the desired evacuation, can only be reflex in origin.

Alvarez(63) has recently gone so far as to consider that the majority of symptoms accompanying chronic stasis are reflex in character, but few would dare to put forward such a sweeping statement. Faecal accumulations may produce symptoms by direct pressure especially if occurring in the pelvic colon or rectum, which lie in the comparatively rigid pelvic cavity. The etiology of haemorrhoids, accompanying stasis, is probably thus accounted for. The veins of the rectum have their origin in venous pools immediately above the level of the anus, run upwards in the long axis of the rectum, and are valveless. Difficult defaecation, together with increased straining and a considerable rise in intra-abdominal pressure, with large hard stools descending and forcing/
forcing the venous blood in the reverse direction would lead to distension of the pools and the eventual development of haemorrhoids. Abrasion of their surface, resulting in inflammation of the piles, would aggravate the bowel condition by reflex contraction of the sphincters.

Pressure on the veins of the female genital organs would result in congestion of these organs, with consequent signs and symptoms, and, very rarely, impeding of the blood return from the lower limbs results in the production of oedema, unilateral or bilateral.

Nerves may be involved by direct pressure, the rectal nerves in the case of pruritus ani commonly associated with an incompletely emptied rectum, or the nerves of the sacral plexus causing irritation of the sciatic nerve or giving rise to symptoms suggestive of hip-joint disease.

It has been considered possible that, in chronic constipation, the continued pressure and pounding of the hardened faeces on the muscles of the pelvic floor, hypertrophy of the levatores ani muscles and anal sphincters might occur and render the original cause more marked.

The abnormally hard faeces, and the difficulty experienced in expelling them, frequently produce lesions. Abrasions may develop into anal fissures, which result in extremely painful defaecation, or anal ulcers, the pain of which/
which occurs a few minutes after the completion of the act.

Rupture of a blood vessel, especially if previously diseased, may occur during straining, or the increased effort may prove too much for an already overburdened heart. The non-assumption of the primitive squatting position during defaecation leaves the hernial openings partially unprotected and an increased intra-abdominal pressure might result in the production of a hernia.

Prolapse of pre-existing haemorrhoids is of common occurrence, and if the sphincter contracts about their neck, and the condition be not relieved immediately, strangulation will occur.

Very occasionally prolapse of the rectum occurs during difficult defaecation, but much more commonly it is a result of profuse diarrhoea.

It is now left to consider the results of auto-intoxication on the tissues, that is, the symptoms and conditions associated with constipation.

Lane(64) draws particular attention to the removal of fat, which results in an appearance of premature senility and, especially in females, a lack of support of the abdominal and pelvic organs. Chapple(65) considers that intestinal stasis is an important etiological factor in the production of gynaecological diseases, but it must be admitted that although/
although this loss of weight is found in the majority of cases, some escape, as for example cases No\(^3\) 3. and 6, who in spite of stasis, were distinctly plump, with very little diminution of their bodily fats. The loss of subcutaneous fat promotes the formation of wrinkles, and the buttocks and breasts, in the female, instead of being firm and round, become flaccid and inelastic. Pigmentation of the skin becomes conspicuous in severe cases and is most marked in the eyelids, and over the face, neck, axillae, abdomen, adjacent surfaces of the thighs, spinous processes; that is to say it tends to affect the parts of the body subject to pressure or friction. Advanced cases have been taken for examples of Addison's disease and possibly the suprarenals play a part in the production of the darkened skin of stasis patients. The skin becomes thin, inelastic, and dry and the complexion assumes a muddy character. The hair tends to fall out, as was well seen in case No. 3, and here it may be mentioned that persons possessing hair of a red or very fair colour do not show much change in complexion.\(^{66}\) Case No. 6, who had obvious toxic symptoms, but a head of bright red hair, had a very clear complexion, with no pigmentation whatsoever.

The skin may feel cold over the upper and lower extremities and Lane\(^{67}\) describes the abrupt change felt on passing the hand over the shoulder. Case No. 2 showed this phenomenon.
phenomenon to a marked extent, the warm shoulders giving place to a cold, partially cyanosed arm at a line drawn round the arm at the level of the insertion of the deltoid muscle. The line of demarcation is not so abrupt in the lower limbs, but generally occurs in the region of the knee. The toxic effect results in muscular debility, which may be present to such an extent as to allow of the formation of actual deformities, such as kyphosis, flat-foot, etc. The weakness of the abdominal muscles has already been referred to as a cause of deficient and difficult defaecation, and it also results in lowered intra-abdominal pressure with subsequent visceroptosis and it may be that general muscular debility is responsible for both the deformities and the stasis. The involuntary muscles would be simultaneously affected to a certain degree. Any deficiency of the muscular activity of the bowel would aggravate the already present constipation, while toxic myocarditis would produce a certain amount of cardiac insufficiency.

It has been put forward as possible that asthma may be a complication of chronic stasis, either through the intestinal toxins producing bronchial spasm, or depending upon the presence of an intestinal-respiratory reflex, as it is well known that the symptoms may very often be promptly relieved in attacks of asthma, preceded by constipation, by the simple administration/
administration of an efficient aperient. The effects of the poison on the central nervous system are generally well marked in chronic intestinal stasis and probably constitute the most distressing element of the disease. Headaches, of varying intensity, occur frequently and the patient is generally very depressed and miserable. This condition of mind was an obvious feature of case No 4, a young woman who had to be discharged from hospital eventually, and prematurely, because of the acute onset of marked mental instability. Considerably diminished mental, as well as physical, energy is frequently noted and occasionally the mental fatigue has advanced to such a degree that the patient is rendered incapable of following his, or her, usual employment.

Neurasthenia is present in practically all cases of toxic delay and the one condition aggravates the other. Neuritis is occasionally present as a complication but more frequently one finds patients complaining of vague muscular pains, resembling chronic rheumatism, or volunteering the statement that their whole body aches, as if they had undergone a severe thrashing or been extensively kicked. Case No. 2 showed this symptom to a marked degree, the condition tending to be confined, however, more to the legs and buttocks.

The breasts undergo degeneratively changes and Lane (68) is/
is of the opinion that their tissue first becomes nodular in the upper and outer quadrant of the left breast. This distribution certainly obtained in case No 3, although the right half of the other breast was lumpy also, but to a lesser degree.

The internal secreting organs are considered to lose some of their efficiency and the thyroid gland may diminish in size to such an extent as to be practically in palpable. The adrenal insufficiency, which is considered by some authorities to be present, could be brought to explain the dermal pigmentation and the liability of constipated subjects to the onset of asthma, which is in many cases so quickly relieved by an injection of adrenalin. Signs of nephritis, or of pyelitis, especially of the E. Coli type, may be present, due to the affection of the renal tissue by organisms, or toxins, in cases in which bacteraemia has occurred. Degenerative lesions of the eye and the incidence of arteriosclerosis could conceivably be accounted for by the presence of a circulating toxin, which could probably also be held responsible for the occasional slight attacks of pyrexia in constipated subjects. Loss of appetite, vomiting, and such gastric subjective phenomena as nausea, and the experience of epigastric distension after meals, are probably due to the alimentary disturbance.

Lane(60)
Lane(69) believes that a great variety of conditions and diseases arise in the individual, because of the lowered vitality of the tissues produced by the toxin in the blood. But here one must proceed with caution, as given a commencing point of lowered vitality one could evolve a chain of events, from a pathological point of view sound in theory, individually and in sequence, by which practically every disease known to medicine and the majority of surgical affections could be explained. The presence of a circulating toxin is, admittedly, a matter of grave import, but to attribute practically all illness to its action constitutes an outlook altogether too sweeping in character, as, unquestionably, many of the lesions found in patients, suffering from chronic intestinal stasis, must be regarded in the light of coincidences. Such affections as enlarged tonsils and adenoids, the invasion of the various parts of the body by the tubercle bacillus, the presence of pyorrhea alveolaris, and the onset of various skin diseases, held by some as representing complications of intestinal auto-intoxication, could, possibly, be explained in quite a different manner, were more exact knowledge known of their etiology.

Direct spread of infection from the stagnating contents of the duodenum along the common bile duct and pancreatic duct has been held responsible for chronic pancreatitis, diabetes/
diabetes mellitus and eventually cancer of the pancreas, while if the infection should ascend the bile ducts various diseases of the liver, bile stagnation with the formation of gall-stones and possibly cancer have been regarded as end-results. Infection of the female genital tract, with the subsequent development of gynaecological lesions, and infections of the thyroid gland producing the various types of thyroid enlargement are other examples of diseases attributed to stasis, but the foundation for these beliefs is rather flimsy and theoretical and further evidence is required before one can accept these various conditions as being true complications of intestinal stasis, with infection superadded. As has been pointed out previously, auto-intoxication may predispose its victims to any of the diseases mentioned above, but the latter, almost without exception, may occur in patients who have no demonstrable intestinal defect and under these circumstances no unbiased observer would be entitled to attribute them solely to the effects, direct or indirect, of chronic intestinal stasis.

The same reasoning applies to the condition of rheumatoid arthritis, some subjects suffering from intestinal stasis developing the disease, as shown in case No 4., while others present all the typical joint lesions and yet possess a normal alimentary tract. As Hurst(70) points out, in the absence/
absence of any obvious source of infection, the possibility of an intestinal origin cannot be overlooked, and Lane has shown that marked beneficial results have been obtained from colectomy in some of the cases operated on for the relief of this most distressing disease.

Appendicitis, in relation to chronic intestinal stasis, is a matter of considerable importance. Caecal delay, with the accompanying irritation of the bowel wall producing typhlitis, could be held responsible for some cases of inflammation of the appendix; a chronic appendicitis on the other hand, by reflex action, or interference with the ileal effluent by the formation of adhesions might result in delay in the onward passage of the bowel contents, while the two conditions, in some cases, can apparently be attributed to the same cause, namely adhesions, inflammatory or congenital, involving the ileo-caecal region.

Irritation of the bowel wall, by hardened and retained faeces, or by the excessive production of the substances resulting from putrefaction and fermentation, eventually leads to catarrhal inflammation. The catarrhal colitis, present in case No 8., could doubtlessly be explained by the obstinate constipation which preceded the first attack.

Muco-membranous colitis may possibly depend upon the same origin, and be analogous to the phlegmonous inflammation which/
which occasionally attacks mucous surfaces in other parts of the body.

Diverticula of the colon, usually found in the distal half of the great bowel, occur as a rule, in patients giving a history of chronic constipation. The increased intra-intestinal pressure, together with a congenital weakness of the bowel wall, or lack of resistance brought about by excess of fat, tending to be deposited in the appendices epiploicae, probably accounts for the development of the diverticulous processes, which, in the majority of cases, are arranged in rows, their sites corresponding with those of the appendices epiploicae.

Faecal impaction in these intestinal herniae results in inflammation, localised peritonitis and adhesions and many regard this condition as a fruitful source of cancer.

Cancer of the colon may be produced, also, by the chronic irritation of retained faeces, or be a result of malignant changes occurring in a stercoral ulcer.

Hirschsprung's disease, or congenital idiopathic dilatation of the colon, is a rare condition. Pathological signs of chronic obstruction can always be noted in the colon and the obstacle is considered, by Hurst, to consist of achalasia of the sphincter of O'Beirne, or of the anus, such absence of active relaxation being present from birth. An/
An elongated pelvic colon, with a stretched and lengthened mesentery, occurs in a certain number of constipated subjects and is considerably more mobile than normal. Should the extremities of this portion of the bowel be fixed by adhesions, the loop is liable to rotate round its narrow pedicle to form a volvulus.

In recent years the importance of the condition known as visceroptosis, in relation to intestinal stasis, has been pointed out by various observers. Walton\(^{73}\) advances three factors to account for its production:

1. General ptosis.
2. Membrane and band formation.
3. General skeletal and muscular changes.

In the majority of cases ptosis of all the abdominal viscera occur, but frequently the mobility of one, or more, organs is comparatively more marked. The peritoneal adhesions present are identical in structure and position with those described already when the subject of colic constipation was considered. The skeletal changes are of two types, which have been designated respectively as the virginal and maternal varieties.

The former patients are poorly developed, tall, and show a comparatively diminished antero-posterior diameter of the thorax, while the upper abdomen is narrow and the waist/
waist long. Such a description accurately fits case No 5.

The maternal type of subjects show practically no skeletal changes, with the exception of a degree of rounding of the shoulders, but the abdominal muscles are atrophied and the lower abdomen protrudes. In these cases the condition is probably acquired after maturity and is frequently a result of repeated pregnancies.

Visceroptosis is met with about five times more commonly in women than in men, probably as a result of the lesser degree of support afforded the abdominal viscera in the female, and the deleterious effect of pregnancy upon the muscles of the abdominal wall.

The symptoms are both local and general. The former result from the abnormal positions of the various organs and the consequent strains imposed upon the mesenteries, and in some cases from localised intestinal delay with subsequent distension of the bowel. The general manifestations are identical with those of auto-intoxication. The local symptoms are usually relieved by lying down, by mechanical pressure exerted over the lower abdomen in an upward and inward direction and by the increased intra-abdominal pressure resulting from pregnancy.

Visceroptosis is very frequently, almost invariably, associated with intestinal stasis. (74)

Some/
Some regard the former as being responsible for the faecal delay, but Hurst (75) is probably correct in his view that "more frequently the two conditions are only associated together because both are independently produced by the abnormal condition of the abdominal and pelvic muscles."

Case No 5. had definite symptoms of intestinal auto-intoxication and a long history of constipation, although no obvious delay could be demonstrated in either of the two barium meal x-ray examinations, made while she was in hospital, with the exception of slight gastric stasis on the second occasion. But while under treatment, regular evacuations were insisted upon and obtained naturally once and frequently twice a day and this may have had a beneficial effect, or what is more probable, the visceroptosis had developed to that stage in which, Walton (76) states, diarrhoea or mucous colitis may occur and the bowel contents be hurried through more quickly than normal.

It is possible that intestinal stasis, of the toxic type, by producing an obvious loss of fat, would detract from the efficiency of the visceral support and so predispose to, or actually cause, the development of visceroptosis.
"The inestimable number of therapeutic measures which have been suggested for the relief and cure of constipation are evidence of the fact that the successful treatment of this complaint is no light task." (77)

There is no stereotyped method of treatment applicable to all cases, and it is a deplorable fact that measures are frequently adopted with a view to securing immediate, but temporary, relief, rather than for their curative properties.

The treatment can be conveniently divided into non-operative and operative sections.

Constipation, in the vast majority of cases, is acquired and in many instances the habit is formed during the early years of life. Consequently patient education of children in the subject of bowel hygiene is a prophylactic measure of prime importance and throughout life an attempt to open the bowels should be made each morning after breakfast, while it is equally important never to neglect to obey the call to defaecation during the intervals, as this would result in the desire passing away and leaving an unnecessarily loaded rectum.
The act of defaecation should never be hurried and the bowels should be emptied as completely as possible. The construction of some modern water-closets leaves a lot to be desired and one so planned as to enable the person to assume a position as near as possible to that of the primitive squatting attitude, during the act, is preferable. Where a high seat enters into the construction it is advisable to provide a stool, of convenient height, on which to rest the feet. In some cases chronic and obstinate constipation, generally due to bowel neglect, can be considerably improved by the employment of psychotherapy.

Suggestion plays an important part and case No 7. is an excellent example of the good that can accrue from determined and continued exercise of will power. This man was very constipated up to the age of 30, when he noticed in a medical paper that his condition was often relieved by making an effort each morning, even in the absence of any desire, and by the persistent exercise of mind his bowels, which previously had only been open on the average twice a week, became regular each day, and with considerably less effort, after a period of 18 months. He was frequently disappointed at the commencement of this home treatment but in the end was eminently successful. A regular life, with a set hour for defaecation, would naturally, considerably aid this.
The dietetic principles of treatment are important and cannot afford to be overlooked.

A sufficiency of food is essential in order to produce a mechanical distension of the gut and it is generally advantageous to have several smaller meals than a few larger ones, as in the former case the gastro-colic reflex is more frequently repeated. Mastication should be thorough, as the irritation consequent upon the ingestion of lumps of hard food only produces irregular peristalsis and enterospasm, therefore dental attention may be required to provide for a sufficiency of efficient teeth, especially molars, and at the same time to treat pyorrhoea alveolaris, if such a condition be present.

The sufficiency of food depends upon the cellulose content of the various articles of diet, and the chemical excitation is really of secondary importance, yet by no means matter to be neglected. The proportion of cellulose varies considerably in different vegetables but those found most valuable for constipation are whole meal, which contains the outer protective envelope of the wheat grain, in addition to the embryo and endosperm used in the manufacture of ordinary brown meal, and in addition oatmeal, spinach, cabbage, asparagus, onions, tomatoes, parsnips, watercress, celery and lettuce.
lettuce. Potatoes baked and eaten with the skin are of considerable use, but as ordinarily eaten, particularly if mashed, their value is greatly diminished. Fruit, which in addition to cellulose contains an important quantity of sugar and organic acids, valuable because of their chemical properties in stimulating motor activity of the bowels, should be indulged in at all meals if possible. Dried figs, raisins, prunes, dates, cooked or uncooked, and fresh fruit such as plums, peaches, cherries, raspberries, gooseberries, strawberries, currants, pears, apples, oranges, grapes, pineapples and melons are extremely beneficial and at any season some of these are available. Nuts act chiefly through their large cellulose content and jam and marmalade because of their contained fruit and the sugar used in preservation.

Fats, with their derivatives - fatty acids, soaps and glycerine - increase the motor activity of the intestines and can be administered in the form of butter, at table and in the preparation of various foods and dishes, in salad oils and dressings and as cream, cod-liver oil and olive oil.

Foods, for example, fine white bread, milk puddings, and mashed potatoes, which are almost entirely absorbed and leave little or no residue, should be eliminated as far as possible from the diet and other foods - whole meal or oatmeal preparations, fruit and vegetables - substituted. Proteins do not stimulate/
stimulate peristalsis to any practical extent but are required for metabolism and provided they are not excessive in quantity should be allowed. But in cases presenting features of intestinal intoxication the protein content of the food has to be substantially reduced until improvement takes place. (78)

It is very important to see that sufficient fluid is drunk. Cold water stimulates peristalsis, while warm fluids tend to reduce spasm in cases associated with colic.

Sour milk, produced by the action of a pure and active fluid culture of the Bulgarian lactic acid bacillus, was strongly recommended by Metchnikoff (79) because of its antiputrescent action and has been extensively employed with considerable success in cases where putrefaction was a marked feature.

Wines act as mild excitants but the large proportion of tannin in red wines renders them unsuitable for inclusion in the diet of constipated subjects. Beer, cider, and lemonade can be allowed in moderation.

The tannin present in tea also precludes this beverage in any excess and, when taken, the tea should be of the Chinese variety, freshly infused and taken with the addition of milk, which tends to render the tannin inert. The diet has to be modified if certain other conditions or diseases be present. For/
For example if the patient be obese the fats should be reduced as far as possible, in diabetes the more serious condition demands its special diet and the constipation should be controlled by drugs, while gastric and duodenal ulceration necessitates a bland non-irritating diet, and it is frequently found that with the improvement of the ulcer the accompanying constipation is relieved. The author has found that in this type of case the administration of a mixture of equal parts of olive oil and cream, produces beneficial effects on both the damaged mucosa and the constipation. Purgatives do not give satisfactory results in all cases of constipation. Undoubtedly some types derive considerable benefit from their use, while others, for example patients suffering from dyschezia, do not obtain any relief from their employment.

Nevertheless a large proportion of cases of constipation can be cured or greatly relieved without drugs if proper treatment is instituted at a sufficiently early stage and persisted in; for, in many cases, a necessarily prolonged period. But the patients must be obtained before the disease is advanced, as it is only logical to suppose that if structural changes, as demonstrated by Keith and referred to previously in this thesis, have occurred, a complete cure will be rendered impossible owing to interference with the intestinal functions.

There is another difficulty which has continually to be met/
met in the treatment of stasis in general hospitals. The duration of the patient's stay is limited and as a rule the full course of treatment, whether it be medicinal or otherwise, cannot be completed, and one has to trust that the patient will endeavour to carry out the remainder of the course at home. One is aware, unfortunately, that instructions are apt to be neglected when the patient has derived what he considers complete or sufficient relief and the final stages, of prime importance, are unobserved, with the result that the treatment only results in temporary relief in many cases.

Other patients, regarding their constipation as of slight importance, treat themselves with patent medicines and often excessive and unnecessarily large doses of purgatives, the continued irritation of which tends to decrease the excitability of the intestinal mucous membrane and render the original condition worse, or demands an increasing dose of the medicine, until such time as the remedy is found to be ineffectual and the intestinal tract permanently damaged.

A case of constipation demands a full and detailed investigation and only after the exact nature of the condition has been established can the appropriate treatment be commenced.

Purgatives are permissible, or rather indicated, in cases/
cases of constipation which occur during acute illnesses, or which accompany and render worse some more serious lesion, demanding special treatment. In many incurable diseases, e.g. inoperable cancer, the expectation of life is short, and it is found that non-medicinal treatment is not suitable, and, in addition, the patient's weak condition rules out deep massage and any other forms of vigorous treatment.

Where hard faeces, with consequent straining at stool, would involve any risk, or result in excessive pain, purgatives, by softening the stools, would prove useful.

Naturally in those cases, for example senile constipation, where non-medical treatment fails and the instances where patients cannot, or prefer not to, submit to the prolonged and perhaps somewhat tedious course of this treatment, drugs are indicated. In treatment the physician should aim at obtaining a normal stool and any abnormal flushing of the bowel is contraindicated except under special circumstances, e.g. poisoning, etc., by reason of the fact that the intestine is unnecessarily irritated and insufficient time is allowed to allow of adequate digestion and absorption of the food.

The various drugs usually employed will be briefly resumed at this stage.

In the physiological section it was mentioned that certain hormones stimulated Auerbach's plexus and it appears reasonable that/
that these should be tried, especially if there is reason to suspect any deficiency in the internal secretions. Certainly in hypothyroidism the writer has obtained beneficial results from a prolonged course of small doses of thyroid extract. Pituitary extract has a stimulating effect on the intestine, especially if injected intravenously and in post-operative intestinal paralysis has been injected with good results.\(^{80}\)

The alkaloids are important in connection with the treatment of stasis. Strychnine, by virtue of the increased excitability of Auerbach's plexus which follows its administration especially if combined with one or more of the vegetable aperients, is of considerable assistance in the treatment of constipation resulting from depression of the central and peripheral nervous systems.

Belladonna and atropine abolish irregular peristalsis and consequently are valuable in cases of spastic constipation, and are often combined with purgatives, which produce colic, with beneficial results. Case No. 3. suffered considerably after the administration of cascara sagrada, but with the addition of 5 minims of the tincture of belladonna to each dose of the purgative very considerable relief was obtained. Care has to be exercised in the employment of the drugs of the belladonna/
belladonna group, as unpleasant effects frequently result from their prolonged use.

Opium and its derivatives form a reliable remedy in constipation due to reflex inhibition and are eminently suitable in acute or subacute abdominal conditions, temporary in character. The prolonged administration of opium would increase the constipation and the possibility of the development of the drug habit has to be borne in mind.

The vegetable purgatives are extensively used. They act through the production of irritation of the intestinal mucous membrane, causing increased reflex and motor activity, and have the additional benefit of only commencing to exert their influence when they reach the bowel.

Preparations of aloes have been in use for a very long period. They exert their influence chiefly on the colon, take about twelve hours to act, and have the advantage of not losing their efficacy, even if taken regularly for long periods.

Cascara sagrada has the additional advantage of acting also on the small intestine, and the writer is of the opinion that addition of glycerine to the remedy considerably augments its effects.

Senna acts entirely on the colon and is independent of the central nervous system, but it should be given in conjunction with belladonna owing to its griping properties.

Rhubarb/
Rhubarb, because of the large quantity of tannin which it contains, is unsuitable for prolonged treatment.

Castor oil is a reliable, safe drug, is not an irritant to the stomach and becomes effective after coming into contact with the fat-splitting ferments, which result in the formation of fatty acids and glycerine, both valuable intestinal stimulants. Some of the oil escapes this action, and together with the glycerine, lubricates the bowel and softens the faeces. Vegetable oils act on both the small and large intestines and are usually given at night and followed by a saline purge in the morning. Olive oil is frequently administered, and given in the form of an oil enemata it forms a valuable aid to the treatment of dyschezia and faecal inpaction.

Phenolphthalein is a synthesized product, closely related to the active principles of the anthracene group of purgatives and encourages both peristalsis and intestinal secretion without the production of pain.

Magnesium and sodium salts constitute the most generally useful of the saline purgatives. Salts have generally been considered to produce their action because of retarded absorption, but Hurst puts forward rather convincing evidence to show that they owe their properties to absorption and consequent action on the nerve supply of the colon, through the/
the blood, producing increased motor and secretory activity. They are safe, reliable, and comparatively pleasant to take, are quick in their action and are particularly useful in the presence of intestinal catarrh, and often efficient in reducing the weight in obesity. They are best taken about half an hour before breakfast, as their action is then stimulated by the gastro-colic reflex.

Mineral waters properly belong to the saline cathartics, as their efficacy depends chiefly upon the magnesium, sodium and potassium salts which they contain. They will, however, be considered later. Mercurial purgatives should be reserved for occasional use in cases presenting gastro-intestinal symptoms, as their action is somewhat uncertain, they are specially prone to produce colic, their continued administration leads to irritation of the intestinal mucosa and they should only be given over prolonged periods in the treatment of constipation in syphilitic patients.

Several preparations have been devised with a view to increasing the bulk of the faeces and therefore to aiding the more timely expulsion of the bowel contents. Agar-agar thus acts mechanically, while regulin, which is made by the addition of cascara sagrada, is a somewhat superior product but has the disadvantage of possessing an unpleasantly bitter taste. Both are used extensively in the treatment of "greedy colon". /
Liquid paraffin is extremely popular since its reintroduction by Lane. It is non-irritating, is entirely unabsorbed and acts by increasing the bulk of the faeces, by rendering them soft and by lubricating the bowel wall. Certain patients complain that small quantities escape from the anus at inconvenient times, especially on passing flatus. This risk can be lessened by giving it in smaller doses, immediately after, or between two courses of a meal, two to four times a day, thereby facilitating its more intimate mixture with the food, but even with these precautions the writer has known some patients who could not tolerate even small quantities. In the vast majority of cases, however, it is an extremely reliable and valuable remedy, is particularly useful in mild cases, and aids materially in the treatment of the more advanced cases.

Suppositories are sometimes used. Those composed of glycerine and soap are the most popular and excite peristalsis and soften the faeces. The result should be practically immediate and in many cases the proportion of glycerine can be gradually reduced as the bowels improve.

Internal hydrotherapy is of great importance in the treatment of stasis, especially of the colon, and consists of fluid introduced into the bowel with the object of producing an/
an immediate evacuation or softening hard masses of faeces.

Enteroclysis, or intestinal irrigation will be considered subsequently under Spa treatment and here the writer will only deal briefly with enemata.

Enemata produce intestinal peristalsis mechanically, thermally, or if medicated, chemically. The mechanical stimulation is due to the distension of the gut and is produced by introducing about two pints of fluid into the bowel slowly by means of a tube connected to a container, raised to the level of about eighteen inches. Fluid, in this manner, flows passively as far as the caecum before peristalsis occurs. If a syringe be used the rapid distension produces defaecation with a smaller amount of fluid and before the caecum is reached. It may conveniently be pointed out here that, with the former method, and in enteroclysis, it is absolutely unnecessary to introduce the nozzle further than just inside the rectum; passing it further involves unwarranted risk of damage to the bowel wall and for this reason also it is preferable to use a rubber nozzle and not one made of bone, ivory or vulcanite.

The effects of enemata can be considerably augmented by using fluids of different temperature to that of the body. Cold water (60°F to 70°F) has a tonic effect on the intestinal musculature and tends to exert a curative effect in cases in/
in which the involuntary muscles of the bowel require development. It is rarely necessary to use enemata lower than 60°F, and below this temperature they are apt to produce violent and severe colic owing to excessive stimulation. Warm enemata soothe the bowel and relieve enterospasm. Gant uses these injections at temperatures varying from 100°F to 110°F, according to the severity of the spasm, and considers them indispensable in the treatment of enterospasm. Hurst, on the other hand, while admitting their use and the benefits they confer, warns one that enemata of a temperature more than a few degrees above that of the body are injurious to the mucous membrane.

The effects of thermal enemata can be considerably augmented if the skin of the body, and especially of the abdomen, be subjected to similar temperatures. This can be conveniently carried out by means of baths or localised compresses, or, if more elaborate apparatus be available, douches may be directed upon the abdomen. The temperature of the spray, and the force, should be adjustable and by this means one is enabled, by using considerable pressure at a close range, actually to massage the abdomen, a valuable adjunct to cold enemata. An alternating hot and cold douche, often referred to as a Scotch douche, produces an extremely beneficial result owing to the powerful reaction.

Chemical/
Chemical stimulation of the bowel is produced by the addition of medicinal substances to plain enemata. Soap is frequently added and, by its irritative action on the mucous membrane, increases the efficacy of the enema.

Glycerine, in similar manner, in doses of one drachm to one ounce, generally evokes a rapid response, but neither glycerine enemata nor suppositories should be used over a prolonged period as they are liable to cause catarrhal complications. They are extremely valuable for occasional use, especially when faeces have become impacted in the rectum.

Turpentine is frequently added to enemata when expulsion of flatus is particularly desired, an emulsion containing half an ounce of the irritant being injected as a rule.

When enemata are used in virtue of their solvent action in lower bowel impaction, vegetable or mineral oils are generally used undiluted, although repeated injections of water at body temperature, especially if the patient is able to retain each for about a period of fifteen minutes, act extremely satisfactorily.

Olive oil, in quantities of four to ten ounces, or a mixture of olive and castor oils, introduced slowly at a temperature of 100°F, has the additional benefits of providing for the lubrication of the bowel wall and being very soothing in its action, the latter property being most desirable if/
able if catarrhal proctitis be present. Liquid paraffin has been used in a similar manner of late, but there is no reason to believe that it holds any advantage over olive oil.

A degree of care has to be exercised in the giving of enemata, as feeble or neurotic patients have occasionally suffered from exhaustion, or actual syncope, following their use. It is noticed in some instances, e.g. Case No 6, that a temporary increase in the severity of the toxic symptoms occurs two to four hours after the administration of an enema and this can probably be accounted for by an increased absorption of liberated toxins, consequent upon the disturbance of the bowel contents, and a good deal can be done to prevent the occurrence of these symptoms, and the erythematous rash that sometimes is noticed after enema administration, by giving a second injection, which need not be retained for more than two minutes, but which removes the liberated toxic substances which may remain after the first enema.

Enemata are of special service in colic constipation. In most cases the type is cumulative, and while an aperient in the slighter cases will empty the bowel thoroughly, in the more severe instances an aperient cannot help, or may do positive harm, if the lower bowel be obstructed by impacted faeces. The correct procedure is to inject about one pint of warm water by means/
means of a Higginson's syringe, if this fails soap and water should be tried, and if the desired result be not attained high enemata should be given, preceded by an oil enema which has been retained over-night. It may even be necessary to empty the rectum with the aid of a spoon, or preferably the finger. It has already been mentioned that warm enemata, either plain, or oil, help considerably in relieving spastic constipation.

In colitis enemata are extensively used. Catarrhal colitis, as in Case No 8, is considerably helped by high enemata, which remove the irritating faeces and toxins and thus favour the restitution of the bowel wall to its normal state.

In muco-membranous colitis enemata are of equal importance, but treatment has also to be directed towards removing the underlying nervous factor. Rest and psychotherapy will go far towards soothing the nervous system. The diet should be generous, mixed, and contain a plentiful supply of foods which chemically stimulate the bowel, while cellulose containing substances and irritants should be excluded as far as possible. Sour milk will help if putrefaction is a marked feature and if pain be present some opium product should be given, together with warm enemata and soothing, gentle massage. In the absence of troublesome spasm fairly vigorous/
vigorous abdominal massage improves the bowel tone and helps to improve the causative constipation. At the commencement of treatment the colon should be emptied by high enemata, combined with castor oil by the mouth and olive oil enemata at night, if these are indicated. Once the colon has been thoroughly emptied re-accumulation of faeces and debris may be prevented by oil aperients, but in many cases it is necessary and advisable to give a course of intestinal lavage, using plain water or saline for preference, as any irritants only aggravate the condition. Lavage can be carried out at home, but is generally more effective at some such place as Plombières, or one of the British Spas, where skilled attendants are available. In dyschezia enemata form the principal means of treatment, and the patient does not derive any benefit from aperients because of the blocking of the distal bowel. The object in this condition is to keep the lower bowel as empty as possible and so to allow the rectum and pelvic colon to recover their normal tone, and this is possible in most cases, even when well advanced, after a varying length of constant treatment. An effort should always be made to open the bowels naturally, immediately prior to the administration of the enema, which may be either plain or of the glycerine type, and when it is found that the bowel has recovered sufficiently to perform the normal function, the injections/
injections should be discontinued and unassisted defaecation encouraged. An enema, at this stage, should only be resorted to when defaecation has been unsuccessful or inefficient. Glycerine suppositories answer very well in this type of case and, as the bowel recovers, the amount of glycerine can be gradually reduced and eventually omitted.

Although rest is indicated in stasis cases which are far advanced and show emaciation and in those in whom the constipation is attributable to reflex inhibition, due to disease of some abdominal or pelvic organ, when in the former cases the strength and nutrition have recovered sufficiently, and in all other types of constipation, exercise forms a valuable adjunct to the other methods of treatment. Exercise should stop short of fatigue and although any form is good, climbing, rowing and riding are the most valuable, because they especially develop the abdominal muscles and stimulate peristalsis by the frequent alterations in intra-abdominal pressure.

Gymnastics form a good substitute when they are directed towards the development of the trunk muscles, but they have the serious disadvantage that they must generally be carried out indoors, thereby losing the invigorating and stimulating influence of the open air on body, mind and appetite.

Massage and electricity are commonly applied to cases of chronic/
chronic stasis. The former should never be ordered if there exists any inflammatory intra-abdominal condition, while in spastic constipation stimulating massage should be substituted by soothing effleurage. But in all cases where it is desirable to improve the intestinal musculature, or in dyschezia, in which the affected parts of the bowel cannot be reached, and where the further development of the abdominal wall would benefit the condition, massage constitutes one of the most valuable therapeutic procedures. It is usual to commence with effleurage and then gradually to add pêtrissage, friction, tapotement and vibration, or any combination of these. Use may be made of mechanical vibration in addition, or this procedure may be carried out at home by the patient himself, when hand massage is not available. Another alternative is presented by "auto-massage", in which a weighted ball is rolled round the abdomen, along the course of the colon, by the patient himself. Naturally, if some particular part of the colon is inactive or sluggish, particular attention is directed to that portion during massage. Electricity is not so valuable as massage, but nevertheless cannot be disregarded, and, used in combination with other measures, is of service. The forms most usually employed are galvanism, faradism and static electricity, the former two types principally for their local effects and the latter when endeavouring to restore/
restore the nervous system in cases in which constipation is secondary to neurasthenia. Galvanism and faradism produce better results when frequently interrupted and varied in strength.

The abdominal muscles may be specially treated, or the colon musculature may be stimulated to contraction by placing the kathode over the back and slowly following the course of the colon with the anode. In cases of dyschezia with impaired tone of the rectum and pelvic colon, the anode, insulated except at its extremity, may be introduced about three inches within the rectum and it has been found more safe, and at the same time more effective, for the patient to retain about one pint of saline in the lower bowel during the treatment, thus diminishing the risk of damage to the delicate mucous membrane by electrolysis and providing for a diffusion of current, otherwise unobtainable.

Spa treatment is deservably popular, but it must be admitted that the change of environment and food, the exercise and the regulated life, together with the suggestion brought about by the patient's confidence in the relief that can be conferred, go far towards, at least, relieving the condition. The drinking of the waters, by reason of the contained salts and the fact that the patients are probably imbibing larger quantities of fluids than usual, certainly helps the bowel condition/
condition to some extent, and the excellent arrangements found in many resorts for treatment by hydrotherapy, massage, electricity and intestinal lavage form one of the greatest assets of modern spas, both Continental and British.

In intestinal lavage the bowels should, if possible, be opened naturally or by means of a mild aperient before the administration of the douches. The natural water of the spa is then run slowly into the bowel, at a temperature of about 100°F, from a height of from one to two feet with the nozzle of the tube inserted just inside the rectum. A quantity between one and two pints is usually inserted, retained for a short time, then evacuated and the procedure is repeated. The lavage is followed by baths, sprays, massage etc., according to the indications for treatment.

In the discussion of the operative treatment of chronic intestinal stasis the writer intends omitting a large number of surgical measures, such as the operative treatment of haemorrhoids, anal fissures, congenital and acquired anal defects etc., as the indications for these and their accurate diagnosis are comparatively straightforward and practically the same routine measures are adopted and advocated by all surgeons and physicians.

But the operations particularly designed for the relief of chronic stasis, such as colectomy and ileo-sigmoidostomy and/
and similar procedures, have formed the bases of many discussions and even at the present moment there is a sad lack of uniformity in the opinion of the merits of these various remedies. The first essential, before embarking on any of these surgical measures, is an accurate diagnosis of the condition present. In spite of various opinions to the contrary, and the presence of some rather misleading statistics, one is bound to admit that these operations are serious in character and involve considerable risk, and consequently the writer is of the opinion that, with the exception of such cases as, for example neoplasm, producing constipation and obviously demanding surgical interference, the relative merits of medical and surgical treatment should be carefully weighed and viewed with an unbiased mind, and operation should only be considered when the symptoms are grave. It is obviously unjustifiable to subject the patient to considerable risk in an attempt to seek relief from symptoms which only constitute an inconvenience.

Many cases would not be affected adversely by a preliminary course of medical treatment and if this were adopted as a routine measure a considerable proportion of those operated upon would obtain the relief they desired, or be so improved as to render operation unjustifiable. Unfortunately colectomy has been regarded recently as a panacea for a host of pathological/
logical disorders and doubtlessly has been performed on many, with varying results, without due consideration. If medical treatment has been tried, and failed, and the symptoms are severe, operative treatment should be recommended, if one can be satisfied that the probable result justifies the risk.

There is no routine operation for constipation and one should be selected to suit the conditions present in any particular case.

Lane (86) considers the essential object is to facilitate the effluent from the ileum and if it is found that an acquired band, or a controlling appendix, is responsible for the stasis, these abnormalities should be dealt with surgically. The division of bands is, however, occasionally followed by peritonitis, probably due to the opening of the lymphatics draining poisonous material from the affected bowel, and Lane prefers colectomy, if the adhesions be at all extensive as, in his opinion, the results are equally good and the mortality less. (87)

Ileo-sigmoidostomy, and similar short circuiting operations, have been advocated as beneficial and even curative measures in cases of chronic intestinal stasis. But again the patients have to be chosen. Ileo-sigmoidostomy dispenses with the entire colon, and in many cases only part of the colon/
colon is affected, while in dyschezia it is difficult to see how any benefit is conferred when one considers that the faulty part of the bowel still forms part of the intestinal tract. If it can be definitely established, by means of x-rays, that only a segment of the colon is not functioning properly then this part should be short circuited, but no more, as undoubtedly the colon possesses functions of considerable importance and should be conserved wherever possible. In this way if the lesion existed at the hepatic or splenic flexures an anastomosis would be established between the limbs of the affected loop, and the flexure retained or, if necessary, excised according to the condition present. It was found that after ileo-sigmoidostomy had been performed there was a marked liability for faecal matter to collect in the blind end of the colon. This accumulates owing to antiperistalsis, but is partly to be accounted for by the continued secretion of the colon.

Frequently repeated bowel irrigation relieves this condition to a certain extent, but at the same time empties the ileum, and in some cases it has been necessary to perform appendicostomy or caecostomy, preferably of Gant's valvular type, when the proximal part of the colon can be kept empty by lavage through the artificial opening. When unpleasant measures, such as these, are indicated, Lane prefers colectomy/
colectomy as a secondary operation.

Colectomy, which Lane now performs at once for his most severe cases of intestinal stasis, is an operation of considerable severity, with high mortality figures, even when performed by eminent abdominal surgeons, and should only be contemplated under the conditions that make ileosigmoidostomy justifiable.

Metchnikoff believed the human large intestine to be useless and attributed to its presence the failure of man to reach his natural termination of life at the age of one hundred and forty years, but undoubtedly the colon possesses valuable functions, among which may be mentioned the absorption of fluids, and the excretion of various poisons such as lead, opium and probably some of the toxic substances present in the blood in disease. Lane dismisses the theory of the uselessness of the colon as ridiculous, but considers that the value of the freeing of the ileal effluent more than compensates for the loss of its functions.

When first the operation was introduced the caecum and ascending colon were removed alone, in many cases, and an anastomosis established between the lower end of the ileum and the transverse colon but now Lane performs a complete excision down to the pelvic colon. Moynihan, on the other hand, almost always prefers a hemicolectomy, making an anastomosis between the terminal ileum and the middle of the transverse colon.
colon and excising the proximal half of the large bowel, as he considers the main seat of the disease is on the right side, constituting, what he has so aptly termed, a "soggy" caecum. By this means the omentum is preserved, and by shrouding it around the anastomosis and invaginated bowel ends the risk of complications arising from adhesions is greatly reduced. Hemicolecotmy is naturally only indicated when no demonstrable cause of stasis is to be found in the distal half of the colon.

But even hemicolecotmy should not be recommended until medical treatment has been tried, as such cases frequently derive benefit from persistent non-operative procedures. The improvement in Cases 3 and 6 serves to exemplify the value of medical treatment under these conditions, but no doubt, under certain circumstances, a time arrives eventually when the morbid processes have progressed to such a degree that, in the presence of marked symptoms, it is proper to advise surgical interference.

Colectomy is sometimes indicated in pelvi-rectal achalasia (Hirschsprung's Disease) but here again medical measures should first be tried. Repeated enemata should be given in an attempt to keep the bowel as empty as possible and so facilitate recovery of tone, which can be hastened by massage, electricity, strychnine etc., but, if only failure be the/
the reward, either the pelvi-rectal flexure can be short circuited, or colectomy performed in cases in which the colon is grossly affected, establishing an anastomosis between the proximal end of the bowel and the rectum. Occasionally the obstruction is so severe as to demand colostomy, with colectomy secondarily if necessary.

If a condition of volvulus be present the bowel may be mobilised in a favourable position, but this procedure often presents difficulties, and resection of the offending part has to be resorted to, with a subsequent colectomy if the large bowel does not show definite signs of recovery.

If medical treatment fails to give the desired results in cases of stasis occurring in the proximal half of the colon, appendicostomy, or caecostomy, may, with advantage, be performed and the bowel washed out daily through the artificial opening. These operations involve practically no risk, and the irrigation can be more effectively performed. Saline or water should be used but in simple colitis the addition of an astringent, or if the case be that of infective colitis, an antiseptic is to be recommended.

If, however, a mechanical cause is found for the constipation, a short circuiting operation, with partial colectomy if need be, is to be preferred to appendicostomy, as in the former case the actual cause is attacked.

Stasis/
Stasis in the distal half of the colon, including the condition of dyschezia, is more easily relieved by enemata, combined with other forms of medical treatment, than by appendicostomy.

Gant\(^{(3)}\) claims that he frequently relieves dyschezia by valvotomy, in which Houston's valves, which he asserts are frequently hypertrophied under these conditions, are divided with the aid of specially designed clamps, which produce pressure necrosis, but Hurst\(^{(4)}\) maintains that the relief can probably be accounted for by the accessory treatment, including the stretching of the sphincters, involved in the performance of the operation.

Operations devised to mobilise parts of the bowel, which have taken up a ptosed or some other abnormal position, were commonly performed at one time. An abnormally movable caecum was frequently treated by caecopexy, but recently the complicating stasis found in the caecum and ascending colon has prompted surgeons to prefer a short circuiting operation, anastomosing the ileum into the transverse colon.

It has already been mentioned that Gant considers a chronic intussusception of the pelvic colon into the rectum a fruitful cause of constipation and it is only natural to find that he has taken steps to prevent such an occurrence by performing sigmoidopexy in those cases which present an abnormally mobile/
Many attempts have been made to treat visceroptosis surgically, but Hurst states that "under no circumstances should any operation be performed for fixing dropped viscera, except incidentally in the case of the caecum when an appendicostomy or caecostomy is performed, and in certain cases of nephroptosis." The ptosis rarely affects one organ, although the condition may be more marked in one than in the others, the operation rarely affords anything beyond temporary relief, and surgical interference is most undesirable in the neurasthenic condition usually associated with this state.

Rather should the treatment be medical. Insistence upon adequate rest during the puerperium, and the avoidance of prolonged standing in those structurally predisposed to the condition, are important prophylactic measures, but once the visceroptosis is established careful treatment should be instituted. In many cases, where the condition is advanced, a few weeks rest in bed should be recommended, the neurasthenic element treated, a generous diet given with a view to increasing the amount of supporting intra-abdominal fat, and the foot of the bed raised in order to reduce the ptosis as far as possible. Massage, electricity, strychnine, etc. should be prescribed in order to improve the abdominal and intestinal musculature and if the pelvic floor be found defective this/
this should be restored to as normal a condition as possible by surgical measures, or by the introduction of a supporting pessary. When the patient begins to get up a good fitting abdominal belt should be worn regularly, and care should be taken to ensure that the patient correctly fits and adjusts this appliance, which probably confers relief more through the raising of the intra-abdominal pressure than the support it may afford any particular organ, but in addition it enables the patient to indulge in more exercise and to lead a more normal existence, thereby constituting, through its indirect effects, a valuable asset to the treatment of the condition.
VI.

APPENDIX

CONTAINING NOTES OF CASES.

Case No. 1.

A male clerk, aged 60 years, was admitted to Hospital in March, 1923, for gastro-intestinal investigation. His family history was uneventful and his past history good. He had always been healthy, with the exceptions that during the past eleven years he had experienced occasional nausea and that eighteen years ago he had an attack, similar to his present illness, but not so severe.

His nausea became more marked about four months before admission, but there was no vomiting. The nausea, accompanied by flatulence, borborygmi, and distension, was aggravated by food, which was followed, in many cases, by acute epigastric pain, coming on within a few minutes after meals. His appetite was considerably diminished, and although uncertain of the amount, he was aware that he had lost several pounds during the past six months.

His bowels had been somewhat irregular during the fifteen months previous to admission, but no reliable history could be obtained.
obtained of their condition prior to this period. The stools consisted mainly of "small pellets", no mucus nor blood had been noticed, but he had observed that the amount of faeces was less than his previous and normal quantities.

He had adhered to ordinary diet up to two months previous to admission, but had exercised considerable restriction latterly, because of the discomfort and pain following food. His fluid intake had been less than normal. He led a sober well regulated life with no excesses.

He looked his years, had a furred tongue, upper and lower dentures fitted eighteen years ago, but previous to this his gums had evidently been unhealthy and his teeth deficient and carious, and his nutrition was only moderately good.

His skin was thin, and inelastic and the complexion shallow and muddy. The temperature was normal. He had suffered from occasional headaches, had noticed mental and physical fatigue and was inclined to be somewhat neurotic. Slight anaemia was present and muscae volitantes had been frequently noticed.

The abdomen, on examination, was distended and tympanitic, but the colon, especially the descending portion, was palpable. No neoplasm could be detected during palpation. The rectum was empty and nothing abnormal was detected.

The heart was normal in size and position, the sounds closed/
closed and, apart from slight bronchitis, the other systems presented no abnormalities.

A fractional test meal failed to display any evidence of free acid and microscopically the appearance of the gastric contents was normal with the exception of the presence of a few red blood corpuscles.

No occult blood was detected in the faeces, which, however, contained an excess of undigested fat. A barium meal was given. The stomach showed active peristalsis, but was comparatively normal in shape and size. The passage through the small intestine was normal, but very slow through the colon, although no point of obstruction was noticed. At the end of 72 hours there was still a very considerable amount of the meal in the pelvic colon, but the rectum was empty, but on examination twenty-four hours afterwards, the bowels having moved naturally in the interval, no trace of the barium was visible.

The laevulose test for hepatic efficiency showed the first reading of the blood sugar to be 0.11%, and the second 0.12%.

The first count of the haemoclastic crisis showed 2,720 white blood corpuscles per cu. mm. of blood and the second 8,200.

The condition was evidently one of general stasis of the
the colon, with the probable addition of gastric carcinoma. Lane(97) considers that carcinoma of the stomach is frequently a result of stasis, but it would be very difficult, in this case, to say which of the two conditions, if any, was responsible for the other. Possibly dyspepsia was the primary lesion and the stasis could be accounted for by the restricted diet, diminished fluid intake and atony of the colon. The patient was rested in bed. The diet at first was light and irritants such as condiments and coarse vegetables excluded, but as the gastric condition improved, these, together with fruit and increased fats, were gradually added.

At first the bowels were thoroughly emptied by an olive oil enema retained over-night, followed by a saline enema in the morning, and subsequently, except during the period of x-ray examination, cold saline lavage was performed each morning.

After three weeks treatment the toxic signs all showed considerable improvement, the complexion was much more normal, digestion was less painful, the faeces more normal in appearance, and the appetite increased, but the gain in weight was negligible. Exploratory laparotomy was then advised, but as permission was refused the patient was discharged.

This/
This case is, admittedly, by no means straight-forward. If neoplasm existed the symptoms were intimately mixed with those of stasis and the degree of hepatic deficiency might have been accounted for by secondary growths in the liver. But whatever the cause, the protective action of the liver was reduced and permitted the appearance of toxic symptoms, resulting from the stasis, or cancer, or both.

Case No. 2.

A constipated man, aged 46 years, was admitted, suffering from toxic intestinal stasis. His mother had suffered from constipation, but the family history was otherwise healthy. Previous medical history—good. He was obviously neurasthenic and his mentality was below normal. He could not ascribe his nervous condition, which had been present for ten years, to any initial shock nor known cause. He had suffered considerably from abdominal colic during this time, although he stated that the bowels were in no way abnormal until about two years previous to admission. In his efforts to combat the pain, he had restricted the nitrogenous element of his food, cut out vegetables entirely and only had three meals a day. During the past two years, according to his statement, constipation had become marked, but he had been able/
able, with the aid of castor oil, to open his bowels about three times a week on the average. Occasional small amounts of mucus, and less frequently, traces of blood had been observed.

His tongue was heavily coated, but his gums and teeth were in fairly good condition. He had noticed a slight loss of weight, amounting to a few pounds. The appetite was diminished, the skin somewhat dirty, dry, scaly, and inelastic, and the facies suggested gastric derangement. Headaches had been very frequent and distressing during the past eighteen months, and he had had two attacks of trigeminal neuralgia within six months of admission. Mental and physical fatigue were marked and he suffered considerably from insomnia. Hypochondriasis was evident. Vertigo had been occasionally noticed.

Others had, on several occasions, noticed him to be slightly jaundiced, and intestinal flatulence proved a most troublesome feature. He showed the typical coldness of the extremities, with the abrupt line of demarcation, referred to by Lane(98) as the result of the damping down of the heart's muscle by the toxins. He constantly referred to general muscular pains, especially noticed in the buttocks and legs, giving him the impression that he "had been thoroughly kicked". Aerophagy was noticed on several occasions.

Abdominal/
Abdominal examination revealed nothing abnormal by palpation, except very slight rigidity in the epigastrium, and this gave one the impression that the relaxation of the muscles was not as complete as that normally observed.

The rectum was empty, there was slight spasm of the sphincters but no abnormal condition detected. The introduction of a finger, or the passage of a hard stool had always caused him a certain amount of pain, but no organic reason for this was ever discovered.

The nervous system showed the signs and symptoms one would expect in neurasthenia.

The heart sounds were rather weak, but otherwise the cardiac examination was normal. The systolic blood pressure registered 148 mm. of mercury, while the diastolic measured 94 mm. and no arterio-sclerosis was present in the radial vessels.

A fractional test meal revealed a degree of hypochlorhydria, but otherwise nothing abnormal. A barium meal showed that the stomach was slightly dilated at the pyloric end, but position was satisfactory and peristalsis of normal activity. The passage through the stomach came within the limits of normality, but 48 hours delay existed in the caecum and ascending colon, while the remainder of the colon was traversed in normal time.

The/
The laevulose test showed the two readings to be 0.08% and 0.12% respectively, while the figures obtained in the haemoclastic crisis were 12,960 and 9,500 white blood corpuscles per cu. mm. for the first and second counts.

Examination of the urine showed the ethereal sulphates to amount to 0.01% and the total sulphates to 0.1%. The diagnosis was obviously intestinal stasis especially affecting the caecum and ascending colon, and producing marked toxic symptoms. The diet was modified to produce as much stimulation as possible,—abundant fluids, increased fats, plenty of vegetables and a liberal fruit allowance being added. A tonic acid mixture was prescribed and given during meals. Regular intestinal lavage with cold saline was instituted; and glycerine and cascara administered if necessary. At first the patient was rested in bed but after ten days he got up, exercise and gymnastics were encouraged, psychotherapeutic measures adopted and attempts to open the bowels naturally, stimulated.

Improvement was marked, the toxic symptoms and signs became very much less evident, he gained three pounds in weight, during the last 10 days in hospital his bowels were opened regularly without the aid of an aperient or enema, and he felt considerably stronger when discharged one month after admission.
Case No. 3.

A girl, aged nineteen years, was admitted to Hospital in May, 1923, for treatment of life-long constipation. As long as she could remember she had had great difficulty in getting her bowels open. At first she did not obtain a motion more often than once, or twice, a week but latterly only once a fortnight or so. She was becoming more constipated, in spite of aperients and the inclusion in her diet of abundance of vegetables and fruit. The stools were very hard, dark brown, and scybalous, but no mucus or blood had been noticed. The patient had always been well nourished and only lately had she lost a little weight, but her appetite was diminished and she suffered from a sense of distension after food. She frequently suffered from colic in the line of the colon, and the pain was rendered worse by aperients and if the bowels had failed to act for any considerable time. She had always been accustomed to taking moderate exercise.

Since January 1923 her neurasthenic tendency had been treated and for a month before admission she had been taking liquid paraffin, but the bowel condition did not show any improvement.

The patient was very fair, somewhat anaemic, her complexion was dirty and muddy and recently she had noticed that her hair was becoming thinner and tending to fall out. She perspired/
perspired freely, especially on exertion and, when admitted, the skin had a slight disagreeable odour, but there was no apparent pigmentation.

The oral condition, with the exception of a coated tongue, was excellent. Frequent temporal headaches had been a distressing feature, mental and physical fatigue were both easily produced, insomnia was present, and the neurasthenic element was marked. She had frequently experienced coldness and numbness in the lower limbs, even during warm weather, but this condition was not well marked in connection with the upper extremities. General muscular pains were almost entirely absent. Her menstrual periods were very irregular and the quantity lost less than normal.

Abdominal examination demonstrated the presence of considerable subcutaneous fat, rendering palpation difficult, but the colon could be felt in practically its entire length. The rectum was partly impacted with scybala but was otherwise normal.

The nervous system showed a state of excitement, but the other systems were apparently normal, with the exception of a faint initial systolic murmur, unaccompanied by any cardiac enlargement. The systolic and diastolic blood pressures were 112 mm. and 86 mm. of mercury, respectively.

The blood sugar amounted to 0.09% but 55 minutes after the /
the administration of 40 grams of laevulose rose to 0.13%, while the first and second haemoclasic crisis readings were 10,960 and 8,340 white blood corpuscles per cu. mm.

A barium meal examination showed general stasis throughout the colon, but more marked in the caecum and ascending colon. The meal was detained in the latter portions for over 48 hours and it required 92 hours to traverse the whole length of the large bowel. The remainder of the gastro-intestinal tract appeared to be normal.

The diagnosis was in accordance with the x-ray findings and a degree of hepatic deficiency accompanied the stasis.

At the commencement of the treatment five ounces of olive oil and one of castor oil were given by the mouth in the evening, together with an oil enema which was retained overnight. A cold saline enema was administered in the morning. This was repeated the next night and a large quantity of faeces were brought away on both occasions. The fluid intake, which had been rather under normal, was increased, but the diet to which she had been accustomed was continued. Cold saline high wash outs were continued for one week, but normal defaecation, which had been encouraged and tried before the administration of each injection began to assert itself and the wash outs were discontinued. A mixture containing cascara and glycerine, which had been given after the third day/
day in hospital, was continued in the meantime, and abdominal massage, exercises and interrupted faradism to the abdomen were commenced. The wash outs had to be recommenced after a lapse of five days, but were finally dispensed with after a further week's treatment. At this time the patient began to suffer, somewhat, from colic, but this disappeared entirely following the addition of five minims of the tincture of belladonna to the aperient. The amount of the latter was gradually diminished as the bowels recovered their tone, until on discharge, five weeks after admission, the amount of the aperient was practically negligible and the bowels were moving regularly each morning. The stools were of practically normal consistency and the toxic signs and symptoms showed marked improvement. There was a slight gain in weight, the extremities were not so cold, the headaches neither so severe nor so frequent, the complexion was markedly improved, fatigue was less noticeable, the appetite had improved and the anaemia was not nearly so apparent. But one of the most interesting changes took place in the breasts. On admission the upper and outer quadrant of the left breast and the centre and outer half of the right breast were quite distinctly nodular, but on discharge the normal texture of the breasts was being regained and the change was so obvious as to be noticed by the patient herself. Lane\(^{(22)}\) contends that the breast tissue "may/
"may be regarded as the barometer of the degree of poisoning" and has noticed the disappearance of even extreme degrees of degeneration of the breast, after operation on the intestine.

Case No. 4.

A young woman, aged 27 years, was admitted in April, 1923, suffering from rheumatoid arthritis and intestinal stasis.

Her mother had suffered from similar complaints, but otherwise the family history was very good. All her life she had been very constipated, and she could only open her bowels every fourth or fifth day, unless she took large doses of aperients. At first she relied upon salts, but latterly had been trying liquid paraffin, but no permanent benefit was observed. The stools were composed mainly of scybala, but no mucus nor blood had been observed. She had always been of a nervous disposition, but it was only after a severe attack of influenza in 1918 that marked toxic signs and symptoms began to appear. During the past five years these manifestations of intoxication had gradually been becoming more prominent. She suffered from frequent headaches, lassitude mental and physical fatigue, some diminution of appetite/
appetite, a degree of dryness of the skin, the complexion assumed a muddy character, and pigmentation was very obvious, especially in the region of the neck, axillae, abdomen, along the line of the spine, and over the adjacent surfaces of the thighs. The pigmentation was quite intense and tended to be blotchy in distribution. She had noticed loss of memory, frequent attacks of insomnia, trembling of the limbs, coldness of the extremities, with the lines of demarcation ill-defined, and her mother was aware that the patient was the subject of occasional slight mental disturbances. About the same time as the onset of these toxic indications, rheumatoid arthritis first made its appearance in the left shoulder, and the other joints were gradually involved, and on admission changes were found in all the joints of the extremities, although the hip-joints only showed a very slight affection, while the right elbow, both wrists and the metacarpo-phalangeal joints were markedly swollen and deformed.

The bowel condition was not aggravated during the last few years, although she had avoided all vegetables, owing to the fact that she did not care for them, had stopped taking preserved meats and pickles, and had a fluid intake considerably less than it should have been. She admitted carelessness in her bowel hygiene and had never been regular in her habits.
She suffered from slight anaemia, was poorly nourished, showed a heavily furred tongue and in her general mental attitude was depressed and melancholic.

The colon, on admission, was easily palpable, and apparently distended with faeces, and the caecum and ascending colon slightly tender on pressure. The rectal examination showed a moderate degree of impaction of faeces.

The urine contained no abnormal constituents and cultures were sterile.

The breasts were nodular throughout their entire substance, and the thyroid was slightly enlarged, while the isthmus showed some irregularity in consistency.

Her history revealed sufficient causes for her bowel condition, which probably consisted of a combination of dyschezia and general colon stasis. The incidence of rheumatoid arthritis in patients suffering from intestinal stasis have already been discussed but in this case the onset of the joint changes was preceded by over twenty years of severe constipation, which it is quite feasible to regard as, at least, one of the important etiological factors in the production of the osteo-arthritis.

The faeces, on microscopic investigation, showed nothing abnormal, and on culture showed no excess of gram positive organisms. B. Coli only were found and from these an autogenous vaccine/
vaccine was prepared, and subsequently administered.

The large bowel at first was thoroughly emptied by oil injections and cold enemata, and intestinal lavage continued during her stay in hospital. Liquid paraffin was found to be ineffective and was replaced by Mist. Sennae Co., one ounce being administered night and morning, with better results. Attempts were made to disinfect the bowel with guaiacol carbonate, 10 grains three times a day, given in cachets.

Abdominal massage and electricity were prescribed with a view to improving the abdominal and intestinal musculature.

Unfortunately, before any further investigations could be carried out, the patient had to be discharged from hospital as an unsuitable patient owing to the acute onset of mental symptoms. During the last few days the nursing staff had noticed a lack of concentration, and an indifference to their efforts to make her as comfortable as possible. This condition culminated in stubborn silence, even when addressed, with alternating attacks of violent hysteria and periods of melancholia and depression. While considering this case it is interesting to notice that Chalmers Watson is of the opinion that mental disturbances, even amounting to definite insanity, form a comparatively common complication of severe forms of intestinal stasis.
Case No. 5.

A young woman, aged 24 years, was admitted to hospital in May, 1923, suffering from visceroptosis. The family history was good, and, although she herself had never been robust, she had enjoyed fairly good health up to recently, with the exception of scarlet fever at 10 years of age.

As far back as the patient could remember, her bowels had been irregular. She frequently missed a day, more particularly during the past two or three years. She had been accustomed to taking aperients, usually in the form of an infusion of senna pods, and thereby avoided any serious constipation. The stools were usually normal in appearance, but sometimes scybalous, and on several occasions she had observed a small amount of mucus, but no blood. She was not conscious of having been of a neurotic tendency before her father's rather sudden death three years ago, but since her recovery from that shock she admits she has been nervous, emotional and easily excited. She began to lose a little weight, was easily tired, had occasional headaches, perspired profusely if excited, or on exertion, often complained of palpitation on effort, and suffered from a degree of flatulence and a sense of fullness after meals, although she could not truthfully describe the sensation as dragging in character. She attended the Hospital as an out-patient 18 months before/
before admission, when the visceroptosis was diagnosed. She obtained slight relief, but this was not permanent, in fact, her complaints became more marked and, to add to her discomfort, she began to suffer from occasional attacks of tonsillitis. Tonsillectomy was performed one month before admission, and since then she had become aware of the absence of the foul breath and bad taste in the mouth in the mornings.

The patient was tall and underdeveloped and was a typical example of the virginal type of person, predisposed to visceroptosis.

The mucous surfaces were somewhat more pale than normal, the skin was very fair, but showed slight pigmentation in the characteristic regions, while its texture showed nothing abnormal.

The teeth and gums were in good condition and the tongue only showed slight furring.

She suffered from occasional headaches, and mental and physical fatigue were easily produced.

The abdomen, on examination, was not distended and the lower part only showed very slight protrusion. The sub-costal angle was very acute, but the abdominal musculature was fairly good.

The liver was normal in size and its position satisfactory.
factory. The right kidney was easily palpable and the caecum, ascending and lower part of the descending colon could be felt on examination and were slightly tender on pressure. Rectal examination revealed nothing abnormal and the pelvic organs appeared to be satisfactory.

The remaining systems were healthy, with the exception of the presence of a faint mitral systolic murmur, unaccompanied by any dilatation, and a hyperexcitability of the nervous system.

The urine was normal and the systolic and diastolic blood pressures registered 122 and 98 mm. of mercury respectively.

A barium meal x-ray examination could not be obtained until the patient had been under treatment for a slightly longer period than a fortnight, but during this time cold enemata were administered daily, the abdomen was massaged, exercise was encouraged and psychical treatment adopted. The enemata were dispensed with after one week, as it was found that the bowels were acting naturally each day, at a regular hour, without the aid of an aperient.

A barium meal showed most marked ptosis of the stomach, the greater curvature lying in the pelvis, peristalsis was only moderately active and the organ still contained a trace of the meal after 8 hours. The rate of progress throughout the/
the bowel was surprisingly good and although some barium was present in the pelvic colon at the end of 48 hours it had entirely disappeared at an examination 24 hours afterwards.

The transverse colon was very low in the position of its central portion, which reached the level of a point immediately above the pubic crest.

The blood sugar amounted to 0.09%, but after the ingestion of 40 grams of laevulose rose to 0.14%, while 10,200 and 8,180 represented the number of white blood corpuscles in the first and second counts, respectively, of the haemoclasic crisis.

The nervous condition showed no improvement and she was accordingly prescribed a mixture containing potassium bromide and tincture of valerian.

At this period of her treatment, after all the investigations had been carried out, she was confined strictly to bed, which was raised twelve inches at the foot, and forced feeding was resorted to. Her diet before admission had been fairly satisfactory, with the exception of a considerable lack of fat, but the latter was now supplied in the forms of butter, cream, fat bacon, cod-liver oil, etc. and in consequence she gained 8 pounds during her fortnight in bed. During this time the massage and psychical treatment had been continued/
continued and an opportunity was taken of accurately fitting an abdominal belt.

It was curious to note, that although she had not been aware of any definite dragging feeling in the abdomen previous to treatment, while in bed during this period, and subsequently when going about wearing the belt she was conscious of considerably more abdominal comfort and the disappearance of some distressing sensation which she was unable to describe accurately.

Her nervous condition has improved and exercises were resumed after the termination of her enforced confinement. Her sedative medicine was replaced by a tonic containing iron and strychnine, which resulted in a considerable improvement of appetite.

The belt, when in position, only raised the level of the greater curvature of the stomach about one half of an inch, but the disappearance of abdominal symptoms were probably due to the raised intra-abdominal pressure.

She was finally discharged after being eight weeks in Hospital and proceeded on a convalescent holiday. The headaches were much less frequent, the complexion showed considerable improvement, the mental and physical fatigue were not nearly so marked and the bowels were open regularly each morning, and occasionally in the evening in addition, without/
without any artificial aid.

Her history had certainly suggested the presence of chronic intestinal stasis and undoubtedly it had been present for a very considerable time previous to admission. The absence of any indication of a definite degree of delay during the barium meal examination may be accounted for by the improvement in the intestinal condition brought about by the first fortnight's treatment, and the excessive stimulation to peristalsis that resulted from the extreme degree of excitability, almost amounting to hysteria, which existed during each x-ray examination, or by the fact that prolonged retention of faeces had resulted in a mild catarrhal condition of the colon and therefore established increased rate of passage of the intestinal contents.

Case No. 6.

A young girl, aged 13 years, who had suffered from obstinate constipation and thread worm infection all her life was admitted to Hospital in April, 1923.

Her family history was good, but she herself had had measles in infancy and several attacks of "rheumatism", the last, 12 months before admission, answering the description of typical rheumatic fever.

She/
She had been in the habit of taking salts, liquorice, castor oil etc., as in the absence of their aid the bowels would never have been open, and even with the regular use of these aperients a motion was only secured, on the average, every second day, but quite frequently the intervals were considerably longer. In November, 1922, the bowels were closed for 14 days, vomiting commenced, and the condition was only relieved by enemata and purgatives. Latterly a stool was only secured about once every four days and the faeces were very hard, often scybalous, and accompanied by some slime and occasional streaks of blood. At home she had been receiving an enema twice a week. The thread worm infection had been treatment with calomel, santonin and medicated high enemata but on admission the worms and their ova were found in considerable numbers in the stools.

Pruritus ani had been a troublesome feature, the appetite was poor, and nausea and an abnormal fullness were frequently experienced after food, yet the girl was well nourished and her weight above the average for her age. She was red-headed and her skin was fair but showed no pigmentation whatsoever. Her tongue was slightly furred, but otherwise her oral condition was excellent. She perspired freely, but there was no foul odour, she had occasional slight rises in temperature, reaching 100°F. on one or two occasions, suffered from frequent, severe/
severe temporal headaches and vertigo, and complained of
general muscular pains and aches. She was easily tired and
could not walk more than one mile on the level, without ob-
vious dyspnoea, necessitating a rest. Mental fatigue was
apparent to the girl's school-teacher, but she could not be
described as neurotic.

Previous to admission she had had two fits, which from
their description appeared to have been of a mild epileptic
nature.

Inspection and palpation of the abdomen revealed nothing
abnormal - the musculature was good and a fair amount of sub-
cutaneous fat was present.

Rectal examination showed a healthy local condition. The
apex beat was 4½ inches from the middle line in the fifth
space and mitral stenosis was present. The systolic blood
pressure was 106 mm. of mercury with a diastolic of 84 mm.

The breasts were slightly developed, but normal in
texture.

Coldness of the extremities, with an occasional small
degree of local cyanosis, had been noticed, more especially
in the upper extremities, where the line of demarcation was
in the region of the elbows.

A barium meal showed that the chief seat of delay was
in the caecum and ascending colon, which were still well
outlined/
outlined after a lapse of 32 hours. The passage through the remainder of the large bowel was comparatively normal in rate.

The haemoclasic crisis figures were 10,380 and 9,880 white blood corpuscles, respectively, for the first and second counts and the blood sugar 0.09%, rising to 0.17% after 40 grams of laevulose.

At the commencement of treatment the colon was thoroughly emptied by means of oil and plain enemata (and it was noticed that there was a marked increase in the severity of the toxic manifestations about 3 hours after the effective enema), the patient was placed on a diet rich in cellulose and fats, with abundance of fluids; abdominal massage and interrupted faradism were commenced, cascara and glycerine given regularly and for the first fortnight hypertonic (5%) saline bowel irrigations were given immediately following the routine cold enemata once a day.

This treatment, together with absolute rest in bed, was given in an attempt to improve the bowel condition, attack the worm infection and at the same time to allow the heart to recover some of its lost tone.

The hypertonic saline irrigations were discontinued after a fortnight, as parasites were no longer observed, but the plain enemata have been continued daily. The cardiac condition/
condition had improved and graduated exercises were commenced. An attempt to open the bowels, each morning before the enema was given, was insisted upon, but, as a rule, there was no result if the cascara had not been administered in doses of at least two ounces per day. The toxic signs were gradually abating, the headaches were much less frequent, the general muscular pains less evident, the cold extremities much improved and mucus and blood had disappeared from the stools. It proved difficult, however, to distinguish between the true toxic manifestations and the symptoms and signs of the cardiac lesion.

The case proved very stubborn, various aperients gave no better results, a discontinuance of medicine rendered the condition worse and demanded an immediate return to purgatives, so that one had to be satisfied with extremely slow progress.

The pressure on the accommodation of the medical wards being much less acute during the summer months, it was decided to extend this girl's treatment as long as possible, and consequently she has not yet been discharged.

During July, 1923 there was slight transient oedema of the ankles, probably cardiac in origin, but this complication disappeared after a week of comparative rest, and the condition of the heart is now satisfactory.

No/
No parasites nor ova have been discovered in the stools during the last three months, but the evidence of toxic infection and the obstinacy of the bowels show such slow progress, although there is quite a definite improvement during the past four months, that the question of the performance of appendicostomy under a local anaesthetic, will probably have to be considered as affording an opportunity of attaining a more rapid rate of improvement.

Case No. 7.

This patient, a man aged 42 years, revealed many interesting points on investigation.

His father died of Bright's disease, but had suffered for a considerable time from severe constipation, while his mother succumbed to enteric fever.

Up to the age of 30 years the patient had been very constipated and had only been able to open his bowels about twice a week, but, as has been described when considering psychotherapy in relation to the treatment of chronic intestinal stasis, by the persistent exertion of will power he eventually overcame his distressing condition and so proved to be a convincing example confirming Trousseau's theory that when "constipation is not constitutionally inherent in the individual, the/
the will, patiently and regularly applied, will often triumph over the infirmity."(101)

Even in the presence of such long-standing constipation there had not been any symptoms of toxic infection, and for the next 16 years his bowels were open regularly each day without artificial aid. He was in perfect health up to 18 months before admission when he began to notice some abdominal distension after food and the onset of intestinal colic. A small amount of mucus, and occasional blood, were noticed in the stools. Intestinal antiseptics were administered and appeared to give temporary relief, but afterwards the condition progressed. Two months before admission a bacteriologist was consulted. Excessive numbers of gram positive cocci were found in the stools but no organisms suggestive of an enteric, dysenteric nor tuberculous infection. An autogenous vaccine was prepared and given, but with no benefit.

At this point it is most interesting to note that, up to recently, it has been universally accepted that a very large proportion of the bacteria normally found in the faeces are dead. This conclusion was arrived at in view of the fact that faecal smears reveal a most varied flora, while cultures would suggest that the organisms present were of very few varieties. But Chalmers Watson(102) attributes this difference in the results to unsuitable cultural conditions, and has/
has devised a new saccharose milk agar medium, whereby the smears and cultures show pictures very similar in appearance. It is only natural to assume that autogenous vaccines prepared by the new method of culture will give very superior results to those obtained by the use of the existing media.

The patient's condition had become gradually worse, and his bowels were open two to six times a day and the faeces were very watery and difficult to retain. Considerable flatus was present and its passage afforded considerable relief.

No toxic manifestations were present, he never suffered from headaches, general muscular pains, nor lethargy, his skin was perfectly normal and his weight had been very steady throughout, with the exception of the loss of one or two pounds during a period of excessive diarrhoea a few weeks previous to coming into Hospital.

On admission, his tongue was fairly clean, and his teeth and gums in a healthy condition. No neoplasm was palpable in the abdomen, the organs were apparently normal in size and position, and on rectal examination the lower bowel was perfectly normal.

A barium meal was given, and it was found that the passage through the stomach and small intestine suggested nothing abnormal. Stasis, however, was very evident in the caecum and ascending/
ascending colon and even after the lapse of 168 hours a large proportion of the meal was still in this position. At this stage efforts were made to dislodge the barium by means of high enemata, but a small quantity was still present in the caecum after 240 hours.

The faeces had again been examined on admission and enteric fever, dysentery and tuberculous enteritis excluded. The blood sugar amounted to 0.12% and fifty-five minutes after the administration of 40 grams of laevulose it still stood at the same level - 0.12%. The first count of the haemoclastic crisis showed 5,940 white blood corpuscles per cu. mm., but the second 8,000.

Here, evidently, was a case of very marked stasis in the proximal colon, not produced by neoplasm as far as could be ascertained, yet presenting no toxic manifestations as a result of a normal hepatic efficiency.

The question of surgical interference was considered, but a thorough trial of medical treatment was decided upon, as the writer was of the opinion that the signs and symptoms were referable to the mechanical irritation brought about by the retention of hardened faeces in the caecum and ascending colon.

The diet, to which he had been accustomed, was generous and did not contain an excess of irritating material and was, consequently/
consequently, continued unchanged. Abundance of fluid was given, and the bowel emptied as completely as possible by high enemata, morning and night. In four days the results were comparatively normal, but a considerable amount of mucus, and epithelial flakes, were present.

Bowel irrigation with cold saline, containing 2% sodium bicarbonate, once a day was commenced and superseded the twice daily enemata, and massage, and was specially directed towards improving the musculature of the caecum and ascending colon.

As the bowels improved remedial exercises were added and the patient, who was intelligent and eager to improve his condition, materially aided the treatment by careful attention to detail.

The diet was not altered while in Hospital, but in the instructions given the patient on discharge he was advised to gradually add cellulose containing foods etc. after the bowels had completely recovered from the irritation to which they had been subjected.

Strychnine was administered internally, but no aperients were given.

He was discharged in five weeks.

A comparatively normal stool, with neither blood nor mucus, was passed regularly each morning, and occasionally in the...
the evening, in spite of the fact that the intestinal lav­
age had been discontinued during the last week of his treat­ment. The amount of flatus was considerably dimin­ished, the post-prandial distension was much improved, and the pain, in the course of the descending and pelvic colons, which had troubled him immediately prior to defaecation previous to his admission to Hospital, had entirely dis­appeared, and the patient felt perfectly healthy.

This case, which shows the most marked stasis of the series, is yet the only one which presents no toxic mani­festations and it has been pointed out that this patient's the liver appeared to be only one acting in an efficient manner. Surely this is more than a coincidence.

Incidentally, it forms a good example of what can be wrought by medical measures in a very severe instance of stasis and one would only be justified in subjecting similar cases to operation after entire failure of the treatment out­lined above.

Case No. 8.

The last case of the series is that of an iron-moulder, aged 32 years, admitted to Hospital in April, 1923, suffer­ing from colitis. He had had a previous attack, very similar to/
to the present one, nine years before, when blood and mucus were present in the stools, the bowels moved five or six times a day and the diarrhoea, although abating, persisted for about twelve months, while, according to the patient's statement, almost three years elapsed before he fully regained his strength. Previous to this he had always been very constipated, and the bowels were only open every second or third day with considerable difficulty and never without the aid of purgatives.

He was comparatively well up to 7 weeks previous to admission, except for occasional looseness of the bowels alternating with constipation. At the onset diarrhoea commenced rather suddenly, small amounts of blood were present in the first motions, but after a few days both mucus and blood were noticed in considerable quantities, and the bowels were open five or six times a day. On several occasions he vomited and he suffered considerably from severe intestinal colic, and distension after food, accompanied by flatulence and heartburn. The attack lasted in a very severe form for four weeks and then improvement gradually commenced and the bowels had recovered considerably when the patient was admitted. During the last week he had spent at home intestinal lavage, using boracic lotion, had been carried out twice or three times a day and this probably had had a marked effect.
effect also, so that on admission the amounts of blood and mucus were considerably decreased and occasionally absent. The faeces, apart from the mucus and blood, had been comparatively normal in colour, but were excessively watery and, during the height of the attack, very offensive.

Since the first attack he had avoided all food which he considered would irritate his colon, although the quantity of food was good and adequate. He had been placed on a milk diet at the commencement of his present illness and when in hospital he was raised to a non-irritating light diet as soon as possible. His appetite, on the whole, was fairly good, but varied considerably. The skin was very muddy and slightly pigmented in the characteristic regions, perspiration tended to be excessive, but was not accompanied by any foul odour, and affected the palms of the hands in particular. Headaches were frequent and severe, general muscular pains occurred, he was easily tired mentally and physically, was neurasthenic, suffered from occasional vertigo, displayed a degree of anaemia, complained of coldness of the extremities and was distressed by the frequent and excessive passage of flatus.

His tongue was furred, but not to a very marked degree, moderate pyorrhoea was present and some of his teeth were carious. His nutrition was fairly good but he had lost some weight recently.
The abdomen was distended and the colon partly palpable and tender on pressure. The rectum, on examination, was empty and nothing abnormal could be detected. Sigmoidoscopy was performed and showed the bowel wall to be hyperaemic and inflammed, bleeding readily on abrasion of the surface, and revealed a considerable amount of mucus and epithelial debris adherent to the mucous membrane.

A barium meal showed the stomach to be normal in every respect, except for the fact that peristalsis was excessively active. In nine hours the meal had reached the pelvic colon and in twenty-four hours no barium was to be seen. The x-ray examination was repeated but the same excessive rate of progress was again observed.

The other systems were normal, with the exception of the presence of slight bronchitis and the excited state of the nervous system.

The laevulose test gave readings of 0.12\% and 0.14\% blood sugar before and after laevulose respectively, while 9,360 and 8,420 represented the number of white blood corpuscles per cu. mm. in the first and second counts in the haemoclasic crisis.

Intestinal stasis had evidently been present previous to the first attack of colitis, which very probably had a similar origin to that in case No. 7, namely the mechanical irritation/
irritation of retained faeces. During the interval between
the first and second attacks stasis probably re-established
itself to a certain extent, but while in hospital no delay
was observed. This can, very probably, be accounted for
by the fact that he had been receiving intestinal lavage
before admission, but the extraordinarily active gastro-
intestinal peristalsis, observed during the x-ray examin-
ations, undoubtedly was due to the extremely irritable con-
dition of the bowel wall.

The sudden onset of the last attack of colitis might
suggest an infective etiological factor, but examination of
the stools after admission showed a paucity of various or-
ganisms with no particular variety preponderating. No or-
ganisms of enteric fever, dysentery nor tuberculosis were
discovered.

He was given a milk diet to commence with, but as the
condition improved he was gradually raised to a non-irritat-
ing light diet. His oral condition received proper attention.
Warm saline intestinal lavage daily, and abundance of fluids
by the mouth, were prescribed. At first absolute rest in bed
was insisted upon, until he recovered some of his lost strength,
and to allow the bowel as much rest as possible.

Sodium sulphate, in doses of thirty grains, was adminis-
tered morning and evening. It was not effective in reducing
the
the amount of mucus in the stools and was replaced by a mixture containing bismuth salicylate. The latter, in virtue of its protective, astringent and slight antisepctic properties, gave very considerable relief when prescribed in doses of 12½ grains three times a day.

The bowels gradually became more normal in consistence, and, on discharge, after eleven weeks treatment, opened regularly each morning and sometimes in the evening in addition. Intestinal lavage had been discontinued during the last month of treatment and the bismuth mixture replaced by one containing reduced iron and strychnine.

No stimulating measures were indicated in the treatment, on the contrary soothing treatment such as the warm irrigations were necessary, but on discharge the patient was advised as to diet, exercise and proper bowel hygiene, so as to prevent, as far as possible, the recurrence of constipation after the complete disappearance of the hyper-excitability of his colon.

At the termination of his hospital treatment neither blood nor mucus were present in the stools, he had gained 21½ pounds in weight, possessed a much more healthy appetite, the complexion was comparatively clear, the headaches had disappeared, the neurasthenic condition showed considerable improvement, the gastro-intestinal subjective phenomena such as/
as distension, heartburn, etc., were no longer present and he felt very much stronger.

In this case intestinal stasis had been present and the effects of the toxic infection from the bowels were very evident. Even when x-rays showed no delay in the gastro-intestinal tract it could not be assumed that no toxic producing process was at work, as the very fluidity of the intestinal contents favoured the absorption of any poisonous material present. The deleterious substances were in excess of what could be dealt with by the liver, already functionally deficient, and consequently toxic manifestations were present, up to such time as the recovery of the bowel was advanced to such a degree that the hepatic protective agency was enabled to cope with, and destroy, all the toxic substances absorbed from the intestinal tract.
BIBLIOGRAPHY


Section II. Anatomy, Etc.


13. HURST, A. H. Constipation & Allied Intest. Disorders. p. 44. 1920
15. LANE, Sir W. ARBUTHNOT. The Operative Treatment of Intestinal Stasis. p. 51. 1918.
16. ASHER, L. Deutsche Medizinische Wochenschrift. xxxiv, I. 1916
18. WEILAND, W. Pflügers Archiv. cxlvii, 171. 1912.
19. von BERGMANN, G. Zeitschrift für experimentelle Pathologie und Therapie. xii. 221. 1913
21. " " " " " " " pp. 63-65. 1920
22. GAGENBAUR, Elements of Comparative Anatomy, English translation by F. Jeffrey Bell, B.A. London. 1878. p. 562
25. BOKAI, A. Archiv. für experimentelle Pathologie und Pharmakologie. xxiii, 414. 1887.
30. HURST, A. . Constip. & Allied Intest. Disorders. p. 120 1919

31. LANE, W. ARBUTHNOT. The Operative Treatment of Chronic Intestinal Stasis. 1918.


34. VIRCHOW, R. Virchow's Archiv. v. 335. 1853.


43. " " " " " " " pp. 105, 152 & 182. 1916.


50. MUTCH, NATHAN. The Operative Treatment of Chronic Intestinal Stasis, by W. Arbuthnot Lane. pp. 117, 118. 1918.


52. MUTCH, NATHAN. The Operative Treatment of Chronic Intestinal Stasis by W. Arbuthnot Lane. pp. 116, 117. 1918.


54. KEITH, ARTHUR. Discussion of the After-Results of Colectomy (Partial and Complete) performed for Colon Stasis. Proceedings of the Royal Society of Medicine. 1922.


60. Haldane, J. S. Proceedings of the Physiological Society. XI. xi. 1890.


64. Lane, W. Arbuthnot The Operative Treatment of Chronic Intestinal Stasis. p. 53. 1918.


66. Lane, W. Arbuthnot The Operative Treatment of Chronic Intestinal Stasis. p. 56. 1918.


68. " " " The Operative Treatment of Chronic Intestinal Stasis. p. 61. 1918.


71. Lane, W. Arbuthnot The Operative Treatment of Chronic Intestinal Stasis. p. 86. 1918.


76. WALTON, A. J. "Visceroptosis". Medical Annual. p. 400
1920.
1916.
78. MUTCH, NATHAN The Operative Treatment of Chronic Intestinal Stasis by W. Arbuthnot Lane.
p. 267. 1918.
80. CUSHNY, A. R. Pharmacology & Therapeutics or the action of Drugs. p. 387. 1918.
1919.
82. CUSHNY, A. R. Pharmacology & Therapeutics or the action of Drugs. p. 105. 1918.
1919.
1916.
1919.
86. LANE, W. ARBUTHNOT The Operative Treatment of Chronic Intestinal Stasis. p. 71. 1918.
87. " " The Operative Treatment of Chronic Intestinal Stasis. p. 73. 1918.
1916
1919.
91. LANE, W. ARBUTHNOT Discussion on the After-Results of Colectomy (Partial & Complete) performed for Colon Stasis. Proceedings R.S.M. 1922.
92. FLINT, ETHELBERT Discussion on the After-Results of Colectomy (Partial & Complete) performed for Colon Stasis. Proceedings R.S.M. 1922.


97. LANE, W. ARBUTHNOT The Operative Treatment of Chronic Intestinal Stasis. p. 45. 1918.

98. " " " The Operative Treatment of Chronic Intestinal Stasis. p. 56. 1918.


SUMMARY.

Chronic intestinal stasis is gradually coming to be regarded as a definite pathological entity and as the older methods of examination become more accurate, and the newer forms of investigation more developed and reliable, its importance will be better understood and the significant part it plays in the etiology of many, and varied, diseases will be more fully realised.

The study of intestinal delay demands a detailed acquaintance with the anatomy, human and comparative, and the physiology of the gastro-intestinal tract.

All cases of intestinal delay are due to either difficulty in propulsion of the intestinal contents, or some interference with normal defaecation, but many varieties, or subdivisions, exist and have been fully considered in the present thesis.

The symptoms of the condition may be local and confined to the alimentary tract, but in the majority of the cases toxic substances are absorbed from the bowel in quantities greater than the emunctories can eliminate, and chronic auto-intoxication occurs. But some patients suffer from severe and advanced forms of intestinal stasis, and yet display no toxic manifestations.
manifestations, and the writer has endeavoured to investigate, more fully, this interesting point.

Recently much attention has been directed to organic efficiency tests, and although it must be admitted that they are not yet universally accepted as accurate and reliable, nevertheless many authorities consider that they form extremely valuable methods of investigation. The writer has availed himself of two such tests, the laevulose test and the haemoclasic crisis, for the determination of hepatic efficiency in patients suffering from chronic intestinal stasis.

Analysis of the results has led him to the conclusion that auto-intoxication exists as a result of the lowering of the protective properties of the liver, and that provided the hepatic efficiency be normal, toxic manifestations do not occur.

The relative merits of medical and surgical treatment have been considered and the conclusions drawn that the efficiency of non-operative, and even non-purgative, remedial measures is, probably, greater than is, at present, realised and that, in the majority of cases, surgical intervention should not be recommended until it has been ascertained that relief cannot be obtained by the less serious and more conservative procedures.