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Professor Russell

Hereby G. J. Williams
is sent herewith for examination and report.
THESIS

on

CHRONIC CONSTIPATION,
its
CAUSES and TREATMENT.

M. D. 1916.

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The subject of my Thesis is perhaps the most common ailment that calls for the consideration of the general Practitioner. Scarcely a day passes but chronic constipation in one of its many forms calls for his attention. The subject is peculiarly instructive in connection with one's endeavour to grasp the principles of rational treatment, and teaches one to respect causes before employing remedies, and amongst causes, we often have to deal with complex and obscure influences.

It is on account of its prevalence and far-reaching ill-effects that the subject of chronic constipation becomes of foremost importance to the Practitioner, occurring as it does among all classes of the community, in both sexes, and at every period of life. In some cases it occurs without demonstrable cause, but generally one is able to assign its causation to errors of diet, irregular habit, neglect of efficient exercise or defective intake of water; these frequently result in some form of indigestion, and this leads to imperfect removal of waste products from the bowel. It should be the aim of the Practitioner to make those who come under his care understand the great importance of a daily, efficient evacuation of the bowel, thereby he would greatly increase the sum of human happiness and efficiency, and be the means of prolonging the span of numerous valuable lives.
Our knowledge of constipation has recently been greatly augmented owing to increased facilities of examination. The latest methods of investigation enable us to ascertain with exactitude the part of the intestine in which the trouble occurs; they also help us to find out the effect of various drugs employed in the treatment of constipation.

The X-rays have added and will probably continue to add enormously to our knowledge of intestinal movements both normal and abnormal. They enable us to understand the pathogenesis of the many varieties of constipation and give us other valuable data.

Before the discovery of the Roentgen rays in 1895 we had no accurate information regarding the rate of progression of food along the alimentary canal. We are now in a different position, thanks to those who have applied and developed Roentgen's discovery. We now know that food is normally delayed at certain points in the alimentary track, and chronic constipation may be regarded as pathological exaggerations of normal delays.

In this Thesis I propose to discuss chronic constipation from the standpoint of the general practitioner, to cite illustrative cases from personal experience, to deduce certain conclusions relative to etiology and effective treatment.
Definition.

Chronic constipation may be defined as a tendency to the accumulation of faecal matter in the large intestine and its habitual and undue retention there.

There is no fixed point at which this condition of chronic constipation begins and the normal state ends - it being largely a matter of personal peculiarity - in many a daily evacuation is almost a necessity, whilst in others, three or four days may elapse without their being inconvenience; in yet another class of persons much longer intervals may elapse without apparent deleterious effects arising.

It has been asserted that there is room in the large intestine for the residuum of several weeks' consumption of food. Ship Surgeons of a former generation, when voyages were longer and ships less luxuriously equipped than they are now, relate extraordinary instances of constipation in patients who had allowed their intestines to remain inactive for two or three weeks with the result that the Surgeon had finally to remove the scabala with the aid of syringe and spoon.

Undue retention of faeces means retention and multiplication of coli bacilli, and possibly in successive generations, increase of their virulence. The coli bacilli though innocuous in healthy faeces may become virulent after a time, they or their products may give rise to
inflammation of the ovaries, fallobean tubes, bladder, kidney, gall bladder, insomnia, pyrexia, etc.

Serious consequences may result from the mechanical pressure of scybala, such as ulceration of the intestine, and such ulcers may perforate the bowel and produce peritonitis and death.

Many people who suffer from chronic constipation may not complain of inconvenience for a long period, but at some time or other they generally develop symptoms due to faecal accumulation, for as well as infrequency there is incomplete emptying of the bowel, so that gradually increasing quantities of faeces are retained.

For practical purposes a person may be considered to be constipated if his bowels are not opened once every forty-eight hours, while the normal standard may be taken as one efficient evacuation daily - a soft but formed motion and preferably in the morning. We take an efficient evacuation to mean that all the faecal material accumulated in the descending and iliac colon during twenty-four hours should be voided.

The constipation of infants requires special consideration on account of the different conditions of life which exist in infancy from those obtaining in childhood, and later years. Defaecation is a purely reflex act up to about the third month. After this the infant is gradually educated to defaecate only in response to
certain stimuli and with further development of intelligence the act comes almost completely under the control of the will.

In the aged, chronic constipation calls for special attention on account of the changes which take place in the intestinal musculature and mucous membrane.

In the normal condition the contents of the small intestine are thin and watery in consistence, the absorptive power of the large intestine is greater than its secretary power, with the result that as its contents move towards the rectum, it gets firmer and more dense. Most of the absorption occurs in the caecum and ascending colon though here the faecal contents remain as a rule soft. There is a steady onward movement of the faecal mass along the transverse colon and absorption still goes on. Very little change in its consistency takes place during the passage through the descending colon owing perhaps to the very slight development of its lacteals in comparison with those of the other parts of the intestine. It is when the contents reaches the pelvic colon, where it is detained until the act of defaecation takes place, that it becomes firm in consistence.

Chronic constipation is a condition which occurs, as we have said, in the large intestine. In some cases of excessive blockage of the caecum and ascending colon
where, as a result of the extreme stasis the ileo caecal valve loses its function of preventing regurgitation from the caecum into the ileum, constipation has been shown to exist in all parts of the small intestine.

It is only in the most severe cases of chronic constipation - those in which the question of surgical interference arises that constipation occurs in the small intestine.

We shall here consider briefly the Anatomy. Comparative anatomy and Physiology of the large intestine.

**ANATOMY:**

The colon or large intestine extends from the right iliac fossa to the anal orifice. It measures from five to six feet in length being about one-fifth of the whole length of the intestinal canal. It differs from the small intestine in its larger size, its more fixed position and its sacculated form. In its course it describes an arch which surrounds the convolutions of the small intestine.

The colon commences in a large blind pouch - the caecum, which is its widest part, and gradually diminishes in diameter as it advances towards its termination.

At the lower and back part of the caecum is the Vermiform appendix, a narrow tube varying from three...
to seven inches in length, its diameter being about equal to that of a goose quill. The transverse colon is its longest part, it is also its most moveable part.

The descending colon is smaller in calibre and more deeply placed than either the ascending or descending colon. Cunningham says that it is common to see the descending colon with a diameter not greater than that of the middle finger.

The gut becomes dilated again towards its terminal portion - the rectal pouch, and then narrows, into the Anal Canal.

The colon is divided into:

- Caecum and Vermiform Appendix.
- Ascending Colon.
- Hepatic Flexure.
- Transverse Colon.
- Splenic Flexure.
- Descending Colon.
- Iliac Colon
- Pelvic Colon
- The Rectum
- The Anal Canal

The more recent writers have adopted the newer nomenclature of Jannesco in describing the terminal portion of the colon.

The Sigmoid Flexure is now represented by the Iliac Colon which extends from the lower end of the Descending
Colon, at the level of the crest of the Ileum to the internal border of the Psoas and by part of the Pelvic Colon; the remainder of the latter represents what was formerly known as the first part of the Rectum—that is, four inches of its length from the commencement. What was formerly described as the second part of the Rectum is according to the new nomenclature, the whole Rectum, while the third part (old style) is known as the Anal Canal.

Structure of the Large Intestine.

The large intestine consists of four coats:

1. Serous
2. Muscular
3. Submucous
4. Mucous

The Serous Coat is derived from the peritoneum and invests the different portions of the large intestine to a variable extent. The caecum is covered only on its anterior surface and sides, the ascending and descending colon are covered only in front, the transverse colon is almost completely invested, the part corresponding to the attachment of the great omentum and transverse colon being excepted. The caecum, transverse colon, descending colon and pelvic colon have through their mesenteries a certain amount of movement. In particular
this is to be remarked in connection with the Pelvic colon - its mesentery is long but its extremities are in close proximity thus forming a distinct loop which when empty lies against the rectum in the pelvis, but which, as it becomes filled with faeces, rises up and becomes what may be regarded while full, as an abdominal organ (Hertz).

The Muscular Coat, consists of

(a) An external longitudinal layer of fibres disposed in three flat bands, each being about half an inch in width and known as Taerniac Coli. They commence at the attachment of the appendix to the caecum, and being shorter than the intestinal tube, cause it to have a saeculated appearance. These muscular bands are nearly one half shorter than the other parts of the intestine and when they are removed the tube is lengthened and loses its saeculated character. In the Pelvic Colon the bands are more scattered, but around its lower part and around the rectum, they spread out and form a thick uniform layer.

(b) An internal circular layer the fibres of which are equally distributed over the caecum and colon being denser in the intervals between the saeculi. In the rectum and anal canal they are seen as a thick layer, especially at their lower end where they are very numerous and form the Internal Sphincter, which muscle is in a
form of tonic contraction.

The anal canal is supported by the Levatores Ani.

Quite at the termination of the anal canal is the external sphincter, with which some fibres of the Levatores Ani mingle.

The Submucous coat, connects the muscular and mucous layers closely together. It is similar in structure to the corresponding coat in the small intestine.

The Mucous Coat in the caecum and colon is pale-yellow in colour. There are no villi, the surface being smooth and raised into folds corresponding to the intervals between the saeculi. In the rectum, it is thicker, of a darker colour, more vascular, and connected more loosely to the muscular coat. When the rectum is contracted its mucous membrane is thrown into folds. Besides these, there are in the rectum a number of permanent folds; in the empty state of the intestine these overlap each other so that it requires considerable manoeuvring to conduct the finger or a Bougie along the canal; they contain some of the circular fibres of the gut and their use appears to be to support the contents of the canal.

In the mucous coat are villi and a considerable number of solitary glands. The bowel is lined by columnar epithelium, and crypts of Lieberkühn are freely scattered over the surface - they are similar to those of the small intestine, but more numerous and somewhat longer.
The Nerve Supply of the Colon, Rectum and Internal Sphincter.

(a) From the lower lumbar region of the Sympathetic through the inferior Mesenteric Ganglia. Stimulation of these fibres inhibits intestinal activity.

(b) Through branches from the Saeral Plexus, especially from the Third Sacral Nerve which end in Auerbach's Plexus, between the longitudinal and circular layers of muscle in the intestinal wall. Stimulation of these increases the motor activity of the intestine.

The intestines can perform their function to a great extent independently of the central nervous system. Thus, separated strips of intestinal muscle are capable of spontaneous contractions, rhythmical in character, if the local nerve plexus is removed with them (Magnus). It is therefore likely that the motor function of the intestine depend on reflexes which have their centre in the nerve cells of Auerbach's plexus. It is well known that the movements of the intestine can be reflexly or directly influenced by the central nervous system. Thus, excitement might give rise to diarrhoea. Moreover, it is known that the taking of food is a powerful stimulus to the motor activity of the colon in man.

The Levatores Ani and External Sphincter are supplied from the Fourth Saeral and Inferior Haemorrhoidal branches of the internal Pudic.
Comparative Anatomy.

The vermiform appendix in man is perhaps the rudiment of the lengthened caecum found in all other mammals except the orang-outang and wombat. It is in mammalia that the large intestine is most developed and is longest in the Herbivora. In them it assists the assimilation of cellulose by reason of the presence of large numbers of bacteria which are able to dissolve cellulose. In certain herbivora such as rabbits, the caecum and vermiform appendix are well developed, and the caecum is believed to be active in the digestion of vegetable matter. The greater length of the large intestine in herbivora has necessitated its arrangement in coils in contrast to the straight "hind gut" of other Vertebrata.

Metchnikoff makes the suggestion that the large intestine was so developed in mammals because these for the most part led very active lives, and whether in pursuit of their prey or being the pursued, the necessity to stop in order to empty the bowel was disadvantageous, whilst the possibility of retaining the faecal contents for considerable periods was useful in the struggle for existence. In contrast, he points out, that birds who do not require to cease their flight in order to void have no large intestine, and that ostriches and their allies are characterized by absence of the power of
flight and by rapidity of terrestrial locomotion, by which they escape from their enemies, are the only birds in which the large intestine is well developed.

Physiology of the large Intestine.

In the morning the caecum has generally emptied itself of its faecal contents and contains only gas. In four to four and a half hours after a meal what remains unabsorbed arrives there in a fluid state from the small intestine.

It has been established by observation and experiment on patients with caecal fistulae that digestion and assimilation of food in man takes place for the most part in the small intestine and that the large intestine plays but a minor part in the absorption of nutrients. Comparatively small amounts of sugar, fat and protein reach the caecum, most being absorbed from the small intestine, but the large bowel is able to deal effectively with the remainder. It has been repeatedly found that the caecum contained small quantities of the nutrients but none were found in the faeces of the same individuals some hours later.

In diseased and irritable conditions of the small intestine where peristalsis is abnormally rapid, large quantities of carbohydrates, proteins and sugar may pass into the colon; then a good deal of digestive
work is done in the larger intestine.

In the colon, the contents of the gut give up a large percentage of their water, gradually assuming as they travel along, the semi-solid form of faecal matter.

A further proof that the large intestine can absorb nutrients in considerable quantities is found in the fact that it is possible to keep a patient's nutrition up for weeks together by means of nutritive enemata such as large quantities - about two pints - of peptomised milk. Sir Lander Brunton kept a patient of his on nutritive enemata for six weeks with the result that the patient gained in weight instead of becoming thinner than before.

The large intestine pours out mucous which serves to moisten the faecal material and so assists in its expulsion. The chief function of the colon in man, therefore, is the accumulation, preparation, and elimination of the waste product of digestion.

The large intestine is not essential to life in man, as is shewn by a case mentioned by Metchnikoff. A woman suffered for thirty years from fistula of the small intestine, through which the contents of the alimentary canal was discharged. When the abdomen was opened with the view to curing the fistula, it was found that the large intestine had atrophied in its whole length from caecum to rectum, yet the individual had enjoyed normal health. As will be mentioned later, Surgeons
have removed the larger part of the larger intestine and the patients have suffered no permanent inconvenience in consequence. Metchnikoff goes much farther. He considers that the colon in man is not only not essential, but that it is useless, and a source of danger to his health and life. He looks upon it as a reservoir for the waste product of the digestive processes in which, especially in constipated individuals, putrifaction is followed by absorption of poisonous products. He esteems it a receptacle for harmful microbes, and points out how frequently the large intestine is the seat of malignant growths, and suggests that the comparative freedom of the small intestine from such is due to the latter retaining its contents for much shorter periods than does the large intestine. Metchnikoff has no hesitation in asserting that the large intestine is an instance of arrested evolution fraught with baneful influences.

The function of the large intestine then may be said to be:

(a) Absorptive - it absorbs the excess of water which remains in the contents of the small intestine after it has passed through its whole length, as well as the remaining portions of carbohydrates, protein, pepton, and salts.
(b) Secretary - it secretes mucous which serves to moisten the faecal matter and so assist in its expulsion.

(c) A receptacle for the storage of large quantities of faeces.

(c) Conduit for carrying the indigestible portions of the food, together with the colouring matters derived from the bile, and cast-off dead cells from the inner lining of the intestine - it is this mass which is periodically expelled from the body as faeces.

As the result of recent investigation carried on mainly by Hertz of Guy's Hospital, much valuable information has been obtained as to the length of time occupied in the passage of the food from the stomach through the small intestine and afterwards through the colon. Much light has also been thrown on the process of defaecation and the types of constipation. As a result of these observations, a more rational treatment of the various forms of constipation and other stases have been arrived at. The method adopted was to administer one and a half to two ounces of bismuth oxychloride at Breakfast mixed with bread and milk and subsequent periodic examination of the patient with the aid of the Xrays. The Oxychloride of bismuth was selected in preference to the carbonitate because it is chemically inert in the stomach.
and it is not influenced by the alkaline intestinal contents. A small proportion is converted into sulphide by the free sulphuretted hydrogen present in the large intestine, but this cannot have any material influence on the intestinal movements. By noting the shadows on the fluorescent screen, it is possible to follow the food from the time it reaches the stomach until it is finally evacuated at the anus. Food thus treated, appeared in the caecum on an average four and a half hours after it was taken; in two hours more it had reached the hepatic flexure, and in another two and a half hours it had arrived at the splenic flexure. The rate of the passage through the descending colon is slower - it took four hours to travel from the splenic flexure to the junction of the descending colon with the iliac colon. The progress of the mass through the pelvic colon took six hours. This makes nineteen hours from the time the food reached the stomach to the time it arrived at the anal canal. The activity of all parts of the bowel are lessened during sleep, probably owing to the absence of the stimuli of food and exercise.

The rate of collection in the pelvic colon depends upon the amount of residue which is present from previous diets. The contents of the colon are moved along by the peristaltic action of its muscular wall; this is set up by nervous reflexes acting through
ganglion cells situated between the longitudinal and muscular layers (Auerbach's plexus). A wave of relaxation followed by a wave of contraction passes along the bowel, and in this manner the contents are driven onwards.

It has been shewn by Aldshoff that the tone and movement of the stomach and intestine remain normal for months after both vagi have been cut above the diaphragm, and also after destruction of the coeliac plexus. It would seem from these experiments, that the peristalsis of the stomach and intestine are independent of the central nervous system. Separated strips of intestinal muscle have been shewn to be capable of spontaneous rhythmical movement if the local nerve plexus is removed with them - but not without. It would appear therefore that the motor functions of the stomach and intestines are due to reflexes having their centre in the nerve cells of Auerbach's plexus.

But there cannot be any doubt that the movements of the stomach and intestines can be reflexly or directly influenced by the central nervous system, e.g. Shock caused by a railway accident caused a man to become obstinately constipated. Intense grief after the sudden loss of a child has caused a similar result. Pleasureable emotions may cause violent diarrhoea.
It has been observed in a dog that intestinal peristalsis was caused by the smell of food, and that the entry of food into the stomach caused still more active peristalsis.

The entry of food into the stomach has been shown by Hertz to be a powerful stimulus to the activity of the colon.

Reflexes may arise locally in the large intestine owing to the mechanical and chemical stimuli created by the faecal contents. The more bulky the contents, the more stimulating they are to peristaltic movements. The more indigestible the food the more residue reaches the colon.

A diet consisting largely of vegetables, especially green vegetables, is found to be conducive to regular action of the bowels, due, doubtless, to the indigestible cellulose-covering of fragments of food causing a bulky remainder, and so stimulating peristaltic movements.

Vegetable food also increases the amount of intestinal secretion and favours the development of large numbers of bacteria.
The chemical stimuli to peristaltic movements depend upon certain constituents of food, upon the products of its digestion, and upon bacterial decomposition. In this connection vegetable food is much more effective than animal food. Undigested animal food produces no appreciable chemical stimulation in the large bowel. Sugar, whether present in the food or produced in the course of digestion of starch, produces peristalsis in the small but not in the large intestine. In the colon, sugar is rarely present, and when it is present, it is found in very small quantities owing to its almost complete absorption before the ilio-caecal valve is reached.

Organic acids, such as formic, acetic, butyric tartaric, citric and lactic acids which are the result of fermentation of carbohydrates, or are present in vegetables and fruit, stimulate peristalsis, but the colon is less affected by them than is the small intestine.

Carbon dioxide and marsh gas produced by fermentation of carbohydrates, and sulphuretted hydrogen produced by fermentation of proteins, are active stimulants to peristalsis.

Animal diet being more completely digested and disintegrated, leaves less residue, consequently, peristalsis is more vigorous in herbivorous than in carnivorous animals.
The bile is believed to have a very slight stimulating effect on the colon and none at all on the small intestine.

Heat and cold influence peristalsis very considerably when applied directly to the abdominal wall; a cold compress stimulates, and a hot compress retards intestinal movements. These are purely reflex effects.

Many people take a tumblerful of cold water before breakfast because they find it has an aperient action. It has been shewn that cold water when swallowed is retained in the stomach until it reaches the body temperature. Its action as an aperient then would seem to be partly reflex and partly mechanical.

**The Mechanism of Defaecation.**

We have already noted that the Pelvic Colon in which the gradual accumulation of faeces occurs, is a loop of bowel extending from the inner border of the left psoas muscle across the pelvis to the right side, where it bends to the left until it reaches the front of the body of the third sacral vertebra, where, when empty, it joins the rectum at an acute angle. As it fills with faeces it rises into the abdomen and thus undoes its flexion in relation to the rectum; in so doing, it lessens the obstruction to the passage of faeces into the rectum.
The rectum is between four and six inches long, and lies in contact with the sacrum and coccyx, being curved forward. The levatores ani muscles support it as well as the ano-coccygeal body. In the quiescent state, the anterior and posterior walls of the rectum are approximated so as to form a slit. At its lowest part it bends backwards, passes through the pelvic floor between the levatores ani muscles, and ends in the anal canal.

The anal canal measures about an inch in length, it is smooth, not sacculated like the remainder of the colon as the longitudinal muscular bands of the large intestine are spread out uniformly and evenly. These, with the circular fibres, form a strong muscular collar, thicker and stronger than at any other part of the intestines.

The desire to defaecate arises from the entrance into the rectum of some of the contents of the pelvic colon. In the quiescent state, the rectum is usually empty.

The pelvic colon fills from below upwards, and if the bowels are opened completely, no accumulation takes place in any other part.

The call to defaecation may arise as a regular habit independent of volition - a reflex act due to various stimuli, chief of which is the entrance of food into the stomach, which is, as we have noted, a powerful stimulant.
to peristalsis. It may also occur as the result of auto-suggestion or may be a part of the routine of a person's life, the thought of the advisability to defaecate may result in the desire to perform the act.

Then again, it may be brought about by voluntary effort - contraction of the abdominal muscles and diaphragm may press some faeces into the rectum and thus the normal reflex be started. By whatever means the call comes the mechanism of defaecation is the same. It consists in the taking of a deep inspiration thus lessening the intra-abdominal space; the closure of the glottis so as to maintain the resistance; the strong contraction of the diaphragm and the muscular walls of the abdomen increase the intra-abdominal pressure. This increased pressure causes more faeces to pass into the rectum, thence, when the rectum is full, into the anal canal. The distention of the rectum and the irritation of the anal canal set up influences which result in stimulating the centre in the lumbar region of the spinal cord, from here efferent impulses are sent to the anal canal and rectum, in consequence of which, strong peristaltic contractions of the colon occur, together with contractions of the voluntary muscles of the abdominal wall and relaxation of both sphincters. It would seem from Hertz's observations with the X-rays, that the whole of
the large intestine is involved in these strong contractions including the coecum and ascending colon. The Bismuth meal also shews on the fluorescent screen, that the contents of the colon below the splenic flexure are completely evacuated; as, after defaecation the shadow of the whole intestine below the splenic flexure disappears.

When the faeces reach the anal canal they are extruded by the action of the levatores ani muscles, which, as it were, draw the bowel up, over, and above them. The external sphincter then contracts and closes the bowel behind them.

Nerve supply of the Rectum. The rectum has a similar nerve supply to that of the Colon. The lower lumbar nerves have fibres which pass through the sympathetic chain to the inferior mesenteric ganglia, here they are connected with nerve cells from which fibres pass in the Colonic nerves to the colon, and in the hypogastric nerves to the rectum and internal sphincter ani

The fourth sacral nerve supplies the voluntary external sphincter ani, and the levator ani muscles; if this nerve be stimulated both the sphincter ani and the levator ani contract.

The muscular system of the internal sphincter, rectum, and colon, is composed of involuntary muscular
fibres, and their nerve supply originates from the ganglion-cells of peripheral nerve plexuses, and not from cells in the spinal cord. These ganglion-cells form the centre for the reflex defaecation when the rectum is stimulated by distention or irritation of such things as glycerine when inserted in the rectum.

If the spinal cord be divided in any part, the act of defaecation is not in any way altered, but under this condition, sensation is entirely absent in the rectum, the act ceases to be under the control of the will, and constipation must occur.

**Composition and characteristics of Faecal Discharge.**

The actual bulk of the Faecal discharge depends upon the character of the food taken - thus, there will be a greater residue from a mixed diet of vegetable and proteid than from a diet consisting of proteid, fat, and carbohydrates.

The passage of the intestinal contents is more rapid through the colon when the diet has consisted of a large proportion of vegetables than when vegetables have been omitted. The passage being rapid, there is not so much time for the absorption of water from the mass, therefore the faeces are less firm in consistence.
Grant says that the daily discharge from the bowel on a mixed diet is on an average between four and six ounces, and should be composed of seventy five per cent of water and twenty five per cent of solids.

Faeces are composed of:-

(1) Water.
(2) dead epithelial cells from the surface of the intestine.
(3) Particles of food which have escaped digestion, or are indigestible.
(4) Mucus and intestinal juices.
(5) Hydrobilarubin.
(6) Lecithin.
(7) the products of the decomposition of bile salts and cholesterol.
(8) Bacteria.
(9) Fat.
(10) Nitrogen.
(11) Cellulose.

The principal contents, viz: water, food residue, intestinal secretion, and bacteria, are diminished in constipation.

The diminution in water is due to increased absorption by the intestinal wall owing to the abnormally long period during which the intestinal contents are retained before excretion.
It has been found that one-third of the weight of dried faeces consists of bacteria.

Bacteria, dead and living, can be separated from faeces by centrifugalising a mixture of faeces and water; the bacteria remain in suspension and all the other solid constituents fall to the bottom. The fluid is separated and alcohol is carried to it to lower its specific gravity. It is centrifugalized again - this time the bacteria fall to the bottom, so they can be collected and weighed.

The Bacteria of the Colon.

The meconium which fills a child's intestine at birth contains no microbes, but in from four to seven hours after birth they have been found by Esecherich - who specially investigated the subject. The number of bacteria present in a normal daily evacuation, are said to be about 128 trillions, and their weight is about eight grammes - one third the total weight of the faeces.

Bacteria are most numerous in the large intestine where waste products accumulate. They are few in the small intestine - the more important digestive part. The remains of undigested food and the mucus secretion from the colon form a suitable nidus for the growth and
development of bacteria.

The larger number of bacteria present in the faeces are dead. If an enema be given, a large number of living bacteria are returned in the water.

The Bacteria of the Colon form enzymes, which digest such substances as cellulose, which have escaped solution in the small bowel. Their action would seem to be partly beneficial and partly harmful - for the products of putrefaction of food residue, which is the result of bacterial activity, may be absorbed into the blood stream causing auto-intoxication, especially if ulceration of the bowel has been produced by retained faeces, here the bowel has been deprived of its epithelium which is the first line of defence in preventing the absorption of poisons from the bowel.

The conditions which the bacteria require for their growth, namely, moisture, equable temperature, alkalinity and varied supply of food are found in the colon. Chronic Constipation is favourable to bacterial multiplication and hence to alimentary toxæima.

Certain classes of bacteria have specially adapted themselves to life under the conditions found in the large intestine. These are:-

The Colon bacilli

Certain forms of streptococci
and Anaerobes.

These three forms are characteristic of the large intestine of man and animals; so characteristic are they, that they are taken as indices of the faecal pollution of water, milk, and earth. They grow best at body temperature. The residue of food which arrives in the colon from the small intestine is split up by them, principally, it would appear, for their own use, but often to the detriment of their host.

In the caecum and colon, the conditions for bacterial growth are more favourable than those existing in the small intestine.

The intestinal contents are here mechanically delayed in order that the last remnants of nutriment may be absorbed.

There is evidence to shew that the bacteria and their products frequently reach the blood stream, these are destroyed by the protective mechanism which the body has evolved in order to avert the danger. It is only when these mechanisms are at fault that serious trouble arises. The normal process of digestion breaks down the protein into simpler molecular groups, which, after absorption into the blood stream, find their way into the liver, whose function it is to effect changes in the protein, and so adapt it to the needs of the body.
The Thyroid gland would also appear to have something to do with the destruction of bacterial toxins present in the blood, because its activity seems to get excited when toxins are known to be in the blood, and it is said that thyroidectomised animals are abnormally susceptible to infective processes.

The various bacilli give rise to different products, some of which are harmless whilst other are extremely poisonous.

Colon bacilli have no effect on proteins, but decompose peptones. If there is complete absorption in the small intestine no peptones will reach the large, so there will be no putrefaction, nor will there be if only unaltered proteins reach the large intestine, but any peptones will putrefy.

Aetiology of Chronic Constipation.

As has been mentioned - to maintain the body in an ideally healthy state a daily efficient evacuation is necessary in most people. By an efficient evacuation is meant that the contents of the splenic flexure, descending colon, iliac colon, pelvic colon, and rectum should be voided once every twenty-four hours.
In considering the aetiology of Chronic Constipation we will review the factors involved in the function, and endeavour to shew how deficiency in any one, or group of them, affects the process. The integrity of one's digestive powers depends upon the tone of the muscular tissue of the alimentary canal, as well as upon the healthful action of the nerve-centres and connecting nerves.

The factors may be divided primarily into:

1. Passenger i.e. Faeces or contents of bowel.
2. Passages i.e. Intestinal canal
3. Powers (a) Intrinsic muscles.
   (b) Extrinsic
   (c) Nervous Mechanism.

1. Faults in the "Passenger" - (Contents of bowel)
   These may be in the nature of:
   1. Too small quantity.
   2. Too great quantity.
   3. Too hard or dry consistence, from
      (a) deficiency of water.
      (b) excessive absorption of water from delay in passing.
      (c) excessive loss of water.
   4. Foreign bodies.
2. **Defects in the Passages may be due to:**

   (1) **Narrowing or Occlusion of the lumen of the bowel by** -

   (a) **Organic stricture.**

   (b) **Pressure from without.**

   (c) **Spasm.**

   (d) **Kinks.**

   (2) **Excessive dilatation of a part of the bowel.**

3. **Defects in the Powers may be due to:**

   1. **Musculature:**

      (a) **Intrinsic, involuntary, muscles of the intestine.**

      (b) **Extrinsic, voluntary, muscles of the abdominal wall, the diaphragm, the muscles of the pelvic floor.**

   2. **Nervous Mechanism.**

      (a) **Cerebral Influences on reflex process.**

      (b) **Nerves involved in the reflex are:**

         I. **Sympathetic.**

         II. **Spinal.**

1. **Faults in the Passenger.**

   The faecal contents may be

   1. **too small.**

   2. **too great in quantity.**
3. too hard and dry, and so cause constipation.

4. Foreign bodies may obstruct.

1. As we have already seen, the amount and quality of the food ingested determines to a large extent, the quantity and character of the faecal contents of the colon.

Thus, if a person is suffering from starvation, due to disease, as for instance malignant stricture of the oesophagus or stomach which prevents food being passed into his digestive tract, then of necessity there must be a reduction in the bulk of the faecal residue. There would then be wanting, that mechanical stimulation which is one of the chief requirements for the peristaltic action of the bowel. The faecal residue would be passed on more slowly, and it would take longer to accumulate in the pelvic colon in such quantity as would create a desire for defaecation.

Again, the constituents of the food have an important bearing upon the character of the faecal residue. The more indigestible the greater will be the residue. Thus we have seen that a vegetarian diet, owing to its large cellulose-content, is less easily dissolved than animal diet, it also increases the flow of intestinal juices and favours the development of a larger number of bacteria, thus increasing the bulk of the faecal remainder.

It has also been pointed out that a vegetable diet more than a meat diet, tends to develop chemical products,
which together with the mechanical effect of the bulk of the residue gives rise to local reflexes in the bowel which lead to peristalsis.

2. In the case of individuals who habitually "bolt" their food and do not masticate but swallow en masse, the stimuli to the bowel may be not powerful enough to move the resisting bulk of material. Similarly in children who are fed on undiluted cows milk, it frequently happens that the residue curd is so massive as to cause obstruction to its onward passage at the normal rate.

3. The stools may be too hard and dry and so resist the driving force of the bowel. Several reasons for this may be adduced e.g. a deficient intake of water and fluids generally, or excessive absorption of fluid from the bowel.

The function of the large intestine as we have seen is mainly absorbtive, whatever then leads to diminished activity of peristalsis will tend to result in dry faeces.

Normally the contents of the small intestine as they are "squirted" into the Caecum are always fluid. The colon becomes narrower as it approaches the pelvic colon, therefore it gives greater opportunity for absorption, and when the contents arrive at the narrower part of the anal they are firmer in consistence.
4. Any influence which increases the secretory functions of the skin, lungs or kidneys, will of necessity deprive the contents of the intestines of some of their fluid. Thus, Diabetes, prolonged muscular exertion, hot weather, tend to result in constipation.

II. Defects in the Passages.

The lumen of the colon is smaller as it proceeds towards its rectal end but as the lumen gets smaller its muscular development becomes greater.

Chronic Constipation may be induced by an abnormal state of the canal in respect of its lumen, this may be in the nature of

(1) narrowing

(2) dilatation.

1. Narrowing is by far the commoner condition and it may be produced by alteration in the bowel wall itself or by pressure upon it from without.

(a) The commonest cause of narrowing is organic stricture, this may be malignant or benign in character.

Malignant stricture has its commonest site in the large intestine - it is often seen in the pelvic colon and iliac colon and rectum, the symptom which generally calls attention to this condition is diarrhoea in a person who has hitherto been of regular habit - this diarrhoea has a
tendency to be intermittent, there may or may not be blood on the stools. The growth when it occurs is usually a columnar called carcinoma.

Benign stricture is a very rare condition and need not be discussed.

(b) Pressure from without.

This occurs so as to affect the free action of the bowels and is situated most commonly in that portion of the gut which lies within the pelvis. Here there is an unyielding bony wall on the one side, and the fixed bowel on the other.

Obstruction in this region is more common in women, because of the more frequent abnormalities in their pelvic generative organs. Thus pressure of a retroverted pregnant uterus, or fibroid tumour, or of an ovarian cyst in the pouch of Douglas, might prove an effective cause of chronic constipation. The pressure exerted by an abnormally placed pregnant uterus may be sufficient to cause constipation in the colon above the pelvis.

The possibility of pressure being exerted, and of resulting constipation by such conditions as tumours of the kidney, gall bladder, liver &c. or by abscess intra or extra peritoneal may be borne in mind, but such cases are not by any means common, and would be complicated by inflammatory infiltration of the intestinal wall and by adhesions.
Spasmodic contraction of the colon is another cause of narrowing of the lumen. This occurs in persons of nervous temperament and affects portions of the colon - a few inches more or less. It may be brought on by worry or excitement.

Kinks or twists of the bowel. These follow upon inflammatory attacks in the Peritoneum, or upon surgical operations, adhesions may be formed and traction exerted upon the intestine; this occurs most commonly in the pelvic region, and severe constipation is a frequent and troublesome sequela.

Splanchnoptosis or "Glenards Disease" as a cause of constipation will be considered later under faults in the musculature.

2. Dilatation of the lumen of the bowel.

This may occur as a congenital defect in the condition known as Hirschsprung's disease, or "Congenital idiopathic dilatation of the colon".

Dilatation also occurs as a result of stricture of the bowel, also in rickets &c. from accumulation of gas in the bowel.

III. Faults of the Powers.

1. Musculature.

(a) Atony of the intrinsic involuntary muscles of the intestinal wall.
Weakness of the intestinal muscles is part of a general manifestation. The cause giving rise to it will already have been in evidence in other parts of the economy. Old age, acute illness, blood disorders, partial starvation, the cachexias, all tend to induce constipation by interference with the general nutrition. The muscular fibres and mucous membrane of the bowels suffer together with the other tissues with the result that they lose their tone and resiliency; they have neither the vigour nor the power of reflex excitability necessary to produce sufficiently strong peristaltic waves. Similarly, in obesity, the infiltration of fat in and around the bowel interferes with its working capacity.

(b) Extrinsic or voluntary muscles.
These consist of the diaphragm, muscles of the abdominal wall, and those of the pelvic floor.

By the combined action of these, in health, there is produced an increase in the abdominal pressure, which assists the onward passage of the faecal contents of the bowel, and gives the needed impetus during the act of defaecation.

When the desire for defaecation arises, the sequence of events is as follows:- A long inspiration is taken, followed by voluntary closure of the glottis; the diaphragm is thus forced downwards, the abdominal muscles then come into action, especially the internal obliques and still lessen the intra-abdominal space, increasing thereby the
pressure, and in this manner the faeces are passed into the rectum, and even into the anal canal. The distention and irritation thus produced give rise to stimulation of nerve endings which communicate with the lumbar spinal centre, and as a result efferent influences pass to the colon causing peristaltic contractions of its muscular fibres, and relaxation of the sphincters.

The combined action of the diaphragm, abdominal muscles, peristalsis of the colon, and relaxation of the sphincters, results in the protrusion of the faecal mass, and its expulsion.

In emphysematous states of the lungs as in bronchitis and asthma, the diaphragm may be already pushed down lower than normal, and so be partly put out of action, while the abdominal muscles weakened and stretched by excessive coughing are inefficient.

The abdominal muscles may be enfeebled by old age, or, as a result of depressing illness, or again, they may have lost their resiliency from over-stretching in cases of large abdominal tumours, or of accumulation of fluid as in ascitis, or subcutaneous fat.

In the writer's opinion the abdominal muscles are amongst those which receive the least attention in the development of the adolescent. The object of most physical culture systems appears to him to be to develop the muscles of the extremities and to increase the chest
capacity, all these are very good in their way, but he thinks that "culture" of the abdominal muscles should receive special attention in view of their important bearing on efficient action of the bowels. From the writer's observations he believes the abdominal muscles are the least thought of and the least exercised, with the result that, there is a lack of tone and a tendency to prominence of the abdomen due to stretching of the weakly parieties by pressure of the abdominal contents. The erect attitude in man lends itself to encourage this tendency no doubt.

Large abdominal tumours, ascites, excessive accumulations of fat within the peritoneal cavity and childbearing, all tend towards stretching the abdominal walls, and thinning of the muscles, in consequence of which, their contractility is diminished. At the same time, the abdominal cavity is enlarged, and the increased volume of its contents necessitates a greater degree of force to obtain the increased intra-abdominal pressure required for defaecation. In addition, there may be separation of the recti muscles which allows of partial protrusion of the abdominal contents, sometimes very marked in "pendulous belly".

A further result of the weakening of the abdominal wall, and which has an important bearing upon the causation
of chronic constipation is, that the viscera lose part of their natural support, and in consequence, they tend to prolapse, leading to the condition known as Splanchnoptosis or "Glenard's Disease".

Some observers (Gant and Lane) consider that visceroptosis is a fruitful cause of chronic constipation, as they say that the prolapse of the viscera tend to cause kinks at the flexures of the colon, resulting in pressure, and interference with the onward movement of the contents of the bowel. They say that, there is constant strain on the peritoneal attachments of the prolapsed viscera, and that there is set up a chronic inflammatory condition which is protective in so far as it tends to limit the prolapse, but, at the same time, there occur inflammatory adhesions between the coils of the gut and neighbouring organs, thus further increasing the obstructions.

On the other hand Hertz says that, he has found no evidence of delay in the onward passage of faeces in the cases of visceroptosis he has examined. He has found in normal subjects in the erect attitude that the angles at the splenic and hepatic flexures are as acute as in any case of visceroptosis he has examined. He holds that visceroptosis and constipation in the cases quoted are really due to weak abdominal muscles.

With regard to the muscles of the pelvic floor, the main cause of default lies in the stretching and tearing,
with loss of tone which are the results of the second stage of labour. The levatores ani are the most important muscles in this connection.

Regarding the external sphincter, it it to be remembered that the condition known as Anal Fissure, which consists of a tear in the mucous membrane extending down to, and exposing the nerve of the sphincter, irritation of which causes spasmodic contraction of the muscle, is both a cause and a result of constipation.

Thus, the passage of scibalous faeces is liable to stretch and tear the mucous membrane, or to scratch it.

When such a tear occurs, the passage of faeces over it causes such severe pain that the individual so afflicted is in dread of the necessity of evacuating the bowels.

2. Nervous Mechanism.

(a) Cerebral influences on the reflex process.

It has already been pointed out that the action of the bowels is greatly influenced by mental states. Thus excitement or fear may be followed by diarrhoea, and anger result in constipation.

Chronic Constipation is a common concomitant of insanity, and is a complication which has to be carefully watched.

In insanity and the milder forms of mental insufficiency such as neurasthenia and hypochondriasis,
chronic constipation is due to depression of the nervous system and diminution in the response to stimuli, which normally excite intestinal activity.

Very commonly chronic constipation is brought about by voluntary resistance to the call of nature.

(b) Nerves involved in the reflex act are:

1. Sympathetic. In affections of the abdominal sympathetic there may be severe constipation.

Some people appear to have blunted or insensible nerve terminals. In adults, unless in the case of the aged in whom the excitability has diminished with failing powers generally, the lack of excitability is due to neglect of regular evacuation, whereby faeces have been allowed to gradually accumulate and to be retained.

The call to defaecate is at first resisted, owing perhaps to lack of time or other inconvenience, the call becomes less and less frequent and less imperative, until at last the presence of a very
large accumulation of faeces in the pelvic colon fails to cause any desire to defaecate.

II. Spinal Nerves.

Chronic Constipation is extremely common in disease and injury of the spinal cord. If the volitional path in the cord is interrupted above the lumbar centre, the will no longer controls the reflex process.

If the disease of the cord also involves the sensory tracts, the bowels act without the patient being aware of it, he does not feel the call to defaecate: in these cases chronic constipation results.

If the sensory portion is unaffected, the patient is aware of the process but he cannot control it. As voluntary action does not occur Chronic Constipation results.
Symptoms of Chronic Constipation.

Constipation affects different individuals in different ways. It may be said that different people react differently to the condition. Some shew no sign of constitutional disturbance even when their bowels have been habitually constipated for years. Others very soon shew signs of auto-intoxication, due to the absorption of toxins consequent upon constipation. Sometimes, there is in chronic constipation more or less absorption of the aromatic substances normally contained in the faeces, and when this occurs for any length of time, anaemia is always a symptom accompanied by a yellowish-white or muddy complexion.

Lassitude, headache, nervousness, are frequently present as symptoms of chronic constipation, and the writer believes he has met with cases where true neurasthenia has been caused by the absorption of toxins in chronic constipation, while depression, bordering on melancholia are common manifestations of the trouble.

In some patients' urine we may find Indican, the presence of this substance is a pretty constant symptom of toxaemia due to chronic constipation.

Faecal retention co-existing with kidney disease may be specially harmful because toxins absorbed from the intestines may be a potent factor in the production of uraemia.
Some persons who habitually suffer from constipation, appear to become partly immune to the effects of intestinal toxins, for we find that the symptoms produced in individuals who have suffered all their lives from chronic constipation are less severe than in those in whom constipation has been developed in adult life.

**Haemorrhoids.**

The parts of the intestine where faeces generally accumulate in chronic constipation are the pelvic colon and rectum, and it is in the pelvis that faecal masses are likely to produce symptoms of pressure.

Haemorrhoids are directly caused in this way, and the severity of the symptoms produced depend upon the degree of constipation present.

**Pruitus Ani.**

This distressing trouble is often caused by the retention of a small quantity of hardened faeces within the rectum. The Pruritus generally quickly disappears on emptying the rectum by means of an enema.

**Catarrhal Colitis.**

Is produced by prolonged retention of hardened faeces in the large intestine. This, in time, leads to atony of the muscular coat which further increases the severity of the
symptoms.

In chronic catarrhal colitis, the patient passes hard scibalae more or less covered with mucus. Strings of mucus are also sometimes passed either with the motion or alone.

In children: Grinding of the teeth night terrors and convulsions may be symptoms of chronic constipation.

Asthma.

In a case of the writer's, the periodical attacks of asthma are invariably relieved by a rapid and thorough clearing out of the bowel. It is believed that, more frequently than suspected chronic constipation is the exciting cause of this trouble.

Hernia.

In one sense, chronic constipation may be looked upon as a symptom as well as a cause of hernia. In certain cases the constant straining involved in the endeavour to get rid of the hardened faeces, is apt to still more weaken the naturally weak area in either inguinal region. Strangulation leads to absolute constipation in the small intestine.
Prophylaxis.

Before referring to Treatment proper, a word may be said here about the best methods of preventing the incidence of constipation. In this connection, a constant endeavour should be made to maintain as high a standard of general health as possible.

Sufficient exercise should be taken daily in the open air. The food should always be wholesome, of the mixed variety, and it should consist largely of vegetables; it should be eaten slowly, and thoroughly mixed with saliva by mastication.

Defective teeth should be repaired, or replaced, and the mouth kept in a healthy condition. Resting after meals assists digestion.

Exercise favours absorption, and maintains the circulation of blood and lymph, and helps the bowels to perform their function properly.

Treatment.

In the cases of chronic constipation that come to us for treatment, there is great difficulty in ascertaining in what part of the intestine the delay occurs, hence the treatment is to a great extent experimental. Whilst we have seen that chronic constipation may be associated with, or be the cause of organic disease, the great majority of cases are due to some
functional derangement.

It is always important to obtain a careful history of the patient, as it generally throws much light on the causation of the abnormal retention of faeces within the bowel.

In reviewing the cases of chronic constipation which have from time to time come under my personal observation in the course of twenty years' practice in South Africa and London, I find they include infants, breast and bottle fed, children, and many men and women of varied habits and callings; thus shewing the condition to be very prevalent, and therefore important. We often find that it brings in its train such symptoms as abdominal pain, neuralgia, myalgia, arthritis, headache, biliousness, vomiting and a host of other evils. There is no doubt that much ill health and suffering can be avoided by giving serious attention to food and drink, hygiene and exercise.

**Food and Drink.**

Fat meats, cream, dressed salads are beneficial in chronic constipation, if they do not cause indigestion.

In cases of chronic constipation, much can be done by a well selected diet.

The tendency nowadays is towards concentrated, soft foods, which have been depleted of their hard and
indigestible ingredients. This kind of food is mostly absorbed in the small intestine, and there is little if any left to mechanically stimulate the mucous and muscular coats of the large bowel to action, with the result that, stagnation occurs, and a lethargic habit of the bowel is established. In prescribing food, such should be selected as leaves a bulky residue, such as wholemeal and bran bread, porridge, made of oatmeal not too much deprived of the oat husk. Vegetables should be partaken of freely. Onions are specially useful. The writer has known boiled onions included in the daily dietary to have a most satisfactory effect. In many cases of chronic constipation, after relieving the immediate condition with an aperient at night and an enema given in the morning following, all that will be necessary to keep the patient in health, will be such a diet as I have just mentioned.

With the advance of civilisation, and the glutting of the market with chemically prepared foods which have little of the stimulating properties of the older and simpler foods, chronic constipation has been much on the increase of late years.

The mechanical stimulation of the colon is dependent upon the irritant action of cellulose, and on the distension produced by the bulk of the food; the bulk is due to the indigestibility of cellulose, to the
intestinal juice secreted into the bowel and to the bacteria.

The chemical stimulants to activity of the bowel, are the organic acids the sugars and salts, these three are present in vegetable foods and the product of carbohydrate decomposition within the bowel. There are other stimulants to intestinal activity, but they are not so important as the above, they are the products of digestion and putrefaction of meat, fatty acids, glycerin and soap.

It is established then, that the coarser kinds of food are more conducive to healthy action of the intestines than the softer kinds.

Another important point in the treatment of chronic constipation is, that there should be sufficient water taken. In those suffering from chronic constipation there is as a rule too little water taken. Diet and water have a close relation to intestinal activity. A glass of water at end of lunch, and dinner, and another at bedtime, and on getting up in the morning, is found to be a strong stimulus to intestinal activity. The water gets absorbed before it reaches the colon, but it adds to the amount of the secretions from the intestinal glands which to a great extent determine the consistence of the motions, and moistens the surfaces of the colon, and so facilitate the movements of the faeces towards the rectum.
The following case may serve as an example of the large class of persons whose constipation is due to insufficient stimulus to muscular activity in the colon.

Case:- M.J. Aet. 25. A governess who had all her life lived a simple frugal life in the country village, removed to London. At home, she had always been well, and never to any extent suffered from constipation. After a residence of three months in town, she came to me complaining of frequent headaches, worse in the mornings, giddiness, loss of appetite, a feeling of weakness and of being altogether unequal to her work. The bowels had been constipated for a considerable time, the motions being small, hard, and lumpy. She had taken aperient pills on several occasions, which relieved somewhat, but the condition still remained. Her food had consisted mainly of meat three times a day, white bread, cakes, pastry, vegetables. She took a glass of claret with dinner in order as she said "to keep her strength up", but she was getting gradually worse, and had began to lose weight and to get pale. At home she had been used to meat once a day only, porridge for breakfast and often for supper, brown and wholemeal bread. She was advised to cultivate the habit of a daily evacuation. She was advised Hyd Subch qr. ½ Pil Col Co. qr. IV - at bedtime.
for two nights, to be followed by an enema in the morning. A return to porridge, wholemeal bread and vegetables was insisted upon. Excellent results followed the enema on both occasions, and in a week she reported herself much better. Six months after, she told me that she had been perfectly well since.

Hygiene.

The mouth should be kept clean and free from sepsis. The teeth should be in good condition, faulty ones should be replaced or repaired, and thorough mastication of the food should take place. Large pieces of unmasticated food may cause colicy pains and irregular contraction of the bowel, instead of normal peristaltic movements.

In many persons the neglect to respond to the "call to defecate" is an important cause of chronic constipation. Such persons should be advised to make the attempt, and to keep on attempting until successful, and it becomes an established habit. Many people who come for treatment are entirely ignorant of this most effective measure, others have heard of its beneficial effect but say it cannot be practical for want of opportunity. We may prescribe a pill or other aperient for such people, but at the same time it should be impressed upon them that the
object of the aperient is to help them to establish the habit of a daily movement of the bowels.

In the act of defaecation, the faecal matters in the rectum are pressed backwards by the action of the intestines - in such a way that they do not strike the anus but strike a point behind it. The muscles in the floor of the pelvis in most people are strong enough to turn the mass forward, but very old people and women who have borne many children have lax pelvic floor and abdominal muscles; therefore the pelvic floor and abdominal muscles need assistance - this is given very effectively by arranging to have the closet seat very low - say about nine or ten inches from the ground, so that the patient crouches down, and so makes the pelvic muscles tense, and to support the abdominal muscles with his thighs.

Exercise.

The good old habit of walking as a special bodily exercise has, to a great extent, gone out of fashion, owing to the strides made in mechanical locomotion during the past twenty years. The ubiquitous "bike" and motor car are now the recognized methods of progression.

Well selected exercises in the open air are about the best means at our command for combatting chronic constipation. Atony of the muscular coat of the bowel
is believed to be a common cause of constipation - Atony, so-called, is often a nervo-muscular tiredness or languor brought on by sedentary habits, and is due to incomplete removal of effete matter from the system. Exercise improves the general bodily health, and the tone of the heart muscle, consequently, the flow of blood to the muscles is increased, and it assists the removal of waste products.

In reference to chronic constipation the kind of exercise suitable to the particular individual should be selected, having regard to age, habits, and indiosyncrasies. The exercises should always be well within the capabilities of the individual, for too violent or too much exercise might cause overstrain.

The writer has frequently recommended golf, horse-riding, hill climbing, a regular morning and evening walk with great benefit.

In people of sedentary habits who are too engrossed with business to take any relaxation, or even to attend to the calls of nature, it is often necessary to strongly insist upon drastic changes in their habits and routine of life. The following case is one in point. O.E. - A solicitor, aet. 45, a man who rarely took exercise except the little involved in going to and returning from his office every day, came to me complaining of insomnia, lack of bodily and mental vigour, soon got tired,
could not concentrate his thoughts for any length of time, loss of appetite, intense depression and general signs of melancholia. His bowels had been habitually constipated for years, he took a strong aperient whenever he thought he required one, but latterly the aperients had not relieved him as much as they used to. He was a man whom the writer knew previously, and one whom he regarded as of a decidedly cheerful disposition in his normal condition.

Percussion of abdomen revealed dulness over the descending colon from the splenic flexure to the iliac colon.

Here, then, we probably had a case of chronic constipation with auto-intoxication, giving rise to a disturbed state of the nervous system in the form of melancholia. The first thing to do, appeared to be the removal of the cause - constipation. It was felt that the nervous symptoms were secondary to, and dependent upon this. Pil Hydrargyri qr.V was ordered to be taken at bedtime, and a large enema of soapy water to be administered in the morning, this treatment to be carried out three times. After the first enema there was an excellent result, the patient passing a large quantity of scibalous faeces. After the second there was also a good response, the patient remarking he did not know where it all came from. The third brought away
a small amount of normal looking faeces. Having been relieved of the constipation, a feeling of well-being and comfort quickly followed. He was put on a diet consisting mainly of porridge, wholemeal-bread and vegetables and a small amount of bread, and he was ordered Easton's Syrup and sulphate of magnesia twice a day after meals for a week, and advised to reduce his office work and take up golf as a hobby. Eight months after he told me he had had no recurrence of the symptoms and had never felt so well in his life.

There is a tendency now-a-days for the food to be too nitrogenous, which frequently results in causing what is indefinitely termed "biliousness" - a condition which finds expression in one of three forms:

1) Absorption of bile into the tissues causing the complexion to become sallow, and the conjunctivae to be more or less yellow.

2) Sickness and vomiting, the ejecta often containing bile.

3) Giddiness, headache, general weakness; all these are accompanied, generally, with nervous symptoms and the bowels are often constipated.

The bile is excreted at very low pressure, and if little exercise be taken there is a tendency for the bile to become thickened, and to remain in the liver ducts instead of being poured into the duodenum. It is possible that
the bile salts on being absorbed into the circulation poison the nervous system, and give rise to the symptoms we so often observe. It is certain that drugs such as calomel which is supposed to increase the amount of bile secreted, especially if it be followed by a saline aperient, quickly relieves the condition, and exercises which involve mechanical pressure of the diaphragm on the liver are valuable prophylactics.

Swedish exercises of various kinds are to be strongly advocated for chronic constipation. The writer's experience of this type of exercise, both personal and in his practice, has confirmed him of the great benefit which results from the systematic practice of such movements.

In constipation, careful attention should always be directed to those exercises which tend to strengthen the abdominal muscles, and which, during their performance, increase the activity of all the abdominal organs by mechanical stimulation. Weakened abdominal muscles are in this way braced up and the tendency to visceroptosis is greatly diminished.

In this connection, it were well if girls did not wear corsets too early if at all, as these are only, at the best, artificial, and do away with the active, vital support of the abdominal walls.

In considering the treatment of each case in which constipation is a salient symptom, one's first duty should be to endeavour to diagnose the primary cause, for in this way
only can one find out whether the patient requires local or general treatment. As the causes of chronic constipation are very varied, so the line of treatment should differ according to the requirements of the particular case. Careful enquiry into the history of the individual is necessary, in order to eliminate the possibility of the existence of serious disease in other systems than the alimentary, which might be the primary case of the condition. That the nervous system exerts a powerful influence over intestinal efficiency is shown by the frequency of chronic constipation in functional nervous disorders such as melancholia and hysteria. Some of the writer's cases seem to shew, that constipation may be both a cause of and be caused by such conditions. Hysteria is not an infrequent cause of constipation, and the effect of auto-suggestion in this connection is sometimes very remarkable as the following case will exemplify:

Edith D. aet 20, a clerk, was brought by her mother, also a nervous person. Her daughter had been falling off in condition for three or four months. Her appetite was poor, her work was a burden to her, and she had not had her bowels opened for seven days, notwithstanding three doses of castor oil and several pills. She was constantly talking about her bowels, and said that she had many times tried to get them opened, but that it was impossible for anything to come through as she had accidentally swallowed

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a small worm with some water. She thought this had grown inside the bowel and prevented anything passing through!

A soapy enema each morning until it failed to produce any result was ordered. Complete rest in bed, a generous mixed diet, massage of the abdomen and an occasional dose of sulphate of soda were advised. In a fortnight she appeared to be quite well. A suitable dietory was drawn out for her, and she was encouraged to take plenty of exercise in the open air. As very infrequently happens in such instances, there was no return of mental symptoms in this case.

In diseases of the spinal cord such as tabes, there is often very severe constipation. It occurs also in diseases of the brain but not to the same extent, as these are not usually bilateral.

The effects of poisons such as morphia and lead are also manifested in part by constipation.

In lead poisoning it is due probably to the action of the metal on the sympathetic nerves, the irritation of which produces inhibition of movements of both the small and the large intestine.

It is of great value to ascertain which part of the bowel is to blame in some cases of chronic constipation and so arrive at a more rational method of treatment. The investigations are prolonged, and it is only in the worst cases that it is necessary to adopt them. As we have stated, delay does not occur until the chyme has reached
the large intestine, and chiefly there in the pelvic colon.

Hertz classifies constipation into

1. Retention of faeces above the pelvic colon i.e. descending colon below the crest of the ileum including the sigmoid flexure.

2. Retention in the pelvic colon where expulsion is difficult or impossible, owing to weakness of the defaecation reflex. To this class of constipation he has given the name "Dyschezia". This classification is based on the two great physiological processes which maintain the regular action of the bowels. These two processes are the passage of the food from the stomach to the pelvic colon, and the complete evacuation of the pelvic colon at proper intervals.

In order to ascertain what delay there is, and the exact place where it occurs, he employs the method of administering at breakfast one and a half or two ounces of oxychloride of bismuth mixed with bread and milk and the subsequent examination of the patient by means of the X rays. The shadow given by the bismuth on the fluorescent screen shows the progress of the food along the alimentary canal. This large dose of bismuth has never caused constipation or other disturbance of the normal activity of the alimentary canal. The average normal time for food to reach the caecum is four and a half hours, in two hours more it is at the hepatic flexure, in two and a half hours more it

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reaches the splenic flexure. The rate of passage through
the descending colon is slower.

Herschell (London) suggests a simple method whereby
the general practitioner who is beyond the reach of Radiog-
raphy may diagnose the two groups. He gives a test meal
in conjunction with a dose of carmine. If this is found in
the stool next morning, the rate of transit is normal; if
stool passes with no carmine, the delay is in the upper
colon. If no stool is passed a small enema is given
sufficient only to empty the pelvic colon, if this brings
away a carmine-coloured stool the delay is in the pelvic
colon. Before giving the carmine, it is necessary to
empty the bowel thoroughly.

It is well to ascertain the habits of the patient as
regards the quality and kind of food he takes.

Treatment may be divided into:

1. Educational and prophylactic.
2. Dietetic.
3. Mechanical.
4. Medicinal.
5. Surgical.

1. Educational and Prophylactic.

This has already been dealt with under the heading
Prophylaxis. (page 48 vol. III).

2. Dietetic.

In the first place it is necessary to determine the
absence of structural disease, before considering the dietary suitable for any case of chronic constipation. Having excluded this, a careful selection of the daily dietary, with directions about proper exercises, and as to the cultivation of a regular habit of a daily evacuation, suffice to cure most cases of chronic constipation. In others, such measures must be combined, for a time, with further treatment such as mild aperients, electricity, massage. Other cases require surgical treatment to bring about a permanent cure.

Dietetic treatment is of the greatest value in those cases which are due to the slow passage of food along the large intestine owing to deficiency of bulk, or of fluid.

Delay may be due to a too complete absorption of food materials, in which cases an increase in the less digestible constituents of the food is indicated — these are found in vegetable cellulose. A diet consisting largely of fruit and vegetables will relieve and even cure many such cases.

A patient of the writer's —

Andries V. aet 34, whose diet consisted of meat at every meal and to whom vegetables were distasteful, suffered from constipation for years. A feeling of almost constant hunger, unsightly acne, loss of flesh, sallow skin and depression, were the symptoms of which he complained; sulphate of magnesia and Nux Vomica thrice daily for about a week were ordered which relieved the immediate symptoms of constipation and depression. He was advised to go to a
country place in the Cape Colony where he could have plenty of fruit and brown bread and nicely cooked vegetables: meat was strictly limited to dinner only. On his return in five week's time, the improvement in his condition was very marked. His complexion was clear, the acne had disappeared, his weight was increased, and he said he felt perfectly well.

In cases like the one just cited, it seems likely, that the diet consisting chiefly of meat, which leaves a very small residue, that the small quantity of faeces formed, remains a long time in the large bowel before sufficient accumulates to produce effective stimulus, and that the long delay results in decomposition and absorption, causing symptoms of poisoning. Such cases are best treated by the administration of foods which leave a large residue. Vegetable foods - green and root - act well generally on account of the cellulose they contain.

Agar agar, a gelatinous substance prepared from certain East Indian sea-weeds, has been used for the same purpose. It consists of a form of cellulose which is unaffected by the digestive juices. It has the property of absorbing water readily and of retaining it. One teaspoonful, which is the ordinary dose, takes up about three and a half ounces of water, so that a small quantity yields a considerable volume for excretion. By keeping the contents of the bowel uniformly moist it prevents the formation of scibalae and by the volume it acquires, produces peristalsis. It can be
obtained as an almost tasteless powder and may be given in soup, or with mashed potatoes or porridge or other vehicle.

The writer in a case of long-standing chronic constipation in an elderly man who was averse to the use of an enema prescribed Agar Agar in teaspoonful doses once daily with mashed potatoes and gravy. The effect was excellent at first, but it seemed to lose its effect as time went on, and the dose had to be increased to a teaspoonful twice in the day.

Great benefit accrues in chronic constipation by the judicious blending of certain food stuffs such as oatcake, wholemeal bread, bran bread, golden syrup, treacle, honey, marmalade: meat fats, and butter are also valuable. So are stewed apples and pears, oranges, prunes and figs: vegetables of the green and root kinds, spinach, turnip tops, Brussel sprouts and onions, turnips and the like.

It is good practice to eat some kind of fruit regularly with breakfast such a raw apple, melon, orange, stewed prunes and figs. This has often the effect of keeping the bowels open without having recourse to aperients. It is a custom with many to take marmalade at the end of breakfast each morning, and a good custom it is for it contains laxative vegetable salts and sugar, and the orange skin which is
mostly indigestible helps to promote peristalsis of the bowel.

Fruits contain, as a rule, salts of vegetable acids, many contain sugar, both of which have laxative properties. The fig is specially valuable in this connection because of the indigestible seed producing stimulation of the intestine and the vegetable salts and sugars it contains.

Bread. Patients suffering from chronic constipation should be encouraged to eat wholemeal and bran breads, oatcake, buckwheat cakes and the like in preference to the white bread so much in vogue at the present day— from which the insoluble husk has been removed in the process of manufacture, much to the detriment of people who suffer from constipation.

Milk. Milk is in itself a type of a perfect food, containing as it does all the essentials for nutrition—albumin, fat, salts, sugar, and life at all ages can be maintained on it indefinitely. It may be said to be the natural food for the young of all mammals. Whole-milk is nourishing, and a well-adjusted food for infants and young children. Infants, however, frequently get constipated when fed on pure whole-milk, but if there be added water and a little cream in proportion suitable for the particular
case, the child's bowels can, as a rule be perfectly regulated. In the writer's experience he has found that constipation in infants is due to a deficiency of fat in the milk - which is effectively supplied by the addition of cream.

Milk is an article of diet which varies much in quality both in town and country; the composition being influenced by pasturage, by the length of time after calving, and by the breed of cow. The reason why whole-milk so frequently disagrees with infants is that it curdles in large indigestible lumps in the stomach, these are either vomited or they pass down into the intestine causing constipation or diarrhoea. In such cases if it be diluted with barley water, or soda water and a little cream added, it curdles in smaller flakes which can be attacked and digested by the gastric juice - the added cream having an excellent effect in preventing constipation.
Water. A plentiful supply of good water should be allowed to children and adults alike. This important need of the bowels in chronic constipation is often overlooked. In adults a glass of cold water at the end of luncheon, and dinner, and another at bed-time, and on rising, have a most beneficial effect in most cases of constipation. It is to a large extent absorbed in the course of the digestive canal, and adds to the secretions from all the intestinal glands which mainly determine the consistence of the motions. Water when taken into the stomach remains there until it attains body temperature, then, if the stomach and small intestine are empty, as they usually are in the morning on waking, it is probable that it passes rapidly along the bowel and that a considerable part of it reaches the colon with little delay, and this may account for the easy evacuation which is so often found to follow, an hour or so after drinking a tumblerful of water on rising.

The constipation which follows severe and prolonged exercise, frequently seen in athletes, may be due to deficiency of body fluid owing to free perspiration as well as to fatigue.

3. MECHANICAL. Sedentary habits conduce to a constipated habit. Those whose avocations entail physical activity such as agricultural labourers, and shepherds suffer very little from constipation.
Exercise, by stimulating the circulation, encourages the elimination of waste products by the various channels of excretion—skin, lungs and kidneys; it increases the secretary functions generally, including those of the alimentary tract, and improves the musculature—skeletal and intestinal. It induces deep breathing and thereby causes a more free action of the diaphragm, and in consequence, a massage-like effect upon the liver and transverse colon. The increased rapidity of breathing also stimulates the circulation, strengthens the diaphragm and brings about a better tone generally. It is reasonable to assume that the involuntary muscles take part in the general improvement, that intestinal glands secrete more actively, and that peristalsis is encouraged.

It has, too, a striking psychic effect in removing the common feature which patients call depression of spirits. A patient told the writer that Swedish exercises "cheer him up more than anything." Broadly speaking, all exercises have a tendency for good, but some are better suited than others for the constipated.

In the section headed Exercise, in this paper, reference was made to the writer's experience of Swedish exercises as a successful means of combatting the tendency to chronic constipation. This system of physical training is a carefully thought-out scheme of exercises grouped according to their special effect upon different parts of the body.
The following were amongst those selected for several of the Writer's patients, the object being to develop the recti and oblique muscles.

**EXERCISE 1:**

(a) Stand erect, heels together, arms hanging stiffly by side, thumbs extended.
(b) Raise arms slowly, circling fashion away from body until thumbs meet above head, inhaling at same time.
(c) Trunk, arms and legs stiff, bend trunk until fingers touch toes, exhaling slowly at same time.
(d) Reverse movements (c) inhaling slowly.
(e) Reverse movement (h) exhaling slowly.
Repeat seven times.

**EXERCISE 2:**

(a) Lie stiffly full length on floor with arms stretched in line with body.
(b) Take a full breath slowly.
(c) Bend body up slowly keeping legs straight, until fingers touch toes, exhaling slowly at same time.
(d) Reverse movement (c) inhaling slowly.
(e) Exhale slowly.
Repeat seven times.

**EXERCISE 3:**

Trunk bending side to side.
(a) Stand erect feet astride. Head
resting on hands.
(b) Bend trunk as far to left as possible, slowly inhaling at same time.
(c) Reverse movement, exhaling.
(d) Bend trunk to right, slowly inhaling.
(e) Reverse the movement, exhaling.

The body should be well stretched out in doing this exercise.

**EXERCISE 4.**
(a) Stand feet astride, arms stretched upwards and kept width of shoulders apart.
(b) Bend trunk to left as far as possible inhaling at same time.
(c) Reverse (b) exhaling.
(d) Bend trunk to right as far as possible - inhale.
(e) Reverse (d) exhale.

**EXERCISE 5.**
(a) Lie down fully stretched on floor.
(b) Take a full breath slowly
(c) While holding breath push out abdomen quickly by contracting diaphragm.
(d) Repeat contractions every two seconds until it is necessary to exhale and take another breath.
EXERCISE 6: Trunk turning and bending.
(a) Stand with body erect, hips firm.
(b) Turn trunk to left keeping muscles tense.
(c) Bend trunk to left.
(d) Stretch upward as far as possible.
Return to position (a) and repeat the movements to the right. Bend only to the side to which the turn is made.

EXERCISE 7: Lying Position - legs raising.
(a) Lie full length on floor.
(b) Take a full breath.
(c) Raise both legs slowly to the vertical position.
(d) Lower legs slowly.
Legs should be well extended during this exercise.

The foregoing are the most usual exercises prescribed by the writer in selected cases, and he is confirmed in the belief in their value in the treatment of chronic constipation. While out of door exercise may not be available for many city dwellers, it is within the power of almost all to institute in their own homes systematic physical training. These are specially valuable if pursued before the morning bath,
and again, if possible, in the evening before retiring. As has been said, the exercise or exercises suitable to the needs of the individual should be selected.

General exercises such as horse-riding swimming, walking, tennis, football, have already been referred to. All these act mechanically, directly upon the alimentary tract, and indirectly through the improvement in the blood circulation, which is manifested in every part of the body.

MASSAGE:

In chronic constipation massage is of the utmost value when there is inactivity of the intestinal muscles. The movements should be directed in line of the colon, beginning over the caecum and continuing along the ascending, transverse and descending colon. The movements should be of a kneading character, and should not be continued for more than five minutes at first, but it can be gradually increased to half an hour.

Abdominal massage should not cause pain, and should never be employed where there is any evidence of inflammation.

Before the massage, the bladder should be emptied and the patient should be in the recumbent position with the knees raised on a pillow so as to relax the abdominal muscles. The best time of day for abdominal massage
is before breakfast, as the stomach is then empty and the massage being added to the morning stimuli to defaecation may very soon result in a normal evacuation.

With the object of strengthening the abdominal muscles in patients who are unable to take active exercise such as Swedish drill, massage of a firmer character is needed.

Auto-massage may be practised with one of the several instruments that have been devised for massaging. A device that answers well in many cases, is a rubber ball filled with No.8 shot to the weight of four or six pounds for an adult and half this weight for children. It is used by the patient himself while in the recumbent position. The ball is rolled over the course of the large intestine from caecum to descending colon, for ten or fifteen minutes night and morning.

4. MEDICINAL TREATMENT: The Board of Trade returns shew that an enormous amount of purgatives in the shape of patent medicines are consumed yearly in Britain.

A large number of people dose themselves with purgative pills on their own initiative. There can be no doubt that this indiscriminate use of purgatives is much to be deprecated, because their constant use is productive of much harm. The great majority of cases of chronic constipation can be cured by proper attention to diet, hygiene of the bowel, and systematic exercises.
The constant irritation of the intestinal mucous membrane by strong purgatives tends to lessen its excitability, so that it is found that the dose necessary to produce an action must be constantly increased. Rational treatment is made much more difficult when the patient has been using purgatives to the extent of diminishing the physiological excitability of the bowel.

There are, however, without doubt, many classes of people suffering from chronic constipation who require help of some kind beyond those just mentioned, e.g., in the constipation which may occur in inoperable cancer, in chronic heart disease, in diabetes. In these and many others, drugs have a varying necessity and a very useful place in one's armamentarium, and one constantly finds that properly regulated doses of aperients are of the greatest value.

There are so many lavishly commended purgatives on the market which are easy of access to the public, that the Physician often finds himself the "last resort" in cases which have by indiscriminate drugging complicated the condition for which relief is sought.

Violent purgation causing a rapid passage through the alimentary canal must result in a considerable loss of nutritive material. It is desirable in some cases of chronic constipation to order the dose - should one be required - of an aperient which will give daily a
formed motion, and to instruct the patient to diminish the quantity as improvement in the condition of the bowel occurs. In habitual constipation each case should be treated on its own merits, and individual idiosyncrasies should be carefully considered.

"Though the symptom of constipation is a simple one, its treatment needs not this drug, nor that drug, but any drug, or many drugs or no drugs, combined with systematic measures for gradually restoring the healthy functions of the digestive tract that culminate in normal defaecation" (Practitioner).

Thus, if spasm or obstruction be the cause, purgatives which increase spasm or peristalsis are "out of court"; in such cases sedatives are in the first place indicated.

If a patient be found to be suffering from impaction of faeces, it would be manifestly unwise to prescribe a strong purgative medicine. So, persons suffering from chronic constipation complicated by some painful affection of the rectum or anus should take such a laxative as will promote soft motions, and so avoid the pain incidental to the passage of large and hard faeces.

The cases of chronic constipation which present themselves for treatment may be divided into three kinds.

1. Atonic - weakness of intestinal muscles.
2. Enterospasm.
3. Incomplete defaecation
   (Dychezira of Hertz).
1. **ATONIC:** In the treatment of chronic constipation due to weakness of the intestinal muscles (atonic), it is wise to avoid severe measures. What should be aimed at is a toning and stimulating effect upon the musculature of the whole body, and with this, an increase in the activity of the intestinal muscles and glands. Of drugs which act favourably on the intestine and particularly on the large, we mention a few of special value.

Cascara Sagrada is probably the most commonly prescribed laxative. It is best administered in small and repeated doses. It has a tonic action upon the non-striped muscle and glands of the intestine, and is slightly stimulating to the liver. The dose has the advantage of being small, and though taken over long periods there is in many cases no need to increase the dose. On the other hand it is often possible to gradually decrease the dose, a healthy habit of action having been established. It causes little or no griping or discomfort. It has a bitter taste, which is objectionable to some. This difficulty is got over by prescribing it in pill form, or by combining it with various aromatics to make it more pleasant. In cascara evacuant the bitter principle is removed and aromatics are added. It is a very efficacious preparation. The writer has in his practice obtained
excellent results from a prescription containing cascara sagrada, nux vomica, belladonna and flavouring agents.

Castor oil is a safe and mild remedy, suitable for all ages. It passes the stomach unchanged and is split up and saponified by the biliary and pancreatic juices; a part of it escapes unchanged to the large intestine and acts as a lubricant. Given in regular small doses it is useful in the constipation of the aged, and in larger doses for the removal of faecal masses.

Senna is a favourite remedy of the writer's, who has found it very efficacious in the form of watery extract of the pods. Six to twelve pods are covered with water, two prunes are added and they are allowed to steep over night and the liquid is drunk in the morning.

Aloes and its principle aloin are very frequently presented in chronic constipation - usually in pill form. Their action is exclusively on the large bowel. They are contra-indicated in Haemorrhoids because of the hyperaemia of the rectum which is liable to result.

Podophyllin is useful as a Cholagogue cathartic. It should be given in small doses as otherwise it is liable to purge severely. It is slow in action. On account of its griping tendency it is best combined in pill form with such carminatives as hyoscyamus or belladonna.

Sulphur in the form of confection is exceedingly
useful given in doses of a teaspoonful at night; or in the form of sulphur lozenges of the B.P. It is a favourite in anal fissure and haemorrhoids, because it renders the motions of a soft consistence which pass over the tender area without causing undue pain. Very small doses of sulphur have often a gratifying effect. It is probably converted into a sulphide in the bowel and it is this that acts as a stimulant to the intestinal mucous membrane.

The following drugs are frequently combined with laxatives:-

Strychnine, for its general tonic effect.
Hyoscyamus and belladonna, to combat spasm and prevent griping.
Capsicum, to stimulate gastric secretion.
Peppermint and Cajutput, to relieve flatulence.

Saline Purgatives. These furnish a ready means of increasing the liquidity of the motions and are an important type of purgatives. In their action they differ from vegetable purgatives such as Cascara, and castor oil in that they increase the secretory as well as the motor activity of the large intestine. The stools they produce are soft, and therefore salines are useful for patients with haemorrhoids and anal fissure.

The best time of day to take an aperient of this class is a short time before breakfast, as then the
specific action of the salt is augmented by the stimuli to peristalsis which normally occur at that time, the most important being the entrance of food into an empty stomach.

A very interesting experiment was made by Otto, by which he demonstrated that solutions of salts were retained in the stomach until they became isotonic with the body fluids by admixture with the secretions of the gastric mucous membrane.

Until recently the mode of action of the salines were imperfectly understood. Hertz of Guy's Hospital, experimented by giving a saline purgative in water with oxychloride of bismuth before breakfast.

Skiographic examinations shewed that the salt did not reach the caecum for four hours; it came along with the bismuth although a watery motion had been passed two and a half hours earlier. Hertz was fortunate in having two patients with fistulae in the end of the ileum, whom he used as controls. He found that the soluble purgative salt travelled no faster than the heavy and insoluble bismuth. Analysis of the watery stools after purgation with sodium sulphate shewed that the percentage of the salt they contained was not increased. The greater part of it being excreted next day when the motions were solid. He found that one-half of the salt was excreted by the kidney within eight hours of its being
swallowed. The conclusion was, that the salt is absorbed by the small intestine, and that it acts through the blood stream on the neuro-muscular mechanism of the colon producing increase of the motor and secretory function.

An interesting feature of the experiments made by Hertz on constipated and normal patients, and on a patient with a fistula at the end of the ileum shewed that saline purgatives do not alter the rate of passage of the chyme through the small intestine and that the colon was the part of the bowel upon which the salt having been absorbed into the blood-stream, acts. The experiments then point out the practical lesson that in cases where it is desired to produce an evacuation of the large intestine without interfering with digestion in the small, salines should be selected.

NATURAL APERIENT WATERS:

Soda and sulphate of magnesia are the chief constituents of the continental aperient waters, so much used in this country, and their action depends on the presence of these salts. It is a frequent experience that drinking the waters at these resorts only produces a temporary alleviation of constipation.

MERCURIALS:

In the form of Calomel, or blue pill, are valuable
as occasional aperients and given in small doses, particularly in constipation with gastrointestinal trouble associated with headache, furred tongue, and a feeling of tiredness and malaise. The continued use of mercurials is to be deprecated as their action is that of intestinal irritants and injury to the mucous membrane of the alimentary canal may follow their protracted use.

**LIQUID PARAFFIN:**

The writer has had very excellent results from the use of this preparation in numerous cases of chronic constipation.

He has had gratifying results in patients of all ages. Its action is apparently purely mechanical, by moistening the lining membrane of the intestine, and it has the effect of rendering hardened faeces moist, which are consequently expelled with ease. From a teaspoonful to a dessert-spoonful night and morning has been the dose usually prescribed, though some required larger quantities. In the class of cases where there is too great absorption of water from the colon rendering the contents dry it has been of the greatest value.

Laxamel is a preparation of liquid paraffin made with a jelly-like form. This is taken by children very readily, who like the flavouring agents in it.

Case A.O.E., aged 45, stock-broker, a man of somewhat
sedentary habits, had suffered since childhood from constipation, and **im** scarcely ever had a motion without taking some aperient medicine.

As a result of changed diet the bowel condition had been better somewhat during the past year, but still he required some medicinal aid.

Liquid paraffin was prescribed in dessertspoonful doses night and morning. After three days the improvement was very marked. Its use was continued for three weeks, when he began to gradually reduce the dose. It was reduced to a teaspoonful twice daily, and this amount he has taken for some years - not being able to leave it off altogether, but the motions are much more satisfactory with this than with pills or salines.

**II. ENTEROSPASM:**

This is a condition where defaecation is painful and inefficient on account of spasm of the colon or rectum.

The faeces are hard and covered with mucus, and the stools are small on account of deficiency of water. With the stools are often passed shreds of mucus of variable lengths, and the stools may be streaked with blood from ulceration of the mucus membrane.

It is in the neurotic type of patient that enterospasm is met with, and it may be looked upon as a definite sign of neurosis. With the aid of the Sigmoidoscope
it is possible to see the alternate contractions and relaxations when they occur in the rectum or pelvic colon. Between the attacks, constipation of an ordinary type is found.

All the well-defined cases of enterospasm of which the writer has had personal experience have been in women who had at the same time other prominent signs of neurasthenia — accompanied by some morbid condition referable to the pelvis. In the milder degrees of this condition treatment consists in the avoidance of purgatives, the administration of hyoscyamus, bella-donna, or small doses of morphia, the careful regulation of diet, and attention to the surroundings and hygiene, abundance of fresh air day and night. The bowels, should they be constipated, in spite of the altered diet, are best helped by liquid paraffin taken by the mouth, enemata of normal saline, and the local application of warmth by hot bran bags or poultices.

The more severe cases of this condition come into the hands of the Surgeon as will be mentioned later under Surgical treatment.

Case. Mrs. H. Aged 46, a lady of highly strung temperament, who had formerly suffered much from dyspepsia and insomnia, complained of pain in the bowels, coming on at varying intervals, and in different parts of the abdomen. The duration was about three months. At times the pain would
be in the right side, at others in the middle, but oftener than not it was on the left side low down in the abdomen. The attacks lasted from about five to fifteen minutes. She had taken rhubarb pills and Seidlitz powders on her own initiative, but they were not followed by relief of the symptoms and the condition was getting worse; the intervals between the attacks had been shorter during the past week. Defaecation was accompanied by pain and distressing straining. An enema of about half a pint of soapy water caused her great distress. The water returning in small quantities during six attempts to relieve the bowels; each attempt being accompanied by distressing pain. In view of the history of the case and present symptoms, it seemed to me to be clearly a case of neurasthenia with intestinal symptoms.

Complete rest in bed was advised; all sources of worry to be as far as possible excluded, and a diet consisting of strong soups, milk, baked custard, milky puddings. After the second day she began to show signs of improvement, which was maintained until she was free of the symptoms. In about seven days she was advised to go for a holiday, and on her return in three weeks' time she appeared to have quite recovered from her intestinal symptoms.

III. DYSCHZIA:

The third division into which cases of chronic
constipation have been divided, consists of a group of symptoms in which there is inability to defaecate completely.

The name Dyschezia was first given by Barnes and subsequently adopted by others.

In these cases there is no delay in the arrival of the contents of the bowel at the pelvic colon, but the final excretion is inadequately performed.

In these cases, when an examination is made, some faeces are found in the rectum, even though it be made immediately after defaecation. This accumulation can often be made evident by pressing deeply with the finger into the ischio-rectal fossa. In a few cases, by palpation of the iliac colon faeces can be made out in this situation.

Dychezia may be due to one or more of the following causes:

(a) Habitual disregard of the call to defaecate, leading to loss of the defaecation reflex, and atony and paresis of the musculature of the rectum and pelvic colon.

(b) Inefficiency of the voluntary muscles of defaecation. Normally the pelvic floor and abdominal muscles are the only support of the viscera. The peritoneal folds help to maintain them in position but they do not support their
weight. Therefore, weakness of the abdominal muscles and of the pelvic floor allow the bowels to drop; Moreover, the "pull" produced on the bowels in this manner causes a constant slight irritation of the sensory nerves of the peritoneum, resulting in a vague feeling of discomfort. This discomfort disappears as soon as the "pull" on the peritoneal attachments is prevented by lying down or by supporting the abdominal wall with the hands, or an abdominal belt.

In these cases drugs are clearly contra-indicated. The line of treatment should be in the way of mechanical support, and the strengthening of the abdominal muscles by the means already indicated, and the prevention of constipation.

(c) An unsuitable posture during defaecation.

In people with lax and weak abdominal walls, the high seat of modern water-closets are, it is believed, productive of difficulty in defaecating. In strong persons the act is efficiently performed, but in those with weak abdominal muscles and in whom the pelvic floor is also weak - the high seated closets prevents them from compensating for the deficiency.

This subject has been referred to in a former chapter.
Other causes of Dyschezia may be:-

Some obstacle to efficient defaecation such as spasm of the sphincter ani in anal fissure, or painful haemorrhoids, structure of rectum or anus, pressure on rectum from without, such as ovarian cysts, fibroids, pregnant uterus.

In these cases accumulation of faeces in the lower bowel is the rule. The best method of treatment for these accumulations is by enemata. Enemata may be divided into two classes.

1. High

2. Low. According as the fluid injected is carried into the descending colon and beyond, or only into the rectum and pelvic colon. A "high" enema is administered by means of a soft, long, rubber tube passed beyond the pelvic colon. It is passed by a short grip, screwing movement. Considerable care is necessary in order to ensure the passage of the tube through the Sigmoid flexure. Two or three pints may be injected. This should be done slowly by means of a funnel or douche set at a height of not more than three feet.

Low enemata are administered by means of a Higginson's syringe; this should consist of a pint or a pint and a half only, for should there be any hardened faeces lodging in the pelvic colon or rectum, little, if any, of the water would reach beyond the rectum. The temperature
of the water injected should be a little above blood heat. The fluid may be cold, with advantage, when a tonic action is desired on the rectal mucous membrane as in Haemorrhoids, and the injection should be a small one. For enemata various fluids may be used such as sterilised water alone, or with a little soap dissolved in it. Normal saline solution may also be used, it is less irritating to the mucous membrane than plain water.

Irrigation of the colon with sterile water, or with normal saline solution, are soothing and valuable in muco-membranous colitis, in spasmodic constipation with, or without ulceration.

Distention of the bowel is a strong stimulant to peristalsis and enemata accomplish this while at the same time they tend to soften the faeces. Soap added to the water causes stimulation of the mucous membrane.

Oil may be injected prior to the soap and water. It has the effect of lubricating the bowel and softening the surface of the faeces, as well as separating the scibala that may be clinging to the bowel wall.

Glycerine, either as a suppository or added to the water acts as a mild irritant to the mucous membrane; it is moreover hygroscopic, and is therefore a valuable help in Dyschezia.

The writer has found the following formula most useful in practice.

* Henry's solution 3\textsuperscript{1\textfrac{1}{2}} Glycerine 3\textsuperscript{1\textfrac{1}{2}} Aq. ad 3 \textsuperscript{m} Misc. *
It has the advantage of being small in bulk and powerfully stimulating. As a rule an evacuation is obtained within a few minutes of the injection. This formula is particularly useful after abdominal operations.

Glycerine is too irritating for use in anal fissure, or in constipation caused by haemorrhoids.

**SURGICAL TREATMENT:**

Where intractable chronic constipation which has resisted all known medical methods of treatment occurs, surgical interference is clearly indicated. Before resorting to any such procedure, an exhaustive skiographic examination of the intestines should be made, with the object of ascertaining as far as possible — if this has not already been done — what part of the intestine is at fault. The percentage of cases of chronic constipation requiring surgical treatment must be very small.

During the past three or four years very conflicting views have been held by surgical authorities respecting the etiology of stasis and treatment that should be followed.

Sir Arbuthnot Lane believes that, owing to unsuitable diet and the assumption of the erect posture, delay of faecal material takes place in the large bowel, owing to the formation of evolutionary bands or new membranes. These are specially evolved from the peritoneum at the hepatic and splenic flexures, and he regards these as both the cause
and result of chronic constipation. He regards the large intestine as the cesspool of the gastro-intestinal tract, and the general drainage system of the body. Much doubt has been thrown on the fundamental canons of Lane's theories, but it seems to be established beyond doubt, that in chronic constipation toxaemia may be produced which causes definite changes, resulting in devitalisation of the tissues, so that the body becomes a ready prey to infective processes. Mr. Lane assumes that tuberculous joints in children are caused by toxaemia resulting from chronic constipation. Other diseases having the same origin, according to his theory, are rheumatoid arthritis, ulcerative colitis, cystic diseases of the thyroid and Bright's disease.

We must remember that the colon has a considerable power to render microbes innocuous. The small intestine in health is sterile and has not this power. Mr. Jordan of Guy's Hospital asserts that in those cases of chronic constipation when there is absorption of toxins the aortic arch becomes atheromatous at an early age. This, if true, is an important point as bearing on operative measures, since patients do not stand severe operations when the arch has begun to dilate.

He states also, that chronic rheumatism is apt to occur as a sequela of chronic constipation, and that all the symptoms clear up permanently on the successful
treatment of the constipation.

Having satisfied oneself that every known means of relieving the constipation short of surgical has failed, surgical means should be adopted. The cases of chronic constipation in which Surgical aid are of value are:–

1. Those in which there is such impaction of accumulated faeces in the pelvic colon and rectum, as from experience of similar cases should not, or could not, be relieved by enemas or any of the other means of relieving constipation that have been mentioned.

2. Those in which there is obstruction to the passage of faeces owing to
   (a) excessive dilatation of or (b) the narrowing or occlusion of the lumen of the canal

3. Certain conditions in which the musculature is at fault.

1. The following case was one belonging to the first division:–

   Wilhelmina R. aet. 35, a farmer's wife, had suffered from troublesome constipation for six years. She attributed her trouble to her confinement six years before she came under the writer's observation. She said the confinement was prolonged, and that there was extensive tearing of the perineum and vagina. Since then she had had to have recourse to aperients and enemas in order to get
her bowels^ She suffered much pain if she allowed her bowels to become constipated. Saline aperients followed by an enema relieved the constipation, and the pain became less severe if there was a good result. On vaginal examination the cervix was found to be displaced to the right, and that it was less mobile than normal.

Through the left fornix a swelling was made out, tender to the touch and globular in shape. Her general health had fallen off, having lost weight and become weak and unable to do her work. Tumour of the left ovary with adhesions was diagnosed and subsequently confirmed by another practitioner. An operation was decided upon and she was removed to the Kroonstad and District Hospital. At the operation there was evidence of extensive, old pelvic inflammation, affecting the uterus and broad ligament. The left ovary was thought to be a little enlarged but not diseased. The pelvic colon was enlarged into a pouch-like protuberance and held down to the pelvic floor by extensive adhesions. The surgeon - Dr. Duthie of Kroonstad - decided to divide the adhesions all round, and fix the pelvic colon to the abdominal wall.

The patient convalesced slowly, but had greatly improved in six months' time. The constipation was not so troublesome, and her general health had considerably improved.

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1. (a) Excessive dilatation of the lumen of the bowel is a rare occurrence associated with constipation.

The writer once had a patient, aged 25, who, as a boy received a far from euphonious nickname on account of the extraordinary prominence of his abdomen. He was brought under notice while he had an acute attack of obstruction of the bowels. There was much pain and vomiting; aperients and enemata had failed to give relief to the bowels. The abdomen was distended along both flanks and across the front. The patient had suffered from similar attacks but not so severe. As the condition was acute he was sent to Hospital, where after repeated injections through a long tube, there was a fair response. Constipation recurred and it was determined to operate. When the abdomen was opened an enormously dilated organ presented itself at the mesial incision.

The Surgeon remarked, "What say you to this being the stomach?" On further examination it was found to be the greatly dilated descending colon, with its wall much thickened. No faecal masses were felt, the contents having been removed by repeated high enemata; there was only a little soft matter to be felt on pinching up the gut. The dilatation was made out to extend from the end of the pelvic colon, upwards and along part of the
transverse colon, but it appeared to be more marked in the pelvic and lower portion of the descending colon. There was no evidence, the Surgeon said, of any stricture in the sense of band or thickening. He expressed the opinion, in view of the available history of the case that it was a case of congenital dilatation. The bowel was brought up and stitched to the abdominal wall, with the object of making an opening into it through which to wash out the bowel subsequently, and also with the idea of removing any kink or bend which might exist in it when it was full of faeces. The attachment did not hold unfortunately, and the bowel tore away from its moorings, so that no washing-out was done. The patient was sent home and he kept fairly well up to the time last seen - seven months after the operation - by a daily high injection of oil and the regular use of cascara and strychnine. The writer believes this to be a case of congenital idiopathic dilatation of the colon (Hirschspring's disease).

In cases of severe atonic constipation which have resisted medical treatment, and in which the whole of the colon is dilated and sacculated so that there is inefficient emptying of its contents, and auto-intoxication is occurring, appendicostotomy may be performed as a temporary measure. This operation was devised by Keetley as a method of treating some forms of chronic constipation. In this
operation the appendix is severed and brought flush with the abdominal wall. The patient is taught to flush out his own colon by pouring a pint of warm water containing cascara through a catheter introduced via the appendix into the caecum. It was claimed by Keetley that by this means the colon could be regularly flushed _ab omni_ throughout its whole length; that abruption would be prevented, and that the bowel would ultimately regain its tone and efficiency. It is disappointing to observe, that Surgeons consider that this operation is not uniformly successful, and that the brilliant results hoped for by its author have not by any means always been realised.

2. (b) Narrowing or occlusion of the lumen of the bowel is by far the most common and important condition, which, giving rise to chronic constipation, necessitates the intervention of Surgery.

The lumen of the gut may be encroached upon by one of the following conditions:-

1. Organic stricture
2. Pressure from without
3. Spasm

1. Organic stricture of the great intestine is by far most commonly due to growths of a malignant character in the bowel wall. The sites of election are—in their order of frequency rectum—pelvic colon, caecum,
- hepatic flexure - Splenic flexure - transverse colon - descending colon - ascending colon. When such occurs above the pelvis, the operative treatment consists of removal of the section of the bowel affected with the tumour, when possible, or, in short-circuiting the bowel where the relations and adhesions of the growth render removal impossible.

When the tumour is in the pelvic colon, the portion of bowel, in favourable cases, may be excised through a mesial incision, a preliminary colostomy having been performed. Needless to say, if there is evidence of extensive glandular involvement, or of spread to organs, such as the liver, colostomy is the only way by which we can hope for some relief. The major operation being clearly contraindicated.

When disease is located high up in the rectum, it may be removed through a median incision. In cases where the disease does not extend to the anus, the stump of the bowel may be freed and sutured to the anal portion, but where there is no such healthy remainder to depend upon, a sacral anus should be made.

Where disease exists low down in the rectum, say three inches from the anus, the involved portion of gut may be resected, provided the disease has not seriously involved the neighbouring structures, such as the bladder or uterus - to the proximal portion of bowel and be sutured to the anal canal.
The writer's experience is limited to those in the last group. In one instance, about three inches of the bowel were removed and it was found possible by freeing the bowel above, to bring it down and suture it to the anal portion. The patient who had suffered much from troublesome constipation exhibited when the writer was called to see her, a small ulcerated and indurated surface on the posterior wall of the rectum about the size of a shilling. The result of the operation was very satisfactory, inasmuch, as the constipation and back pain from which she had complained were completely removed.

In four years thereafter however, the back ache and constipation returned and there was a recurrence of the disease at the level of the original growth: this spread around the bowel, involving the sacrum and the tissues around the pouch of Douglas. Death was due to spread of the disease and to toxaemia.

In other cases, the disease had progressed so far by the time the writer was consulted that colostomy was the only measure possible.

The writer has often been impressed by the absence of symptoms of sufficient urgency as to suggest to the patient the need for consulting a medical man. Time and again has he been consulted for the first time by patients whose only complaint was constipation and a feeling that the bowel was never properly emptied, and troublesome straining at stool. No blood may have been observed in
the motions, and little pain felt, and yet he has found it may be, a fairly large fixed tumour infiltrating the surrounding tissues, which could not be removed by operation without endangering the patient's life.

On one occasion the writer was consulted by a man aged 46, who, as it turned out had advanced rectal cancer. In this case the main symptom was persistent diarrhoea, not constipation.

In this connection the lesson the writer has learned is, that in all cases where the patient is above thirty five years of age whose symptoms are constipation with intermittent diarrhoea, or of persistent diarrhoea which does not soon give way to medical and dietetic treatment - he should examine the abdomen and rectum, and not to be denied an examination because of scruples on the part of the patient.

Another point which one has noticed is, the slow growth of rectal cancer in patients of advanced years. A patient aged seventy three lived over ten years with an artificial anus, and the growth when first discovered practically filled the bumen of the rectum was not manifestly larger when death occurred. It may be that the colostomy relieved the growth from the irritation of the faeces. It did not prevent dissemination to glands and liver nor did it prevent toxaemia.
2. **Pressure upon the bowel from without.**

This condition is more common in women than in men because of the more frequent abnormalities of the pelvic organs that occur in the female.

The rising of a retroverted grand uterus above the symphysis pubis which occurs about the fourth month of pregnancy, the removal of a fibroid uterus or of an ovarian cyst may be the means of restoring the normal function of the bowel.

3. **Spasm.**

The existence of spasmal constipation has already been alluded to (page 76, Vol IV) as occurring in neurotic individuals; in mucous colitis, and lead poisoning.

In dealing with Enterospasm, the writer mentioned that in all of these cases which have come under his observation there were prominent signs of neurasthenia, accompanied by some morbid condition in the pelvis. (Vol IV. p. 83.)

The following may serve as an additional example of these cases:-

Edith H. aet 36 had suffered from intermittent attacks of mucous colitis for some years. She had had four children and it was thought she had some pelvic inflammation following her last confinement. An enlarged left ovary with adhesions of broad ligament to the pelvic colon were diagnosed. As time went on she became more markedly
neurasthenic, body nourishment poorer, pain and discomfort in the side and the evacuations were often scibalous and covered with mucous. When at last she was prevailed upon to submit to operation, the diagnosis was confirmed and the treatment amply justified. The enlarged ovary was removed, the adhesions were divided and the cut edges carefully stitched over. The result was most satisfactory. The constipation was relieved, the pain disappeared and there was complete cessation of mucous discharge. Her general health improved greatly.

Certain conditions existing in the anal region may give rise to constipation as when pain gives rise to reflex spasm as in haemorrhoids which have become inflamed. These should be removed at the earliest opportunity. Fissure of the anus, this necessitates free incision and division of the external sphincter.

4. **Kinks.**

Kinks in the intestines may be caused by adhesions, the result of surgical operations on the abdominal organs, or of chronic peritonitis, particularly in the pelvic region.

Sir Arbuthnot Lane believes that the adhesions produced by localized chronic peritonitis are important factors in the production of chronic constipation, as they lead to Kinking and narrowing of the intestinal bumen. He argues that the erect attitude in man tends to aggravate

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the condition of constipation by "dragging" the abdominal viscera, that nature throws out buttresses, as it were, in the form of peritoneal adhesions, which, while they support one organ, may be the cause of greater intestinal difficulty; as for instance, adhesions may form between the right kidney and upper part of the ascending colon, and again to the abdominal wall to overcome the "drag" of the caecum. The angle between the ascending colon and first part of the transverse colon becomes more acute, and ultimately these parts may become adherent to one another.

Hertz has studied this question by the aid of the X-rays and has satisfied himself that adhesions at the hepatic and splenic flexures rarely produce any permanent delay in the passage of faeces through the colon, though incomplete defaecation may be caused by pelvic peritonitis which has bound down the pelvic colon, so that it can no longer be straightened by the passage of the faeces into it.

Further, Lane suggests that given a condition of chronic constipation, the absorption of toxic products from the bowel leads to loss of vitality of the organ, and that there is a chronic peritonitis set up which results in adhesions and kinking, and that at the same time a state of general toxaemia is set up which produces degenerative changes in all the structures of the body. The material harm done directly and indirectly by
imperfect intestinal drainage is, in Lane's opinion, greater and more far-reaching than that ascribed to alcohol, while the misery inflicted on the individual as well as on those who are brought into constant association with him, is often very intense.

Division of adhesions, where these exist in the form of bands may give relief, but there is a risk of their reforming.

In those cases in which chronic constipation has been followed by auto-intoxication to such a degree that the health of the individual is seriously threatened, short-circuiting operations in which the ileum is implanted by lateral anastomosis into the pelvic colon have been done with success. The ileum is not divided in this operation.

Mansell Moullin who was the first to adopt this method has published his later experiences, and in the cases recorded the operation was uniformly successful. In the exceptional cases of chronic constipation which are not the result of "incomplete defaecation" this operation seems to be the most rational: but before resorting to this or any operation an X-ray investigation should be made in order to ascertain in what part of the large intestine the delay occurs and also to exclude dyschezia.

In those cases of severe auto-intoxication Lane recommends the very radical operation of removal of the colon as far as its junction with the pelvic colon, a union being made between the latter and the ileum.

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In the British Medical Journal, Lane recounts quite a number of cases in which this operation was performed by him, and the results reported certainly give one the impression that there is a field for this extensive denudation. He guards his recommendations by saying that "in no circumstances should operative interference be contemplated until the surgeon has satisfied himself that every other means of treatment has failed."

**Splanchnoptosis**, is a condition frequently found associated with chronic constipation. It is caused by stretching of the abdominal muscles during pregnancy, or may result from ascitis, large abdominal tumours, accumulation of fat, producing weakness of the abdominal muscles - the muscles being unable to contract sufficiently to produce efficient defaecation. The condition is most effectively relieved by strengthening the abdominal muscles by massage and suitable exercises, and by giving the necessary support such as might be obtained from a belt. The object arrived at should be to exert pressure from below upwards and backwards in the line of the muscles themselves. The belt should be applied while the patient is lying down with the knees bent up and the buttocks raised - in this position the abdominal organs fall into their proper places.

The modern straight-fronted corset is a great improvement on its predecessors, as it gives more effective abdominal support, and there is a diminution of harmful compression at the waist-line.
Electricity in the Treatment of Chronic Constipation.

In a large proportion of cases where chronic constipation occurs as a sequela of acute fevers such as diphtheria and enteric, electricity is of undoubted value. The prolonged daily application of a faradic current to the abdomen and back has a most invigorating effect.

Recent experiments after the administration of a bismuth meal show that even strong currents of galvanism have no appreciable effect on peristaltic movements of the bowel; still, it improves the condition of the nervous system generally, and the muscles of the bowel take part in the improved tone.

Weak abdominal muscles are strengthened by the active contraction produced by an electric battery.

In "incomplete defaecation, which is due to a paresis of the rectal muscles, it strengthens and stimulates the weakened muscles and helps them to regain their contractile power: to attain this end intra-rectal galvanism should be employed. One electrode (preferably the cathode) insulated by a piece of rubber, should be introduced three or four inches into the rectum, and the anode placed over the lower part of the abdomen.

In constipation due to neurasthenia, electricity is of considerable value. Static electricity should be applied for about half an hour daily.
In atonic dyspepsia with constipation of long standing, the writer has had encouraging results from the employment of the faradic current of rapid interruption. In the following case the results were specially gratifying.

Martha C. aged 37, had suffered from atonic dyspepsia with constipation for two years. She was poorly nourished, appetite variable, slept badly, had lost one stone nine pounds in weight in twelve months. Before electrical treatment was begun vomiting had been almost a daily occurrence for six or seven months, the vomiting had a marked periodicity - six o'clock in the evening being the almost invariable time. The sickness was not accompanied by nausea, and it was followed by a feeling of relief. She had taken bicarbonate of soda and sal volatile in large doses, on her own initiative for a considerable time and it gave relief for the time being, but her general condition became worse.

The faradic current was used - generally and locally. Large electrodes were employed to prevent undue concentration of current: the anode being placed on the back and the cathode over the stomach, and kept in constant motion; in this way painful muscular contractions were avoided. This treatment was continued for three weeks, each application lasting half an hour, then thrice weekly for a month.

The result was as has been said very satisfactory; the appetite soon began to improve, vomiting disappeared,
sleep was induced, and she regained her lost weight.

The writer believes that this excellent result was due to reflex more than to direct effect upon the stomach and intestines. In this case probably the defective digestion and constipation depended upon an exhausted state of the nervous system interfering with the normal activity of the processes of secretion and excretion, and the electric current supplied the necessary stimulation.

**Hydrotherapy.**

A very valuable method of treatment for chronic constipation is the frequent application of cold water to the abdomen accompanied by massage. The writer has had experience of the following method of treatment in an institution in South Africa, and the results have been very satisfactory. A four-legged stool of suitable height is placed in a large sitz bath filled with cold water to the top of the stool. The patient is directed to sit on the stool for half an hour twice a day and to massage the abdomen with a piece of rough towelling frequently dipped in the cold water; he is directed to begin at the right iliac fossa and to follow the course of the colon in a circular fashion.

In the same institution the 'Scotch douches' is practiced - hot and cold water are alternately thrown against the abdomen for twelve seconds each. Painful
conditions of the abdomen are frequently relieved by the application of heat in the form of a compress or hot water bottle - a rubber one by preference as it lends itself better to the shape of the surface to which it is applied: a hot bath when the patient is able to use it is a still more effective method.

Heat has a sedative effect upon the musculature of the alimentary canal, while cold applied to the abdomen and back has a stimulating effect.

A cold bath in the morning is in many instances an effective stimulus to evacuation, especially if it be preceded by Swedish drill or other exercise. The morning swim indulged in by many who visit sea-side resorts, is probably to a large extent accountable for the good derived from such a holiday: Swimming as it were, combines the cold water application and exercise.

The Constipation of Infants.

Both in breast-fed and hand-fed infants constipation is a very common trouble, and is often difficult to remedy. If allowed to persist, it may lead to permanent weakening of the bowel; hence the importance of inducing a regular habit of evacuation.

Up to about three months of age, the life-conditions are different from those that obtain later, therefore the
infant requires separate consideration.

At first, defaecation is a reflex act; after the third month or so, the infant gets used to defaecating only in response to certain stimuli and thus it gradually becomes a reflex act.

The causes of constipation in infants may be grouped under the following headings:-

(1) Diet
(2) Conditions giving rise to muscular atony.
(3) Congenital defects.
(4) Certain cerebral conditions.

1. Diet.

The most common cause of constipation in infants is some fault in the quality or quantity of the food. The first thing to do therefore, is to enquire into the dietetic habits, which involves in breast-fed infants, an investigation into the mother’s habits and dietary. Human milk from a healthy mother is the ideal food for an infant. In constipated infants there is generally a lack of the stimulating properties in the milk-fat and lactose. It is in bottle-fed infants that constipation is most frequently met with. Cow’s milk contains only two thirds of the lactose present in human milk and more than double the percentage of protein. This is the chief reason why constipation is more prevalent in hand-fed than in breast-fed infants.
The stools may lack volume from deficiency in fat or protein, or they may be too great in bulk as frequently happens in hand-fed infants from the excess of protein in cow's milk, or from imperfect digestion owing to the milk having been boiled, boiling makes the protein less digestible. In the former case the lack of volume results in deficient stimulation of the intestinal muscles, in the latter there would be such an accumulation that the feebly developed muscles of the intestine are unable to propel the faeces along. In the rare condition known as congenital Idiopathic Stenosis of the Pylorus, the constipation which is one of the associated symptoms is due to the lack of food residue, the greater part of the food being lost in the vomiting which is so characteristic.


Muscular atony is apt to be an important factor in the onset of constipation. In infancy the bowel muscles have not yet acquired their strength or habit - both of which come largely by education.

There may be congenital weakness of these muscles.

In rickets - which is a disease probably induced by improper diet - and in which the blood carries toxic products to all parts of the body, we have as a rule well-marked atony of the intestinal musculature accompanied by constipation. Muscular atony also results from general weakness following acute illness.

The pelvic colon in infants is relatively much larger than in adults and kinking at the pelvi-rectal junction may readily take place.

The accumulation of hardened faeces in the pelvic colon as a consequence, would aggravate the condition. Congenital Idiopathic Dilatation of the colon is a rare condition in which evident peristalsis and marked constipation are the chief symptoms. Congenital defects, such as stenosis of, or imperforate anus, would be obvious causes of constipation.

4. Certain Cerebral conditions.

Cerebral diseases such as purulent and tubercular meningitis have constipation as a predominant symptom.

Treatment.

Treatment may be divided into:-

1. Prophylactic.
2. Dietetic.
3. Mechanical.
4. Medicinal.
5. Surgical.
1. **Prophylactic.**

In infants as in adults, to establish the habit of regular action of the bowels should be our first aim. Much may be done by the intelligent mother or nurse to this end.

The habit of regular evacuation may be induced by suggestion, by holding the infant over a suitable receiver at regular, stated, intervals: even if there be no result at first, perseverance will be rewarded. It is best to make such suggestion immediately after the first feed of the day, and the second twelve hours later. It is of importance that the child shall receive nourishment at strictly regular intervals. It is clearly the duty of the parent to instil into the minds of older children the importance of the function, and the necessity for intelligently attending to its performance.

All that has already been said in connection with prophylaxis in the adult applies equally to young and growing children.
2. **Dietetic.**

Should the mother's milk be at fault, as is not infrequently the case; the deficiency will probably be in the quantity of fat. In such cases, attention should be directed to the habits and dietary of the mother. Her dietary should consist of abundance of milk - rich in cream. Fat may be added if necessary in the form of cod liver, or olive oil or butter. Careful attention should also be given to the state of the mother's general health.

In the constipation of bottle-fed infants the fault is usually in the improper proportions of casein and fat, as contained in cow's milk. If the milk is boiled a further difficulty arises as boiling makes casein more difficult of digestion.
By the suitable dilution of cow's milk with water or barley-water to reduce the excess of proteins, the addition of cream where fat is deficient, and of sugar of milk to make up for the shortage of soluble carbo-hydrates, we may arrive at such a modification as will satisfactorily take the place of human milk, which, as has been said is the ideal food for an infant. Cow's milk should, by preference, be sterilised.

3. Medicinal.

One often finds that mothers and nurses give large doses of aperients in the constipation of infants, this custom is much to be deprecated, as it tends ultimately to an atonic condition of the intestines. What is wanted is a laxative which will be non-irritating, and which will induce a regular emptying of the bowel without pain or diarrhoea.

G. F. Still advocates the regular use of small doses of laxatives in infants suffering from constipation - continued over a period of weeks, in preference to any other method of treatment, as he regards attempts to correct constipation by diet as a common cause of digestive disturbance.

For the chronic constipation of infants, sulphate of soda, and sulphate of magnesia are perhaps the best drugs, three to six grains two or three times daily in dill water. The dose should be modified to personal requirements.

Senna is another very useful drug. For infants, the
pods are most effective. An infusion of senna pods is almost tasteless, it produces no nausea or griping, and in moderate doses acts as an ideal laxative. It has, moreover, the advantage of not losing its effect after considerable use, as is the case with many other aperients, it tends rather to improve the tone of the muscular coat of the bowel, so that after a time it may be discontinued.

In rickets, where atony of the musculature always occurs, general treatment, consisting of a well-considered dietary, massage, and an abundance of fresh air should be continued with such remedies as nux vomica and general blood tonics.

The constipation of meningitis should be treated by castor oil, salines, or enemata.

Enemata, in children should be small-two to four ounces, so as to avoid distention of the bowel which would defeat one's purpose. Cool injections are preferable to warm, as they are not so locally enervating.

A good and homely method of stimulating the defaecation reflex is the use of a cone of soap — castille, or ordinary yellow-soap. It is preferable to a glycerine injection or suppository, because it is less irritating to the sensitive mucous membrane. The soap lubricates the canal and at the same time stimulates reflex action.

**Surgical.**

In cases of imperforate anus, operative treatment may, by division of the septum, relieve the condition.

Congenital stenosis of the anus may be treated by
careful stretching with a bougie, after, if need be, incision of the stricture.

Conclusions.

From the foregoing remarks we may conclude:

1. That the constipated state is of very frequent occurrence.

2. That while it is not, strictly speaking, a disease, but rather a symptom of some morbid condition in one or other of the systems of the body.

3. That there is a danger of treating chronic constipation per se, and of overlooking the primary cause, which may be, though less apparent, of a very vital nature.

4. That chronic constipation is generally preventible, both in infants and those of more mature years.

5. That much can be done for the general welfare of the community by the training of infants and children at home, and young men and women by lectures and literature.

6. That in the treatment of obstinate chronic constipation, enquiry should be directed to the habits and mode of life, particularly with reference to exercise, food and environment.

7. That in many cases a correct diagnosis might be materially helped by a rectal and abdominal examination.
8. That each case must be considered on its own merits.

9. That the object of treatment should be to re-create a natural desire and habit by the mildest effective means at one's disposal, and to continue the remedy for as short a time as is consonant with cure.

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