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Graduation Thesis

by

Vincent Green MB CM Edin.

April MDCCCXCV.
The sequel to a case of Lumbar Colotomy with remarks thereon.

In choosing the subject of my thesis I have been influenced to a great extent by my environment, which, since my graduation has been that of a general practitioner, and I have felt all along that it was amongst my patients I must look for a subject, if rather than in the laboratory. It has often been remarked how, in general practice as well as in hospital, similar cases occur in pairs. A case of myxoelemma is met for the first time, and hardly a month elapses before another comes under treatment. Unfortunately, I have not been blessed with such good fortune, for at least twice I have taken as complete notes as possible with the hope that similar cases would follow, but only to be disappointed. I was rescued from my dilemma however by the appearance of the case which forms the subject of this thesis. It seemed to me to be of sufficient interest and importance to stand by itself. In choosing a descriptive title my chief difficulty has arisen rather from an embarassment of riches than from anything else, and at times I should seem to wander from the subject as implied by the title. I would beg that the descriptive heading be considered at fault rather than the subject matter of my thesis. Before starting I must mention my indebtedness.
to my brother Mr. Walker I mean a student at St. Mary's, for kindly looking up the old case sheets and providing me with a resume of the case when in hospital. I have also to thank Dr. David M'Neil late of Ealing now of Lincoln Square, London, for seeing the case in consultation with me as well as for his assistance at the post-mortem.

The case was that of AE, a carpenter by trade, but who had not done any work for five or six years. His wife, who was a dispensary patient of mine, called at my house one evening in a great hurry, to ask if I would go and see her husband at once who was suffering from a dreadful stomachache. On questioning her concerning his previous history I ascertained that two and a half years previously, her husband had to go into hospital on account of a stoppage in the bowels, and that the doctors had to make an opening in his side in order to save his life. They told her that he had a tumour which had stopped up the bowel. Since leaving hospital all motions had passed thro' this opening nothing whatever passing the natural way. During the two and a half years which had elapsed since patient left the hospital, he had enjoyed good health up to till within about six months of my seeing him. His appetite had been good and there had been no pain or feeling of discomfort and he had rather put on flesh than otherwise. During the last six months, however, he had gradually been more and more troubled with constipation.
headaches, bad taste in the mouth morning, bad smelling breath, pain after food, and during the last three months, in his wife's words he had come once dreadfully irritable and depressed. During the three weeks previous to my seeing him he went to stool not oftener than every third day and during the last five days there had not been any evacuation of the bowels. Another symptom, volunteered by patient when I saw him, was that he had been troubled a lot of late with colic. His wife ascribed the present attack to his having partaken very heartily of a red currant tart the day previously. The attack had come on in the morning of the same day that I saw him. When he felt as usual when he got up in the morning, but on coming downstairs he was suddenly attacked with giddiness and nausea. The nausea increased, and shortly afterwards a violent fit of retching came on which culminated in the vomiting of a small quantity of bitter bile stained fluid. Immediately afterwards he began to complain of violent pains in the stomach. This was soon followed by a feeling of tightness round the waist, his clothes having to be undone, and within an hour it was noticed that the abdomen was becoming abnormally distended. As the pain and distension grew were gradually increasing his wife came for assistance. I found the patient in a rather collapsed condition, his face pallid, drawn with pain, the feet & hands were cold, whilst his face was hot.
were sweating profusely. An examination of the abdomen revealed the following: in the right lumbar region was an artificial anus which barely admitted the terminal phalanx of the little finger. The opening was surrounded by a firm fibrous ring. No obstruction could be felt with the finger so inserted. After a little manipulation I managed to force the whole finger in. All I could make out was that on passing the finger in a downward direction there it seemed to be in a cul-de-sac which was filled with what, on withdrawal and examination of, turned out to be red currant jubes, mixed with semi-fluid faeces. The abdomen was very greatly and fairly uniformly distended. The distension of anything was most marked in the epigastric region in about the position of the transverse colon where there was a distinct transverse bulge. Palpation revealed nothing beyond a smooth, uniformly tense, drum-like parietes, most marked however in the region above mentioned. Percussion, which had to be very superficial on account of the pain and tenderness, gave a tympanitic note all over except in the left flank where comparative dulness was well marked. All possible hernial openings were examined. A rectal examination was also attempted. With some difficulty owing to the contraction of the sphincter, and only after using considerable force, I managed to insert my little finger into the anal canal, but when so inserted it was so firmly gripped that it was impossible to make out anything. No faeces could be felt
however, and there was no faecal odour observable on withdrawing the finger. Future twisting pain with periodic exacerbations, which was referred to the region of the umbilicus, was complained of. The patient was also troubled with a continuous ache in the middle of the back. Nausea was intense, and he had a feeling that if he could only be sick he should feel better. The tongue was furred and quite moist. The pulse was thready, but of low tension, and fairly regular, and about 100 per minute. On examination of the heart revealed no murmurs but both sounds were feeble; there had been one or two attacks of palpitation since morning. Enlarged glands were carefully looked for in groins and axillae etc but none were found and all possible situations for secondary growths were examined with negative results.

Considering the fact that patient had partaken freely of currants only the day before, the appearance of their purps in the cæcum and that they had given rise to no feeling of discomfort. I concluded that the mischief must be somewhere between the cæcum and the original obstruction which I supposed to be above the cæcum, but as to what was the immediate cause of this sudden onset of acute symptoms I was quite at a loss. Traction of the bowel with overdistension suggested itself. I also thought of acute obstruction by twisting or strangulation; and spread of a malignant growth, leading to perforation of the gut wall elsewhere—
An exploratory incision without delay was made in view of relieving any obstruction by laparotomy, etc., if necessary, seemed to be the only treatment that would be of any avail, and therefore although almost the first thing patient said when he saw me was "Mind no cutting doctor," I felt I was justified in telling him that I thought his best chance lay in immediate operation, strongly advising him to give his consent. But his one answer to all I said was I will never consent to another operation. I ordered Tinct. Qui sip. every two hours; with hot water into which a little lemon juice had been squeezed to drink. A cage was rigged up to take off the weight of the bedclothes, and the foot of the bed elevated. I saw the patient again four hours later, in consultation with Dr. McTosh, and my brother who was also present was able to give us a brief account of the case when in hospital. The patient was admitted in 1892 suffering from symptoms of chronic intestinal obstruction. The history was that constipation had slowly supervened. It was neglected at first, a dispensary doctor was then consulted who after fourteen days of absolute constipation had been allowed to elapse advised him to go into hospital where he was admitted in an almost moribund condition. The case was diagnosed as one of malignant stricture of the bowel above the sigmoid flexure and a right-sided lumbar celotomy was performed without delay. For the first 48 hours after the operation there was a constant evacuation.
An exploratory incision without delay with view to performing a laparocolotomy, as seemed to me to be.
The opening made of enormous quantities of feces. The patient made an uninterrupted recovery and was discharged three weeks later. At this the second visit AE was seen to be decidedly worse. The distension had increased, the breathing was hurried and short, and there was a dry hacking cough. Pulse 100 feeble heat and irregular. Temp. 99. The apex of the heart was situated in the fourth interspace just inside the nipple line. The tongue was covered with a thick greyish mottled fur. There had been no vomiting since the attack first thing. The patient did not complain so much of the pain before mentioned as of a terrible feeling of oppression in the thorax. The opium was ordered to be continued through the night. A tube was passed thru the artificial anus in an upward direction. At first a small quantity of flatus came away; when withdrawn, the end of the tube was found to be blocked with feces. A glycerine enema was then given, the nozzle being passed in an upward direction, this was not returned. As regards diet, Benger's food, Bovril, home made beef tea containing a little sherry or brandy were ordered to be given in small quantities at frequent intervals. All through the night there was a constant dribbling of semifluid feces from the lumbar opening but no flatus was passed. Patient had been extremely restless and had not slept all night. On making my morning visit I found the patient was in a very critical condition. Collapse was very marked.
His limbs were cold and blue; Temple pulse thready irregular. Temple 97.2. The tongue was about the same, moist and thickly coated. There had been no vomiting nor had any wind been passed either by the mouth or the artificial anus. The abdomen was distended it seemed almost to bursting point. The pain had somewhat altered in character; there had been no paroxysms during the night and there was no longer the twisting umbilical pain but rather a feeling of general soreness. The abdomen was extremely tender to the touch, the lightest percussion giving pain. The muffled note of extreme tympanites was extremely well marked. The lower limit of the liver dulness in the mammary line which usually corresponds with the costal margin was at quite an inch and a half above that point. The dyspnœa was very distressing: the respirations being as many as 40 per minute, very shallow and entirely thoracic. The short hacking cough was now accompanied by a rusty expectoration of frothy mucus. Numerous ronchi and mucous râles were audible all over the bases which however were only imperfectly examined owing to the distress caused by turning. About twelve ounces of urine were passed during the night. There was a copious deposit of mucus but no albumen or sugar. With a view partly to relieve the obstruction if any & partly to relieving the flat-ulent distension I passed a metal tube, which had previously been softened in hot water, up into the ascending colon. It passed up about twelve inches.
without either any obstruction to the passage of the tube or any flatus escaping; when withdrawn the end of tube was found to be blocked with feculent matter. A small dose of water enema was then administered the nozzle being just introduced at opening & no more with no other result than that it was at once returned.

The bowel was again explored with the finger by passing the finger upwards towards the middle line. The finger impinged on a part of the circumference of an enormously distended piece of gut running parallel to the spine. The distension was gaseous. No obstruction could be discovered. An asafoetida enema was then administered the tube of the syringe being passed well up the ascending colon. This was retained.

Dr. Wish saw the case again with me about midday. The symptoms seemed hourly to be becoming worse. Since my last visit there had been a constant dribbling away of fluid feces smelling strongly of Asafoetida. It was then decided to resort to acupuncture. This was done, the epigastrium region being the site of the operation, the transverse colon being the part of the bowel aimed for. For the operation I used a small sized trochar & cannula. The gas escaped with considerable force making a whistling noise as it escaped thru the small cannula. The gas escaped in this way for about three minutes, and then after a slight splutter the tube became blocked. The patient expressed himself as greatly relieved by the escape of the flatus, but at first, immediately after the puncture
had been made, he cried out with pain which he afterwards described as a mere gibe. At the next visit about 5 p.m. I found the distension had again become extremely acute and signs of collapse were even more marked. The bowel was again punctured in the region of the transverse colon the same small sized rubber cannula being used. Previous to doing this however I passed a rectal up tube a distance of about eight cen inches up the transverse colon. No flatus escaped and on withdrawing the tube the opening was found as before to be blocked by faecal matter. Then punctured a large quantity of flatus escaped by the bowel the tube being finally blocked as before by faecal matter smelling strongly of oncopeda. The gum was now stopped and Todd Towel Belladonna every ½ hour substituted. The diet to be continued as before. When seen two hours later between 7 8 p.m. the patient was almost in articulo mortis. The pulse was at times quite imperceptible at the wrist the heart sounds were very feeble and irregular. The breathing was shallow & gasping. When spoken to answers were given in low hoarse whispers. The face & extremities were cold & pale and cyanosed. The abdomen was as distended as ever the skin being stretched and anaemic looking. The two lowest intercostal spaces on the right side in the mammary line were tympanitic whilst the upper limit of the lower dulness ran the same line reached the third interspace. The tongue thickly purfed and moist. No sickness.
The food had been taken as ordered without any difficulty. Nothing had passed from the artificial anus, either flatus or feces. No wine had been passed during the day, nor had there been any desire to do so. The hypogastric region was sympangetically down to the pubis. The abdomen was again punctured; this time the part aimed for being the descending colon. A spot was chosen in about the position of the junction of the hypogastric and left inguinal areas at their upper limits. The trochar & cannula were again used and for five or six minutes the wind was whistling thru the cannula. The relief afforded however, though marked at the time was only temporary. Collapse deepened and patient sank. Three hours later just before midnight, a post mortem examination was made. Twelve hours later, rigor mortis was well marked. The body was thin—It might almost have been described as emaciated—The abdomen presented enormous smooth & globular appearance. The lower part of the thorax being somewhat spread out and thrown up by the abdominal distension. On opening the abdominal cavity in the usual way by an incision from the umbilical cartilage to the pubis a considerable amount of feces escaped and on the abdominal contents being exposed all that could be seen was an enormously distended and greatly discoloured colon almost filling up the abdominal cavity & concealing the small gut from view except in the hypogastric region.
For convenience sake I will now trace the gut up from the anal canal. The rectum was transformed into a white cord-like structure. To give some idea of its calibre it was only after using considerable force that I managed to push the end of a lead pencil into the gut end. In the region of the sigmoid flexure was an inimical and unyielding structure. The bowel involved in the structure being contorted and twisted by what appeared to be fibrous bands, the bowel having the appearance as if pieces of string had been tied tightly round it in several places and the structure parts drawn up together. The lumen of the bowel was completely obliterated. The adjacent mesentery was slightly puckered by the contraction of the bowel but seemed to be quite unaffected by the growth, no thickening or adhesions being noticeable. No enlarged or hardened lymph glands in neighbourhood of tumour could be found; in fact no involvement of abdominal glands had occurred. Although the whole of the descending colon down to the obstruction was enormously dilated, a distinct pouching had occurred immediately above the stricture. Hypertrophy of the gut wall was more marked in this cul-de-sac than elsewhere in the colon. This pouch-like part was partly filled with remoulded feces and enormously distended by gas. It measured when emptied and laid flat nine inches across. The characteristic calculation of both the
transverse and descending colon were entirely obliterated. About midway between the structure portions and the splenic flexure the gut began to show a gradual darkening in colour and just beyond the splenic flexure the bowel and its mesenteric attachment were almost black. This discoloration involved the whole of the transverse colon and its mesentery towards its bowel attachment, and commenced to fade away immediately below the hepatic flexure. At this point the lumina also began to rapidly diminish in size and the calcifications to reappear and on reaching the lumbar opening the bowel was normal in both colour and calibre. The transverse and descending colon were partially filled with reddish brown semiliquid masses which smelt strongly of gas and enormously distended by flatulence. At the artificial anus which communicated with bowel about two inches above the cecum the bowel was somewhat dilated. It was firmly adherent to the abdominal parieties for quite half an inch all round the opening. There was no appearance of a structure in the course of the bowel other than the one described. Although carefully looked for the points of pain are made to relieve inunction could not be found. At no point had the bowel lost its glistening character but in the region of the hepatic flexure it tore very easily and it required very
little force to thrust the finger thru' the gut wall anywhere in the course of the transverse colon. The small intestine which was moderately distended with flatus and very contained very little solid matter was normal in every respect. There were no adhesions or any of the other ordinary signs of peritonitis either past or present either local or general. The liver was displaced in rather a remarkable manner. The anterior edge had disappeared beneath the costal margin and the under surface of the liver had come to be looking forwards as well as downward. The organ had as it were been rotated on its posterior border. I think the explanation of this is to be found in the anatomical fact that the posterior attachment of the diaphragm is a rigid and unyielding one whereas the anterior attachments are more movable. The rectum and large intestine having been removed the transverse colon was slit open, and its contents removed out. The mucosa had somewhat lost its velvety feel and was although only washed sufficiently to remove feces very free from mucus on squeezing up a portion of bowel between fingers. A piece of the hepatic pleure and a piece of the cecum were cut out and if hardened together in Muller's fluid. A medial incision in the long axis of the bowel was then made thru' structure. The gut wall was found to be irregularly thickened. Some of what appeared from the outside to be pouchings were
quite solid and at least ½ an inch in thickness at parts. The lumen of the gut was completely obliterated at points, two points situated about ½ of an inch apart and it was at these two points in special that the bowel had the appearance of having been bedewed with string. The stricture portion of bowel was firm and unyielding. A portion of the thickened gut involved in the stricture was removed and put in Milius fluid to harden. About four ounces of wine were drawn off from the bladder. The kidneys showed slight congestion. The capsules tore off stripped very easily. Sections were made of the kidneys, spleen & liver after their removal but nothing in the nature of a secondary growth discovered. The thorax was opened in the usual way, but owing to its being done subsequent to the examination & removal of abdominal viscera no note was taken of the position of the organs in situ. The right side of the heart was engorged with blood only partially clotted. The valvular openings were competent. No signs of former disease. The lungs showed marked engorgement and on making a section through one of the lower lobes and squeezing it frothy fluid freely exuded. The head was not examined. Microscopically the tumour section shows the characteristics of a malignant adenoma—nodous or monomorphic usage of follicles with gradual invasion of deeper structures by these gland tubules. The section shows an increase of small cells in neighborhood of invading acini. Where acini have invaded, fibrous tissue has proliferated this.
especially noticeable in the middle coat. A section of the transverse colon showed complete destruction of the glandular element of the mucosa with the exception

... empty acini.

Ziehl, A. stained with Kromow'd acid.

Namaa of a few isolated gland cells. The outline of the tubules were hardly distinguishable. The muscularis mucosae was practically the only part of the mucosa distinguishable and it was entangled fast globules nucleus round cells & debris. The muscular layer showed hypertrophy but was especially noticeable for the way in which the bundles had separated giving the appearance of fine wavy parallel lines. This may have occurred during preparation of specimen but section of mucosa did not show any such feature.
In discussing the chief points of interest about the case which I shall take up first is the pathology of the case is the first upon which I wish to make a few remarks. A point especially to be noted is the remarkable slowness of growth exhibited by the neoplasm. Although it had been in existence at least two and a half years it had not spread beyond the structure in which it had originally started namely the wall of the colon. No involvement of contiguous structures had occurred, though with a movable attachment namely the meso colon adherent to other portions of the intestine would be less likely to occur, but that there was no appreciable thickening of the peritoneum adjacent to tumour was rather remarkable considering the length of time that the tumour had existed. So far as could be ascertained it had not given rise to any secondary growths in other organs. Indeed from the clinical history one might feel almost inclined to ask the question Did it not show rather the characteristics of a simple tumour than those of a malignant growth. The adenomas are perhaps the most ill defined and variously defined, which is a necessary corollary of the former class of tumours they are both as regards structure and life history. A typical growth is now malignant and springs from a gland to which it is similar in structure. The most varying factor in these tumour's is the tissue between the glandular elements. It may be fibrous myxomatous...
carcinous or sarcomatous and while in some
this tissue is only present in small quantities, it
in others greatly predominates. The particular var-
ety with which I am here concerned has been described
by various authors as Malignant Adenoma, Aden-
cid Cancer and Columnar cell epithelium. In favour
of the tumour being classified as benign or simple
we have its strictly local development with non in-
volvement of neighbouring structures, its slow growth
or rather its not at all rapid growth for whereas
a malignant growth is characterised as a rule by
rapidity of growth when abdominal it cannot be
said that benign growths are always slow growing
P. Raymond Johnson in Lancet 1st Feb 89 describes
two cases of benign of below in both the growth had
within a short period spread to other coils of intest-
tines. Absence of ulceration & of pain are points of
very minor value. On the other hand in favour of
its being carcinous in nature we have its gradual
merging into normal tissue which it exactly resem-
bles in structure, namely lieberkuhn's follicular
tissue; the absence of any limiting capsule to
the growth with gradual invasion and destruction
of tissues around especially noticeable in this case
in the muscular coat. I think also as in favour
of its malignancy may be quoted bacteriæmia. There
was emaciation and patient had a decidedly sallow-
yf not carcinous look, but there were probably in
part at least due to retention of faecæ and de-
ordered digestion, although the appetite seems to have remained unimpaired almost up to the day before illness started. I think the question of malignancy is best answered by saying that the tumour is best placed in the class which Ehrickow describes as "locally malignant." The essential element in a cancer using the word in its restricted sense is the overgrowth of the normal epithelium of a part. This epithelium burrowing into contiguous structures, into tissues to which it is foreign and leading there to the formation of an alveolar stroma, which latter plays a very important part in the life history of Adenoid cancers. This alveolar stroma consists of ordinary fibrous tissue and is formed in much the same way as fibrous tissue is formed by inflammation due to the presence of a foreign body. Small round cells appear first — seen especially well in neighborhood of invading tubules — these are followed by fibrous tissue cells which proliferate leading to the formation of tume a fibrous tissue which encapsulates the invading tubules. A cut section of a series of which, giving the alveolar appearance. The importance of this element in Adenoid cancers — To my mind the importance of this element in Adenoid cancers lies in the fact that it has a marked tendency to contract, in other words to contractise. The liability to fibrous tissue formation varies in different parts of the body. It is probably least present in the brain while it is well marked in the intestinal canal. In the latter a transient inflammation seems sufficient to start an increase
in the vesicular elements of the mucosa submucosa and owing to the flexibility and yielding nature of the bowel resection is able to go on unhindered.

Consequently where the cancer is a slow growing one, a ready covering being quickly formed round the tubes, inhibits the growth of the tumour by resection. Nature thus attempting to stamp out the disease by what is really a most compulsion; a method of which was extensively tried by Sir Charles Bell and Reamur amongst others. I think the case in question rather supports the above for the bowel in the position of the tumour was firmly contractile and knotted together in a most striking fashion whilst microscopically the relation of the cancer element to its surrounding connective tissue is very well brought out. It is as if two malformations mimetic to one another, the one benign and the other cancerous or malignant, were developing side by side and each striving for the mastery. Malignant Adenoma or Adenoid Cancer which bears a closer resemblance to Ependymal Cancer is rare in the young and commonest in old age. It is confined to those regions where columnar epithelium is normally to be found such as the bowel, and in the colon it is probably the commonest variety of new growth affecting the mucosa primarily. The uterus gall bladder and more rarely the breast are sometimes the seat of this tumour variety of tumour. The commonest situation of Malignant Adenoma...
in the sigmoid flexure. Except that this part of the bowel is the commonest seat of dysentery and other ulcerations it is rather difficult to comprehend why it should be specially prone but this is only the natural result of our imperfect knowledge of the etiology of cancers in general. For the above reasons I am inclined to take notes on the Star (1717) by all means the degree of malignancy is probably least in adenoid cancers by which is meant they are slowest growing and least likely to spread locally and to give rise to secondary growths. Secondary growths when they do occur are usually to be found in the liver and according to Brain (Dict of Med p. 295) it is not at all uncommon to find secondary growths in the liver with little or no implication of the lymphatic glands. These secondary growths when present strictly follow in structure the parent growth so that we may find embedded in the liver or lymphatic glands a tissue looking like an irregular mass of Lieberkühn's follicles. As was well exemplified in the case of AE the neighboring lymphatic glands are not as a rule implicated until late in the disease. If a section of a typical adenoid cancer be examined microscopically it is seen to be composed of irregular tubes lined by columnar epithelium one or more rows in depth which might be described as greatly exaggerated Lieberkühn's follicles. They are found together at first by a delicate stroma with here and there clusters of small
round cells. (Niles of Fact Path clair 66 also Woodward Path p.599) In the healthy mucosa where these features are normally present the stroma, which is represented by the muscularis mucosae, is very small in amount whilst the columnar cells or crypts relatively preponderate but as we pass into the tumour mass the stroma begins to assert itself and at parts the section will have the appearance of a fibroma but probably this in the field of the microscope will be included one or more isolated clumps of columnar epithelium which would be sufficient to distinguish the nature of the tumour. Adenoid cancers may also be confused histologically with sections of small papillomatous covered with columnar epithelium, a benign form of neoplasm of not uncommon occurrence in the large intestine. The bases of the papillae on sections giving the appearance of tubes; but if the margin of the tumour is examined its true nature would at once be revealed; if the tumour be found invading the muscular coat or spreading into neighbouring connective tissue its malignant nature is at once placed beyond a doubt also in the cancer we should expect to find irregularity in structure and greater cell infiltration (Buchau Vol. 4 p.1067.) Naked eye adenoid cancers might be confused with one of the forms taken by simple adenomatous. Simple adenomas are described as being polyloid or flat. By flat is understood the variety where
the tumour spreads along under the mucosa, and it is this variety that might be mistaken for adenoid cancer.

In a slowly developed stricture as is typically seen in cases of adenoid cancer affecting the large bowel considerable changes may occur in the gut both above and below the stricture. Below the stricture the mucosa no longer being called upon to exert its secretive function becomes atrophied. The reduction in calibre of gut is I think due in part to contraction of the muscular fibres and in part to contraction of fibrous elements which gradually replace the other tissues. I regret that I cannot bear out this statement by reference to the case of A. E. (microscopically) I unfortunately not having kept a portion of rectum for microscopic examination, but maked eye it resembled a tough fibrous cord more than anything else. In cases of chronic stricture above the obstruction dilatation of the bowel with hypertrophy of its walls are invariably present and in long standing cases to a very marked extent. In reading the clinical histories of such cases, one constantly finds the gut being compared in size with the leg or thigh of the patient capable of such enormous dilatation in the colon. The dilatation is due partly to retained faeces, and in part to intestinal flatus. The hypertrophy also usually occurs pari passu with the dilatation. In cases of stricture of the colon the hypertrophy is as a rule limited to the large intestine but it may involve the end
of the ileum (Tedesco Infant. Surg., p. 277). A very similar
disorder has been described by Wirsching of
Copenhagen (quoted by Sapius Vol. 1, p. 128) in which
dilatation and hypertrophy of the colon had occurred
per se. He considered the condition to be a distinct
disease which, so far as his experience went was
always congenital. He had met with four cases of
the kind one of which was that of a child three days
old who was brought to him with the history that
nothing had passed by the bowel since birth, and
that the abdomen was enlarging. Movements were
provoked by evacuating enemata, but the child
did not thrive, and died two months later. The
post-mortem showed an enormous enlargement
of the transverse colon with hypertrophy, especially
at the flexures of both muscular and mucous layers.

An exactly similar case was very fully reported by Mr. W. Walker de Griffiths in the Post
Med Journal for July 93. In this instance the
patient was a male, lived till he was eleven years of
age. The dilatation of the colon which was noticed
soon after birth having gradually increased during
this time. At the post-mortem the dilatation was
found to involve the ascending and descending
colon, the latter being 28 inches round whilst the
whole of the colon the appendix and at any rate
the lower end of the ileum were greatly hypertrophied.
Dr. Griffiths of Addenbrookes explains the
condition as being one of both in infancy which
had become chronic. Great distension by rectal gaseous the formation of which was due to the altered chemical condition of the faeces then followed. Such distension would render peristalsis more difficult and thus increased difficulty in driving the faeces onwards had been compensated for a time by hypertrophy. This explanation is not I think the correct one for more order to arrive at this conclusion Dr. 

suffice this has arbitrarily and I venture to think wrongly distinguished between cause and effect taking into consideration firstly that the condition is a distinctly congenital one. Secondly the absence of any acute symptoms at birth as would be expected from an extensive and necessarily severe colitis. Hardly the ineradicable constipation persisted from birth onwards whilst the distension was not noticeable at birth I would suggest that the condition is due to faulty innervation of motor nerves or ganglia supplying the muscular layers of the intestine whereby coordinated movement which results in peristalsis is either entirely absent or extremely active defective. The structural changes namely

thickening of muscosa with destruction of its glandular elements and dilatation being a result of the retention of faeces & somewhat similar condition seems to have been brought about by retention of faeces in the case of AE namely decomposition of the same with production of putrid leading to dilatation, and hypertrophy of the muscular coat.
and destruction of the glandular elements of the mucosa. But in the case of AE it had gone a step further. The dilatation had become so acute and prolonged as to seriously impair the vitality of the gut wall, the condition of the transverse colon suggesting a commencing gangrene. It is all probability the destruction of the mucosa took place after the onset of acute symptoms which only terminated in death. The splitting up of the muscular fibres so noticeable in section of hypertrrophic descending colon may have been due to postmortem changes or to faulty preparation of the specimen, but this would not altogether account for it as a portion of the eacum which was removed at the same time and went through all the stages of hardening in the same bottle and was cut and stained in exactly similar fashion did not show any such fusion of the muscular elements in the entering into the gut wall. In Dr. Walker and Griffiths's case a microscopic section of the colon wall is figured and described. The specimen showed thickening of the peritoneal coat which was only slightly marked in my case, hypertrophy of the muscular layers more especially of the circular fibres, and chronic inflammatory thickening with loss of epithelium and obliteration of mucous crypts. In their case the destruction of the glandular elements had evidently been a gradual one. It
to the exact causes contributing to a destruction of the glandular elements I think dilatation of the bowel is a not unimportant factor. Dilatation would not affect the serous and muscular layers owing to their power of hypertrophy and elasticity but it is quite conceivable that the crypts of Lieberkühn would become enormously and permanently widened out which would allow of the vitiated fecal matter coming in contact with the delicate gland cells whose vitality is already lowered by a mechanical interference with their blood supply by the distending force. Where dilatation consequent upon structure there is often observable immediately above the structure a distinct poucheding of the gut. This is attributed by most authors, e.g. for example, to distension acting upon walls weakened by disease; the walls of such pouches being thinner and the mucosa often ulcerated. To my mind the thinning if not the ulceration is a result of the poucheding rather than a cause of it. In the case of AE for instance, there was marked poucheding immediately above the structure into which my closed fist (taking nine in gloves) could easily be slipped and moved about but there was neither ulceration nor any appreciable thinning of the gut. The poucheding was due I believe in this case as in most cases to peristaltic action. It is evident that each peristaltic wave as it passes along the bowel exerts indirectly this the intestinal contents a distending force on the segment in front and it is obvious that the nearer the structure where
Bladder in its course and more or less the bowel is distended by its contents the nearer the structure the wave approaches the greater will this distending force become until the segment immediately above the structure is reached, here the distending force will be at its maximum. Before peristaltic action has been weakened by the extreme distension which occurs in such cases this distending force must be very considerable. Any weakening of the bowel would be at isolated points and it is rupture that occurs at such points which are usually situated in the neighbourhood of the structure. A very good example of pouching of the large intestine is recorded by Dr Moore in the 2nd volume of the Lancet 1876 p 505. Here the structure was in the descending colon. Immediately above the structure was a marked pouching which contained an enormous number of cherry stones. Other changes are met with in the bowel above the structure. Ulceration is said not to be so common in cases of structure of the large intestine as in cases where the small intestine is affected. It is of great importance owing to the frequency with which it leads to perforation. The extent and position relative to structure of the ulceration vary considerably. It may be very extensive involving a considerable length of the gut, or it may be absent altogether. As in other diseases of the large intestine where ulceration occurs the caecum and sigmoid flexure are the commonest seats of this condition.
and where the seat of the structure, as is commonly the case, is situated in the sigmoid flexure or rectum we find ulceration occurring immediately above the structure and also at some distance from it with intervening healthy bowel as cases have been recorded where perforation has occurred in one of these two situations but the relative frequency of perforation in the neighbourhood of the structure is much greater than in the healthy bowel. Whilst on the one hand as detailed above in structure of large intestine towards lower end of bowel the ulceration when present is usually multiple the most usual state of affairs in the small intestine is an ulceration limited to immediately above the obstruction. As to the causes of ulceration. On looking over the various recorded cases one is driven to the conclusion that these ulcers bear no kind of relation in extent or frequency of occurrence to the amount of distension affecting the gut. Disturbance in function of trophic nerves may be a factor also chemical products of faecal decomposition. That which occurs in the immediate vicinity of the structure is possibly caused by spread of the malignant growth in wall of intestine leading to destruction of mucosa; But where it occurs apart from the primary disease it may be as stated above trophic disturbance and chemical action acting on a mucosa whose vitality is lowered. It is quite reasonable to suppose
that in the same way as ptomaines penetrate the muceosa in constipation giving rise to Streptococcal ptomaines injurious to the vitality of the muceosa may penetrate. But I would go a step further. Where enormous distension quickly occurs at splits might occur in the muceosa allowing the penetration of Bacterium and ulcerative processes being started. Gangrene is not uncommon in cases of obstruction of the colon, but it is only in this part of the intestine that gangrene of an extensive character is met with. (Saur's Text Book 1920)

Gangrene probably results from a multiplicity of causes. It is most common, when occurring as a complication of chronic obstruction, in patients who have passed the meridian of life, whose circulation is poor and the vitality of whose tissue is lowered but it is in cases where the hold on life is so tenacious that the patient lingers on for days perhaps in an almost morbid condition that gangrene is most likely to occur. The same causes mentioned as giving rise to ulceration equally apply here such as obliterative of blood vessels by distending force acting from within and the formation of ptomaines of an highly poisonous nature by the decomposition of intestinal contents. In the case of AE a commencing gangrene which was cut short by death was evidenced I think partly during life by the now return of the emaciation.
The absence of griping pain during the latter half of patient's illness. Secondly after death, by the fluid condition of the face, in the colour, the tendency for the fluid portion of the face to be absorbed is very great and although I am not forgetting the emaciated, I think judging by the fluidity of the face, throughout the colour that this function must have been in abeyance for some time. By the physical appearance and condition of the bowel, the transverse colon being almost black in colour and tearing very easily I do not think this latter was a post mortem change as the bowel immediately above the stricture, although distended in the same way showed no signs of blackening or fragility.

Partly by the destructive process going on in the mucosa.

The cause of death. Death seems to have been due partly to over distension of the bowel which had given rise to a state of affairs analogous to asphyxia; and also absorption through the intestinal walls, may have been an not unimportant factor, cardiac failure was the ultimate cause of death. This was contributed to in several ways. Firstly the heart's action was undoubtedly hindered by direct upward pressure. I think however a more potent factor during the last hours of life was the mechanical tendance offered to the heart by the extreme distension. This had
so completely fixed the diaphragm that, coupled with the comparative rigidity of the chest wall normally present in a man of his age, respiratory movement was reduced to a minimum, and thus the emptying of the heart was rendered all but impossible. This would also lead to imperfect aeration of the blood with all its far-reaching consequences. Apart from these purely mechanical hindrances to the heart, it may also have been weakened by the action upon it of poisonous substances of an alkaloidal nature which had been formed by the decomposition of intestinal contents and absorbed thro' the gut wall. We know that the condition known as Streptococcaemia is due to an absorption of this kind and Brunton in the Practitioner for 1894 states that in some forms of dyspepsia alkaloids resembling curare in their effects are absorbed from the intestinal tract. The formation and absorption of these alkaloids may be responsible for the cases of sudden death in County patients where the only thing noticeable post mortem is contracted kidney and it is worth noting in connection with this that in the case of AE the functions of the kidneys are greatly impaired, the condition being almost one of Aturia. In the Glasgow Medical Journal for May 1894 Dr. Middleton detailed a fatal case of concretion (renal) in which he ascribed death to the absorption of poisons from the intestinal canal and Dr. Henke of New York in
the Medical Weekly for 1867, 4th stated that some of the early epileptic seizures in children may be due to the absorption of products of decomposition from the intestine. These alkaloidal products may be of the nature of Muscarine, a powerful alkaloid which can be formed by albuminous decomposition outside the body (operation of choline by nitric acid) and which also occurs in the common fly agaric. Muscarine has a powerful action on the heart. It paralyses the cardiac muscle and also stimulates the inhibitory muscle ganglia. In the case of AE, the staining of the colon with blood pigment and the fluidity of the blood in the right cavities of the heart are additional evidences in favour of the presence of these poisons in the evacuation. Dr. Baker records a case in the Brit Med Journ. Vol 14, 1850, p. 503, in which death was brought about in very much the same way as in the case of AE. He operated on the left point by Jenner's method to relieve an obstruction due to cancerous structure of the rectum, but without giving the desired relief. Post mortem it was found that owing to the transportation of the large intestine he had opened the cæcum instead of the sigmoid flexure. He ascribed death to the pecil accumulation. Mr. Malcolm, speaking before the Roy Med. V. Ch. Soc. in October 1857, maintained that paroxysms of symptoms of obstruction is a possible sole cause of death. I have been unable to get access to a full report of this paper. But I can quite understand paroxysms as an immed-
medial precursor of, or concomitant with gangrene would be sufficient to cause death from deepening collapse. In strangulated hernia we know paralysis of the gut and commencing gangrene, especially where the constitution is enfeebled, are of themselves capable of inducing collapse deepening into death. The showed all the signs of profound collapse, as is seen in such cases, shortly before death.

The history of the patient's illness prior to the performance of colotomy would not be of very much value owing principally to the fact that the etiology of primary tumor of the bowel is practically unknown. In cases of chronic obstruction a history of dysentery would rather point to the large bowel being the seat of the structure whilst a history of peritrophitis or strangulated hernia would be of more doubtful value as indicative of structure of the small intestine looking at the subject from a broader point of view as an example of previous history being of value in diagnosing the seat of an in a case presenting symptoms of acute intestinal obstruction. I have in my experience seen one very good case. It was that of a young boatman aged 23 yrs whom I saw last year in consultation with my cousin Dr. Troucher of Eastbourne. All the symptoms of acute obstruction were present. There was a previous history of two distinct attacks of peritonitis but diagnosis was structure in the region of the cæcum by bands or adhesions. Dr. Troucher operated and found a band
uniting a loop of small intestine to the pelvic wall in the neighbourhood of the anterior superior spine. This loop was also adherent to the cavity over which it passed, and between these two adhesions and the pelvic wall a second loop had slipped and become obstructed. When we come to the second stage in the case of AE that is after colotomy had been performed, the previous history of a colotomy preceded by an absolute constipation of a fortnight's duration was of great value as indicative of a stricture in the colon and of enormous distension of the large intestine and if more stress had been laid on this latter and less thought given to the symptoms, a more correct diagnosis of the condition of affairs might have been made.

The case of AE was a very typical one as regards the position of the structure, and the age of the patient. It is worth noting in this respect that Dr. Patey gives a table of such cases in which out of 98 cases of stricture of the large intestine, in no less than 58 the structure was situated in the sigmoid flexure. In a general summary the same author states that primary cancer of the bowel is extremely rare before the age of 40. Benignous structure unlike simple structure is generally acknowledged to be uncommonest in males. In dealing with the symptoms proper I feel it would be quite out of the province of my thesis to discuss in any detail the symptoms of a slowly supervening stricture such as were probably
present in the case of AE prior to his admission into hospital, but whilst considering the symptomatology of his last and fatal illness slight reference will be made to them. The most prominent symptom of almost from the time of his acute seizure was tympanites. Although there is no doubt that the tympanites was almost entirely due to flatulent distension of the bowel, a moderate distension of the small intestine also contributed towards its production. At the post mortem when the peritoneal cavity was opened there was a sudden escape of a large quantity of gas but this was in all probability the result of postmortem changes. Little possibility of peritoneal flatus arising de novo during life. \textit{D'Espine} in the \textit{Lancet} of July 57 page 58 mentions that Fabre published a thesis in 1860 (\textit{Les pouvoirs abdominaux dans la Tympanite}) in which he recognizes two varieties of tympanites, intestinal and peritoneal, and in giving their source and symptoms etc. quotes Chomel & Trous as to the source of the gas in the latter variety. I have been unable to find any other reference in the current medical literature at my disposal to tympanites due to the presence of gases in peritoneal cavity apart from that seen with following a perforation of the gut and my friend Dr. Waterhouse of Sharrow Grove to whom I wrote on the subject told me that such a condition is probably more evident where there is no abnormal opening into the peritoneal cavity such as perforation of gut or of an abscess cavity etc. Peritoneal tympanites is
distinguished from the intestinal variety by the difference in feel to the palpating hand and also by the fact that in the latter abdominal respiration is not suppressed unless the distension is very extreme. A question which has to be answered in connection with the subject of Tympanites is what are the sources of the intestinal gases which give rise to such extreme Tympanites, and also the causes which lead to their production. Some authors suggest that the alimentary mucosa may secrete gases in large quantities, a statement rather difficult of proof; but louder Thunen considers some cases of flatulence as due to the absorption of air which has been swallowed, which is normally carried on by the mucosa. These sources however true they may be of the upper part of the alimentary tract probably play a very minor role if any in the production of gases in the colon. Here I think there is but one great source, namely the intestinal contents, the gases being produced by decomposition of long retained feces by the bacteria of putrefaction, or by the altered chemical action of intestinal secretions on one another, or on the undigested portions of food remaining in the gut. The gases thus produced vary in their nature. They usually contain carbon, hydrogen, and nitrogen. Marsh gas (C,H) is very commonly present. Of the influences governing the production of these gases, we cannot speak so certainly. The nervous system has a marked in-
fluence which is not quite understood. Although the
functions of the intestine are under the control of
autonomic nervous pleasures and ganglia in its
walls, they are affected by direct stimuli, and also
are readily influenced by the cerebro spinal and sym-
pathetic systems, with which they are closely as-
associated. Whatever be the predisposing or exciting
causes which lead to the production of the gases,
the immediate cause of tympanitic distension, whether
due to faulty innervation, as in diseases of the cord;
local diseases: Dysentery & Peritonitis; Injury
to the bowel: Enterectomy; Intestinal obstruct-
ion; Pyaemia; Gastroenteritis; it seems so pretty
well agreed to be a paralysis more or less complete
of the intestinal wall. The case of H.E. was I
think no exception to this. All the conditions fa-
vourable to the production of intestinal gases
were present, such as long retained faeces, prob-
ably degeneration of the intestinal mucosa with
altered chemical secretion, and with the onward
passage and for escape per anum of flatus
stopped. But it was not until two days before
his death, after a fit of retching, from which
time I date the commencement of the pains, that
signs of Tympanitis showed themselves; and before
death occurred a complete paralysis of the trans-
verse colon and a partial one of the descending
one had probably supervened. This was I
think evidenced by the character of the pain. To such


the gripping intermittent pains often associated in their severity are but the sensory accompaniments, and some sequcues of violent muscular efforts that are being made by the bowel to force its contents past the obstruction. Great waves of peristaltic action being to use Mr. Fever's graphic expression hurled against the impediment. That this had been going on to some extent previous to the onset of acute symptoms was evidenced by the colicky pains.

But as the paroxysms of the gut became more pronounced, not even the stimulus of the puncturing needle was able to excite a peristaltic wave. Giving to the marked tympanites the absence of a pattern, such as is described by D'Wyllie in his paper entitled Diagnostie value of abdominal patterns in abdominal tenderness from which I have just quoted, was not of any value as evidencing paroxysms of the gut. It would have been extremely interesting however if the presence or absence of a pattern had been noted during the 48 hours previous to the signs seen.

A point of some importance well exemplified by the case under consideration is the general contour of the abdomen in tympanites due to obstruction. In obstruction of the colon especially if low down the distension, as would be expected, is especially well marked towards the side and upper limit of the abdomen. The abdomen having a bulged appearance D'Wyllie mentions as characteristic resistance to the hand on palpation as being very characteristic of obstruction in the large intestine.
and another symptom known as Thomas' test which is said to point to obstruction in or below the descending colon is a flattening above the navel. In cases of distension of the small intestine there is anything an absence of the fulness in the regions above mentioned; the distension which is not incorrectly compared by Mr. Treves to the abdomen at the 6th month of pregnancy being central and most marked above the umbilicus. In later stages however these points of difference become more or less obliterated, all forms of obstruction developing signs akin in detail. The importance of a sympahtic to extreme as in this case does not lie so much in itself as in its secondary effects, especially on the circulatory and nervous effects systems. It is certainly conceivable the bowel might rupture from overdistension pure and simple. There are very few cases on record however where this has occurred. One such was recorded in Brit Med Journ. April 1900 by Dr. Harvey but in the most cases there is some complication present such as ulceration, gangrene or amputation wound.

Everyone it may safely be said has experienced at one time or another the symptoms of flatulent distension, and knows how completely hard de combat the whole system is for the time being, and can therefore form some idea of the severity of the symptoms in a case of severe sympathetic. One of the first effects of such a distension will be a marked interference
with the sympathetic system thru the abdominal plexuses and their splanchnic branches, firstly by irritation of ganglia by stimuli transmitted in this case by the three sets of colic branches, the superior mesenteric plexus and by the left colic and sigmoid to the inferior mesenteric plexus, and secondly by direct pressure upon the semilunar and solar plexus. To describe the effects produced by this disturbance of the sympathetic system would mean entail an enumeration of the signs and symptoms produced by an interference with the functions of every vital organ in the body. The mildest effect produced by such an interference with the sympathetic system is seen in everyday cases of flatulent colic and at the other extreme as an example of an interference with the sympathetic thru the abdominal ganglia are the cases where sudden death has followed a blow received in the epigastric region; in the case of AE the heart was seriously interfered with, this may have been due in part to interference thru the sympathetic with secreting organs, such as the liver, which have such a marked reflex influence over the heart, as well as to reflex stimulation of the cardio inhibitory centre by visceral branches of the vagus. The heart would also be mechanically interfered by direct upward pressure of the diaphragm on the heart and by increased resistance to flow of blood out of the heart both into the lungs and toward the liver by pressure on abdominal arteries.
one of the first effects produced by Sympathetic will be that exerted upon the great muscle of inspiration. The distension exciting a constant upward pressure will prevent the descent of the diaphragm during inspiration, and in extreme cases of distension we have a gradual suppression of the same train of symptoms as would follow division of both parietal pleurae. Intercourse with the diaphragm would impede the movements of the lungs limiting their due expansion. This would lead to 'clogging of the heart by lungs.' This latter is responsible for the dyspnoea, interruption of circulation, and terrible anxiety usually present in such cases. A fact to be remembered in the clinical history of AE's case is that the lower limit of the liver dulness anteriorly was abnormally high whilst the upper limit of the comparative dulness did not extend to a corresponding extent higher up in the thorax. Although the "felt" of the organ observable post-mortem partly accounted for this apparent decrease in size I do not think it accounted for it all. The importance of my clinical observation as to the size of the liver I only thoroughly appreciated on reading a communication by Dr. Cole to the Lancet for July 87 in which he quotes Sebrow as saying that a highly distended stomach — in my case transverse colon — pushes up the liver which is so compressed between it and the diaphragm that an additional amount of blood from the hepatic vena cava is directly thrown into the right cavities of the heart at a
time when the heart’s action is already embarrassed by the upward pressure of the diaphragm stomach.

The extent to which the diaphragm may be pushed upwards by abdominal distension is well illustrated by a diagram which shows the upper convex boundary of the muscle behind the third intercostal space on the right side and behind the fourth on the right side. D’Sibson observes that when peritoneal distension accompanies acute disease it is often the cause of death.

Another very prominent symptom present in the ease under consideration was pain, with which may be associated tenderness. In acute cases where an obstructive element is present pain is almost the first manifestation of the attack and as a rule is one of the most constant and marked of the symptoms. Mr. Fried Traever in the Text Med. Jour. for July 24th, 1867, classifies the pains of intestinal obstruction according to its etiology into firstly where due to direct damage to peritoneum and bowel. Secondly where caused by irregular and disordered peristalsis. Thirdly where due to distension of the bowel above the obstruction; and fourthly where due to inflammatory changes in the peritoneum and intestine. The acuteness of the pain is also dependent to some extent upon the temperament of the patient and the amount of girth involved. In the ease of A.E. number one, which depends upon lesions of intestinal and peritoneal nerves from compression
as in acute strangulation volvulus etc., need not be considered. Some of his sufferings however during the earlier stages of his last illness were undoubtedly due to irregu-
lar and disordered peristalsis. He had been troubled with colic from this condition for some time previous to the acute onset. This pain is evidenced by its paroxysmal character and in cases of pure ob-
struction which are also only partial it is said to be intermittent whilst in complete obstruction it is complete continuous with exacerbations (Dr. H. Tox Notes, 1st Shani Ward). In the case of AE the hyper-
trophied bowel and consequently vigorous peristalsis, the loaded gut and complete free slowly produced obstruction which are the factors most favourable for the production of this kind of pain were all present. The structure besides being an obstacle to the normal peristaltic wave would be a starting point for irregular intestinal movements that are the out-
come of reflex action (Tues. Med. Obs't. 1857). However of this paroxysmal pain towards the close of AE's illness may have been due to paralyses of the intestine, although the action of the spasm must not be forgotten. As beari-
ing out the now generally recognised fact that the position of the pain is no guide to the localization of the disease, here was a case of structure of the sig
moid flexure with a condition analogous to Reuss Analphine s in the gut above the structure with twisting gripping pain referred to the umbilicus. The relations of the solar and superior mesenteric
plexis to the umbilicus, namely their close proximity to it through or on a deeper plane, naturally suggests itself as explanatory of the frequency with which the pain is referred to the region of the umbilicus. I think there is no doubt that Distention of the gut above the structure was responsible for most of AE's agonised sufferings. As would be expected this pain was continuous and diffused over the whole abdomen, and as Treves points out in his paper on the pain of Ulcer: ...' quoted on a previous page the explanation of the pain referred to the back — not an uncommon symptom in severe colic — lies in the fact that the integument of the back (and abdomen) is supplied by branches of the lower intercostales; and the splanchnicus which supply the spinal elements to the intestinal pleurae derive their spinal filaments from these same intercostales. Pain from distension is said to be always most marked in cases where the colon is involved. The last condition giving rise to pain is inflammatory change. The pain here however is more of the nature of a tenderness although where the gut is congested and inflamed, or ulceration of the mucosa is present pain due to peristalsis or distension would be greatly aggravated. This hardly contributed to the sufferings of AE until perhaps shortly before death when a commenceing gangrene appears to have started in the transverse colon, with at the same time a marked congestion.
of the menacing of that part of the colon. The tenderness which was so conspicuous may have been due to changes in the intestine (congestion & distension) & congestion of peritoneum; but I think it was principally due to overstretching of the abdominal muscles and nerve endings. At no time does this tenderness appear to have been localized. From the fact that it became more marked as the paroxysmal pain passed off one might suppose that some of the tenderness proceeded from the gut as a result of its violent and continuous muscular contractions. Most authors whilst discussing the after-results of holotomy for intestinal obstruction call attention to the distension which is often occasioned by the accumulation of feces which is liable to occur between the artificial anus and the stoma. The accumulation and retention of feces which was the cause of his illness can hardly be described as a constipation although the literal translation of the Latin from which the word was derived exactly describes the state of affairs (con together stipe Sarum) In Vol 1 of the Lancet p 454 Mr Bryant has recorded a case illustrative of this in which after an artificial anus had been made communicating with the small intestine, pieces accumulated in the colon giving rise to abdominal pain and vomiting. It is self-evident that the greater the distance between the artificial anus and the stoma the more serious is the trouble likely to be. In the case of AE the feces finding a difficulty in passing thro'
The contracted lumbar opening passed on, and gradually filled the colon. It is conceivable, however, that for some time previous to the fatal onset peristalsis if not an antiperistalsis carried at any rate the flatus if not the feces back to the lumbar opening. But as soon as the transverse colon became paralytic, this segment of the bowel would act very effectively in leading to a complete arrest of any backward flow of feces, which peristalsis of the still unaffected descending colon might have been the means of bringing about. This accumulation in the colon was responsible for the irritable humour, foul tongue, offensive breath and attacks of colic which patient had previously complained of. A symptom which only became noticeable at quite the latter end of the illness was oliguria. No urine was passed during the last fifteen hours of life. Post-mortem the bladder was found to contain only four ounces of urine. This suppression of urine is not uncommon in acute intestinal obstruction when it seems to depend upon the acentuation of the symptoms, a reflex inhibition of the renal function being induced. Oliguria may occur in cases of chronic obstruction. Here it is due to the stricture being high up in the course of the alimentary canal. A good example of it is often met with in cases of pyloric obstruction. The cause of such an oliguria is obvious. D'Halloy considers that oliguria in acute cases is also dependent on the seat of the stricture but Mr.stives in intestinal
obstruction p. 369 states that this is incorrect. In
the case of AE the oliguria probably occurred in part
as one of the ordinary phenomena of collapse being
due to diminished blood pressure. The amount
of blood going to the kidneys being still further dimin-
mished by direct pressure of the distended gut upon
the abdominal blood vessels. The reflex nervous in-
fluence also alluded to may also have interfered
with the secretion of urine.

I now come to a symptom which though as a
rule most prominent in this class of affection
was in the case of AE conspicuous only by reason
of its absence. Speaking generally the vomiting in
such cases may be classed according to its cause
into two entirely distinct varieties. First we
have vomiting which is a purely reflex action. It
being so induced by injury to the peritoneal and in-
testinal nerves. The best example perhaps of this
variety is the initial vomit of strangulated hernia
which owing to the sharp unyielding character of
the constricting edge and the close connection of
the small intestine with the solar plexus is very
common. It should be borne in mind however that
in such acute cases reflex vomiting is not always
only initial, so it may lead to errors of diagnosis
in pseudo-strangulation. The second variety and by
far the commonest is mainly due to the parietal
action of the bowel. Dr. Brunton in a paper on the
1582. p. 827 goes very fully into the theory of its production. By means of a diagram I give below, the will show how normal peristalsis cause repugitation of the bowel if an obstruction exists. Antiperistalsis is now generally acknowledged to be a possible though as a rule unimportant factor in the production of vomiting. In certain cases of acute obstruction where almost the first symptom is faecal vomiting, and the bowel post mortem is not found to be filled with faeces, antiperistalsis seems more than likely factor in the production of the vomiting. Where the accumulation in the bowels is very great any pressure on the bowel as in coughing breathing etc would tend to move the intestinal contents in the direction of least resistance namely towards the stomach and to favour faecal vomiting. Where the vomiting is reflex it is mucous and bile mixed with unaltered or partially digested food that is returned; whereas in the second variety it is usually the upper end of the ileum whilst in stricture of the colon it becomes distinctly choleoacous. In the case of A E except at the commencement of the attack vomiting was conspicuous by its absence. The fits of retching and vomiting that did occur was undoubtedly reflex. The absence of vomiting due to peristalsis was I think due partly to the existence of an artificial anus above.
the affected segment, the empty state of the bowel above the lumbar opening, and when the acute symptoms had supervened to the careful dieting, and lastly to the administration of opium. But apart from these suggestions it is a matter of clinical observation that in chronic obstruction of the large intestine especially where associated with faecal accumulation vomiting is often absent. Collapse in intestinal obstruction and its allied conditions is usually a very prominent symptom. It is perhaps most marked in acute stenogulation, by bands, of the small intestine and in such cases it is one of the first symptoms to show itself. In such cases it is due to direct injury to the nerves of the peritoneum and intestine, and is perhaps more in the nature of shock than collapse. Collapse as a rule gradually supervenes upon nerve exhaustion, the previous existence of which its presence presupposes. The prolonged irritation of the nerves leads to exhaustion not only of these nerves but also of the centres with which they are connected, in this case more especially the abdominal sympathetic ganglia. This leads to a general vaso motor paralysis which according to Dr. Greenigen of Berlin in his little book 'über Schock' is the essential element in the pathology of the condition. The medulla and cord are exhausted; irregular action of the heart, diminished blood pressure, anaemia of the brain, and lowering in different degrees of motor sensory and reflex nervous power follow. The degree of collapse varies
with the nervous constitution of the patient. It is most marked as would be expected in the very young and in the old and feeble. It is more profound in those the greater the extent of peritoneum and intestine involved; and it also varies with the seat of the disease, giving to the more complete and closer connection between the small intestine and the sympathetic than between the latter and the large bowel. In the case of NE as would be expected the initial shock was not present, but symptoms of prostration and then collapse soon became apparent, namely, pinched features, sunken eyes, clammy skin, voice reduced to a hoarse whisper, feeble respiration, small quick pulse, cold extremities, lowering of temperature, and abatement of pain; death was I think accelerated by this increasingly profound collapse. In his case favoring the collapse we have old age, large extent of bowel involved—practically a commencing gangrene of whole transverse colon—extreme pain due to Meteorism, whilst on the other side might be mentioned absence of vomiting—vomiting quickly accelerates the intervention of collapse, probably by causing a functional exhaustion of the medulla where the vomiting centre is situated—the disease being situated in the large bowel, the chronicity of the disease.

Note: Collapse arises from many different causes—Shock being one, of which collapse may be regarded as an extreme and final degree. Collapse entails a previous nerve exhaustion. Shock on the other hand may suddenly appear in a healthy individual.
The diagnosis in cases presenting symptoms either of, or resembling those of acute intestinal obstruction is of utmost importance as often it is difficult. The importance lays in the fact that the question of operation often rests upon the diagnosis, and on the answering of this question more often than not depends the patient's life. Going to pathological and clinical data bearing so slight a relationship to one another, and the infinite variety of conditions possible in such cases, differential diagnosis is more than difficult, it often is impossible, and a perusal of our current medical literature on the subject is sufficient to show that notwithstanding the every day occurrence of such cases errors in diagnosis are still painfully frequent. I do not intend to go into the question of diagnosis simple and differential of intestinal obstruction in general, but rather confine myself to a discussion of the diagnoses in the case of A.E. Diagnosis which - the one made during life and the other post mortem - I am fairly confident differed very considerably. In arriving at a correct diagnosis the previous history was of paramount importance. For we were able to start with the certain knowledge that there was a stricture towards the lower end of the colon which was due to a neoplasm of over two and a half years duration. Then the previous history of a foul tongue, colic, constipation, and ver-ritability, coupled with the contracted condition of the lumbar opening gave another fact namely
focal accumulation. The question naturally arose where was this focal accumulation situated? The presence of the currant peps in the faeces less than 24 hrs after having partaken of a heavy meal of which currants figured on the menu, and the certain knowledge that there must be a blind tube between the artificial anus and the structure, coupled with the contracted condition of the artificial anus, seemed to justify its being placed in the colonic cul-de-sac. From the appearance of the symptoms—the suddenness of onset, with pain, vomiting, tympanite, and constitutional depression—a diagnosis of acute obstruction over and above the one already known to exist was made. Then having decided that the case before us was one of acute obstruction, our next step was to endeavour to decide which particular variety we had to deal with. One could not help but think that as a result of the long continued and gradually increasing focal accumulation the bowel had become lengthened and consequently more or less coiled or doubled upon itself; and added to this, owing to the spread of the malignant neoplasm which it must be remembered had been in existence at least two and a half years, the colon was probably fixed by adherions towards its lower end. On these conclusions did we base our diagnosis differential diagnosis, which was that a kinking or acute bending had occurred; the condition being very similar to, if not actually our
of Volvulus. The previous constipation, sudden onset, vomiting, and extreme tympanites, being all characteristic of this condition. The subsequent absence of vomiting in the case of AE is not an uncommon condition in like cases, for Mr. Trues in "Lutetia": Ob. I 3, he makes the following remarks on vomiting in cases of Volvulus of the Colon. Vomiting appears less early and is less marked and severe than in the previous form of obstruction (strangulation by bands). It may be absent; it is often scanty. Acute vomiting only occurs in one-third of cases. It may be late. It often affords much relief to patient. The vomiting in the case of AE seems in direct contradiction to this first remark but I did not take much heed of this. Our chief difficulties however were to find an exciting cause for this sudden attack, and to understand the clinical significance of the mode of onset. My giddiness, nausea, culminating in vomiting, and then the onset of pain. As regards the former, the only explanation I could offer was that peristalsis during the night perhaps increased by irritating residue, namely the currant puris, had assisted by the patient lying for some time in a position favourable to its production, gradually caused a bending or twisting of a coil upon itself which was converted into an acute obstruction as soon as patient assumed the upright posture and commence to move about. Amongst other conditions that suggested themselves were rupture and peritonitis; they seemed however to be excluded by the moist tongue and soft pulse; and also by the fact that the temperature
was subnormal from the first. As regards the exact seat of the obstruction, the small intestine seemed to be excluded by the presence of current pips in the faeces, the absence of vomiting (almost invariably present where the obstruction is acute) and the metastasis being diffuse and not most prominent between the navel and the pubes. The passage of the long tube and the non-return of the enemata seemed to point to the mischief being near the original seat of the disease. As to the subsequent progress of the case when the pain began to decrease and collapse became so marked Dr. McColloch quite agreed with my suggestion that gangrene of the segment of bowel involved in the kink or twist was more than likely. The subsequent post mortem showed our diagnosis to have been in error. There was no obstruction of the bowel other than that known to exist, no adhesions, and although enormous dilatation, no very great lengthening of the bowel. The condition had been one of faecal accumulation, gaseous distension, paresis and commencing gangrene. I have already discussed at some length the interpretation of the symptoms, but have left it till now to give what I consider is the correct interpretation of the symptoms mode of onset. In a case of acute volvulus pain is usually the first and most marked symptom. The usual history of such cases is well exemplified by a case published by Nicolaysen in Brit Med Jour for July 23rd. The patient, a young man, while in bed was suddenly seized with severe abdominal pain, which was followed later by vomiting.
Now in this case the first symptoms were giddiness and nausea which after lasting some time were followed by a bout of severe vomiting. After the vomiting had ceased, pain was for the first time complained of. I am afraid in making my diagnosis I rather ignored the question as to what was the clinical significance of this mode of onset. It is now my belief, that, the symptoms were due to the sudden absorption of a large quantity of stomeates from the intestinal canal. They perhaps were formed and partly absorbed during sleep; but as soon as patient awakened in the morning and intestinal activity restarted they were suddenly thrown in large quantity into the circulation, thus giving rise to giddiness and nausea which culminated in a violent attack of retching and vomiting; and it was the straining and vomiting which acted as a last straw as it were to the hyperdistended intestine. So that practically it comes to this that the cause of the intestinal condition which caused death was an attack of vomiting.

Treatment. In dealing with this the most important part of my thesis I wished in the first place to take up the subject of Colotomy as so far as this particular case is concerned. I take this point partly because it stands first in the sequence of events and partly because the subsequent history of the case is chiefly instructive as a sequel to a particular form of Colotomy. In the Harveian Lecture delivered by Mr Bryant in November 1854 he reported in the T. M. J & F. an act of that month
he laid down as an axiom, that in all cases of tumourous structure of the rectum and colon which are not amenable to colotomy, or anal excision, colotomy is strongly to be advocated, with the well-grounded hope of relieving suffering, retarding the progress of the disease, and prolonging life for even five or six years; and he significantly adds that it is necessary for the operation to be performed before the pernicious effects of obstruction have supervened. Although in reading the records of such cases one is struck by the insidiousness of onset — Patients some complaining of indigestion, diarrhoea, vague shifting pains perhaps bleeding which is ascribed to piles for some time before difficulty in defecation is even noticed — whatever symptoms may have presented themselves in the case of HE prior to his admission into hospital, it is hard to conceive any circumstances which would justify allowing a constipation, which had slowly supervened, to remain absolute for fourteen days, without resorting to surgical interference; for obstruction even per se, whatever the cause, brings about changes in the bowel above the obstruction which may at anytime lead to a fatal result. Mr. Bryant illustrated this fact in his lecture very forcibly by two tables one of 'too late cases amongst which are six in which absolute constipation had existed for three weeks and all of which were fatal', in table II which contains his successes, in only two had the obstruction lasted two weeks, and one
of which only survived three mos. It is clearly evident therefore that in colotomy the period at which the operation is undertaken, with respect to change in the bowel, is a matter of primary importance. The earlier the operation is performed, the better will be the patient's chances, and the longer it is post-poned the greater will be the risks of serious irreversible organic changes taking place in the intestine, and consequently the greater the risk to life. But apart from the question of ultimate success, the amount of suffering relieved, and the comfort and happiness given during the remainder of the patient's existence are sufficient to justify early interference. The majority of successful cases recorded die of Ataxia, in other words of a slow & painless process of exhaustion, instead of pain, peritonitis, or obstruction which usually terminate unreplied cases. Colotomy is also of value in that it retards the growth of the humour by removing its great and only source of irritation namely passage of faeces through the diseased bowel. Some of the malignant neoplasms occurring in the bowel are, as I have shown my case to be an example of, specially characterized by their slowness of growth if untreated, and the contraction which often occurs seems a provision of nature to guard against this eventualty. Unfortunately however this contraction is not such a pronounced feature in all varieties of malignant neo-plasm of the bowel, consequently the humour often
attains to considerable bulk, and the patient is exhausted by loss of blood, often erroneously ascribed to one or two innocent piles, before colotomy is even thought of. As regards the after-treatment in cases of colotomy, a point of paramount importance, which is well exemplified by the case of A.E., is to efficiently guard against the passage of faeces past the artificial opening, into the cul-de-sac which always exists to a greater or less extent between the stricture and the colotomy opening. This is done in two ways:—Firstly, by keeping the artificial opening well dilated, and secondly, by efficiently obstructing the passage onwards of the faeces. As regards the former several very ingenious instruments have been devised with the object of attaining this.

A, which represents Harrison's Cruetz's colotomy dilator is a dilator pure and simple. The other two instruments are plugs and dilators combined. B.
represents Crripps Lawrence's plug and dilator. It is somewhat like a Burnes bag, in that it is made of indiarubber, and is inserted and then dilated. The third instrument represented was invented by Dr. Cousins. It consists of a central tube enclosed in another elongated and inflatable tube. An indiarubber band surrounds it in the middle and regulates its shape when distended. The bag should be inflated introduced and then inflated. The central tube allows of the escape of faeces. The second method of avoiding against the onward passage of faeces is part of the operations, and this brings me to the question, what are the comparative advantages of lumbar and inguinal colotomy? A comparatively few years back such a comparison would have been an absurdity, if only for the fact that inguinal colotomy was seldom or never performed. Its advent was due to nearly every other advance in surgery, to the introduction and promulgation of the principles of Bichat's Surgery by Edinburgh surgeons and not, as Mr. Bryant somewhat suavely remarks, to Fashion (the Bradshour lecture desk quite wrong in fact). Inguinal colotomy was first suggested by Littre in 1710 whilst the lumbar operation was not advocated until nearly 100 years later, when Ballon suggested the operation. Inguinal colotomy was seldom performed however, but of late years it has steadily increased in favour, and now there is no gainsaying its advantages in most cases over the lumbar operation. So formidable a task
a rival had it become to the lumbar operation that
we find Mr. Bryant devoting his Institute Lecture
course Dec. 28 to an attempt to resurrect the lum-
bar operation and bring it into favour again. He
gives the advantages claimed for the inguinal opera-
tion, and then taking them up creativ attempts
to disprove them. Briefly, it is claimed that the in-
guinal operation is easier. No doubt is an experienced surgeon
like Mr. Bryant this does not hold for much, but col-
ostomy is an operation that often has to be performed
under circumstances that admit of no delay and
consequently often falls to the lot of the inexperienced
and one only wants to aver such an operator being
no better situated than could be stung about in the lumbar
fat with a constant oozing of blood and fearing
every moment to find oneself in the peritoneum
so appreciate Mr. Bryant's words aside, if the patient
be fat there is doubtless at times none trouble.
Certainly in a spare patient with a normal meso-
colon, and distended gut, the lumbar operation has
the one advantage that the peritoneum is not opened;
but when the surgeon knows beforehand that he
is going to open the peritoneum, as in the inguinal
operation he goes to work thoroughly prepared and
so minimises the dangers incurred by opening the
peritoneal cavity, and by allowing a day or two to
elapse after fixing the bowel at the abdominal wound
before opening it the danger of septic infection of
the peritoneal cavity by faecal extravasation is avoided.
tended by a Lucas inflator, a rather dangerous proceed
are I should think in some cases where the bowel
is thin ulcerated and rigid from adhesions. The
distension of the bowel in the case of AE was prob-
ably one of the chief reasons which led to the
lumbar operation being chosen in his case. Another
advantage claimed for the inguinal operation is
that in obscure cases the abdominal cavity can
be explored with the finger, and the diagnosis ver-
ified before the bowel is opened. The importance
of this is well brought out in my case. If an in-
guinal opening had been made the position of the
structure accurately defined a colotomy might have
been performed a short distance above the struc-
ture and the unfortunate sequel avoided. An advan-
tage not mentioned at all by Bryant is that in
cases where, as in mine, the structure is above
the rectum and its position cannot be more
definitely localized than to say it is in the course
of the descending colon by performing the inqui-
nal operation a greater length of bowel can be ex-
amined and is as it were under command and
there is therefore less likelihood of opening the bowel
some distance from the structure either above or below.
On the other hand in the lumbar operation especially where
the bowel is fixed if operating on the left side the bowel might
be opened below the structure whilst if done on the right side
a fecal accumulation may be unrelieved, a case illustrating
It may have been that in the case of AE the surgeon, feeling the uncertainty as to the position of the structure decided to operate on the right side. I think one of the most cogent arguments in favour of the inguinal operation is the greater range of movement of the bowel. If you operating the structure is half an inch above, abdominal wound the bowel can be drawn down and success so ensured. The ultimate success of the operation depends in great measure upon the efficiency of the spur. In other words it is essential that faeces should be prevented from passing out. The most thorough and I might say the ideal method of attaining this is to draw a loop of bowel completely out through the opening in the abdominal wall, and having done so, fix it there by underpinning or by stitches or by both. This can be done as a rule through the inguinal wound. But in the case of the lumbar operation, especially if the patient is well nourished, the tension that would be exerted upon the stitches inserted to keep the bowel in situ renders the thorough carrying out of this impossible. Consequently the liability to the passage of faeces past the opening is increased. If the obstruction is not complete irritation and pain with passage of faeces for assured will in most cases call attention to the fact, whilst in cases of complete obstruction where, as in the case of AE the bowel is permanently dilated by the previous obstruction and constipation, faecal accumulation may go on unnoticed by the patient until too late.
A point that my former teacher, The Professor of Surgery at Edinburgh Univ., used to lay considerable stress upon, was the advantage of position which the inquinal had over the lumbar areas. The patient has complete control over an inquinal opening. He is able to see what is going on. He can clean it himself, and it is so much easier to manipulate the dressings. Another point, that I think I obtained from the same source, is that where the opening is not intended to be a permanent one, as where a colostomy is performed preliminary to extirpation of the anulus analis or rectum, the inquinal operation is much to be preferred: as access to the pelvic contents from above is thereby gained. There is one other point of comparison that I wish to allude to—having a special bearing on the case in question. It is that the subsequent prolapse or retraction of the bowel at the artificial opening and the consequent dilatation or contraction of the artificial opening. It is claimed for the inquinal operation that subsequent prolapse is not so likely to follow as after the lumbar operation. The truth of such an assertion can only be decided by experience, and on reading the literature on the subject I find that though the advocates of inquinal colostomy claim that prolapse to an annoying extent is apt to follow the lumbar operation, the advocates of the lumbar method of whom Mr. Bryant is a champion are not at all backward in claiming exactly the reverse. In his Horaeian Lecture before quoted, Mr. Bryant's argument is in plain language as follows: Because Mr. T. Allingham Jones resorts to the heroic measure of drawing all the spare large inc-
out of:

'At the end of the wound, and at a subsequent date remov-
ing it in mass, therefore the tendency to prolapse after
the inquinal operation must be very great. Why Mr.
Allingham, whose operation is fully described in the Brit.
Med. Jour. for April 89, does not push the lower end of
the loop in as fast as he pulls the upper end out of
the wound I don't quite see. But apart from that one can
hardly see the connection which seems to exist in Mr.
Bryant's mind, between Mr. Herbert Allingham and the
tendency to prolapse. Mr. Bryant states very emphatically
that a little prolapse is necessary and the truth of this
is shown by the case in question. There was no prolapse
whatever in the case of NE. Consequently the opening was
able to contract and faeces were able to escape there
out. The former is a matter of considerable importance.
It illustrates an universal law, namely that the ten-
dency of all artificial openings is to contract. The pro-
lapse keeps the opening dilated. It acts in very much the
same way as a gum elastic catheter tied into a stric-
tured artery. I do not think there is any doubt but
that the certainty of obtaining this prolapse is greatest
at the inquinal anus, bec;ue to obtain it the bowel must
be freely drawn out of the wound. I would also
suggest, that owing to the lumbar opening being
aponeurotic, principally aponeurotic (lumbar fascia)
whilst on the other hand the structures entering into
the formation of the inquinal opening are princip-
ally muscular (two obliques and transversalis); the
necessary prolapse is less likely to increase to an
annoying extent of the latter. # owing to the fact that an involuntary contraction of the muscles entering into the formation of the abdominal walls occurs when any extra force is exerted upon the abdominal viscera (as when coughing, sneezing, shouting, &c., defaecating?) or lifting a heavy weight) the tendency to increase of prolapse is least under such circumstances at the inquinal opening # owing to its position an inquinal prolapse is easily controlled in the upright position by means of a suitable pad, and by virtue of gravity becomes spontaneously reduced in the horizontal posture # owing to the structure of the hernia being principally muscular, there is less likelihood of the formation of a rigid fibrous ring. This latter statement is I should state in direct variance with some authorities on the subject. Brearley for example in his text Vol. I, p. 89 says that the tendency to contract is greatest at the inquinal opening but as Bryant does not mention it in his summary of the comparative advantages of the two operations I think it may be considered a most point. Two of the above suggestions are well borne out by the case of AE. Firstly there was no prolapse whatever (or even a spur) whilst the opening was surrounded by an extremely rigid fibrous ring, which barely admitted the tip of the little finger; and it is worthy of note that when the patient was asked how it was he had allowed the opening to become so small without having it seen to, his excuse was that he could not see it.
As to the different methods adopted to provide an efficient spur region to the number. The principle, however, is the same in all. The only differences lie in the method adopted to fix the gut in position. The object aimed for is the same in all, to get a loop of intestine fixed well forward, and to render its retraction impossible. Taking the lumbar operation first, Mr. Bryant draws the bowel out as far as the posterior longitudinal band muscular bands and then stitches gut to parieties. This is fairly typical of the lumbar procedure. The methods of obtaining the spur in the inguinal operation are more varied. Mr. Creppa only draws the bowel forward until two-thirds of its circumference is outside, whilst at the other extreme we have Jean Bouretts pulling a loop right out and drawing the bowel. The lower cut end is invaginated stitched up carefully and thrown back into the abdominal cavity and the upper cut end is then fixed at the wound. Underpinning or drawing the abdominal parieties together beneath the gut by ligatures passing thru the mesocolon are the favourite and probably the safest and most efficacious methods. As regards stitching the gut to the abdominal parieties some surgeons aiming at simplicit have omitted this altogether, trusting entirely to underpinning. The Lancet 1843 March 27th review quotes two cases recorded by Dr. Kelvey in the NY Med Jour. of Feb 93. In both cases no stitches were inserted. Subsequent to the operation there was a sudden pouring out of serum which, on removal of dressing, was found to be due to a prolapse of three or four feet of bowel.
I think the above epitome of the two operations tends to show the superiority of the inguinal over the lumbar operation especially in effectually guarding against the passage of faeces past the opening into the cul-de-sac beyond. When AE left hospital I have no doubt but that he had an efficient spur; this being however gradually obliterated. This may have been due to the comparative rigidity of the bowel in that region not permitting of its being drawn out sufficiently at the operation; but the contraction of the opening and neglect of bowels by patient probably contributed towards the complete obliteration of the spur. To prevent the opening from contracting is therefore a matter of great importance.

In discussing the treatment proper I shall start by taking the non-medicinal management. The principles of this part of the treatment are to my mind splendidly set forth by Dr O H Thomas in his work on Intestinal Obstruction and Disease. Dr Thomas' book is in reality a work recalling our attention to the principles of Sydenham for the relief of obstruction. These are simply—avoidance of all purgatives or means of forcibly moving the bowels, a fluid diet, and the use of sedative doses of opium. By intestinal obstruction says Dr Thomas p. 48 I mean any condition of the intestine, its surroundings or contents, which retards or completely arrests their progress towards the intestine the matter contained within the gut. The word sewer may be taken to include artificial means. If we
exclude hernia and related reticulum of which the diagnosis and treatment are unmistakable, we have a clinical condition dependent on any of a variety of pathological states which have obstruction as the dominant symptom, and as remarked by Dr. Thomas all forms of obstruction sooner or later develop signs akin in detail. For this reason he argues that differential diagnosis though without doubt extremely desirable is not essential for successful treatment. No matter what may have been the cause of the disease, the detche and therapeutic treatment at the commencement is practically the same for all varieties. The first point in the Sydenham code, as enumerated by Thomas, deals with the constipation. It is that it should simply be left alone. The rational treatment of obstruction necessitates that some of the symptoms should be prescribed for, but constipation requires no direct interference. The difficulty it will at once be seen is to decide whether the case is one of obstruction or simple constipation. The thought that the symptom of constipation in obstructive cases is the cause of all the patient's sufferings and must be grappled with and even at some hazard relieved, goads the physician despite his doubts and better knowledge to permit the administration of, if not a purgative, enemata (p. 29 Thomas 6th ed. 601). I did it in the case of A.E. Two enemae were given with the object of trying to relieve the overloaded bowel and perhaps of removing a kink or twist, and I am driven to the conclusion, in the light of the subsequent post-mortem, that they only tended to aggravate the con-
dition. The bowels must be left alone. The next point is the restriction of the diet. What is sought for is a dietary under which constipation can be comfortably borne. Accordingly, the diet in obstruction prescribed by Dr. Thomas is as follows: arrowroot, sago, ground rice cooked with water with the addition of brandy or wine, nutmeg, sugar, salt, and butter. Pea flour or bean flour cooked with water and carefully strained with a little butter, salt and pepper carefully added may be given. For a change Dr. Thomas permits any of the flesh broths these being administered in small quantities and as seldom as thirst and hunger permit. All solids and milk must be prohibited. The latter being often as harmful as solids. (p 90) This was strictly observed in the case of AE. At first only rips of hot water were allowed. Later bouillon, beef tea, beef jelly containing brandy or sugar, food were given in small quantities and at frequent intervals. Dr. Thomas goes on to say that the selection of a suitable diet for the patient is all important in the treatment of obstruction, and is in most cases of much greater assistance to recovery than any medicinal or surgical aid. Finally as a reason for the above strict diet Dr. Thomas says (p 255) that without it you cannot put in force the great medicinal remedy viz. Opiate. For if the diet is coarse including solids and milk, tender full doses of opium the sensibility of the abdominal organs is so blunted that sufficiency of such food may
be swallowed to induce serious or fatal symptoms. The use of opium in combination with an unsuitable diet is the worst form of masapraxis in these diseases. The third point in the code is the administration of drugs. Medicines given in this class of cases may be divided into stimulants & sedatives. Of the former, belladonna is the only one I shall mention. If the condition of collapse should threaten, in which both pulse and temperature show a marked depression, belladonna, or the pine in the form of the tincture or the strain are usually to be thought of in large and repeated doses. The drug acts here as a neurotic stimulant. Some authors recommend that it should be given together with opium. Of the sedatives, Thomas considers opium and alcohol are the only two of any value. Alcohol he insists is never anything but a narcotic, rather a questionable view, but as he accords it a very subordinate position in the treatment and gives it on the usual clinical indications I will at once pass to the sole drug to which he is in common with most surgeons trusts in almost all cases, namely opium. Thomas recommends the subcutaneous injection of liquor morphia sulph. 1 grain to the 3/4 of water, but where there is no vomiting it is preferable to give it by the mouth. A word as to the action of opium on the intestine. As peristaltic movements occur readily on stimulation after a portion of the bowel has been severed from its nervous connections, it is evident that its movements are regulated by you
glionic centres in the wall of the bowel itself. The bowel is also influenced by other fibres. It has been found stimulation of the vagus increases, whilst stimulation of splanchnics arrests intestinal movement. The vagus reinforces the activity of the ganglionic centres. The splanchnics rea...
be withheld as if collapse should supervene while the patient was charged with opium or alcohol, his chances of reaction would be very poor (Thomas J. Hobart's Obst. p. 121) Thus according to Thomas J. in addition to the negative condition of abstinence from purgatives and from coarse and solid diet we add the full sedative action of opium suppressing pain and peristalsis, and by inhibition of area motus centres enlarging the area of blood diffusion on the patient is put in the most favourable position for natural recovery from the various pathological states lying at the root of the obstruction. In the case of AE this was practically the treatment adopted although I must add that if Thad had a clearer conception of the pathology of the case I should have at the outset been benefited to try strychnine pushing it to its extreme physiological limit in hopes of restoring tone to the paralyzed gut.

Massage has been recommended and extensively tried in the treatment of intestinal obstruction. It is especially advocated by those who are for deferring operative treatment. Jonathan Hutchinson in a paper published in his very interesting Archives of Surgery tells how by calling in four policemen they might take the patient, shake him well up, twist him, turn him, and pummel his abdomen, and that they would be likely to cure him in that way. Concerning this method of treatment says (in textbook p. 456) its action (massage) is very vague, and its general
effects uncertain and unsatisfactory. It has often
been used with much success with constipation and
in obstruction due to faecal masses, gallstones, and
foreign substances. In these cases the manipulation
of the abdomen probably not only excites peristaltic
movement, but also directly dislodges the obstruc-
tive element. After questioning its value purely in
expectation, he adds in other cases of acute obstruc-
tion I imagine that this mode of treatment would
probably do more harm than good. It could never
be applied with any scientific precision. The most
prominent symptom from first to last in the
case of AE was Tympany, for the relief of which
Acupuncture was resorted to. This is not a very scien-
tific operation, and its effects are usually temporary.
But for the time being, the relief afforded is very
considerable. Puncture of the abdominal wall and gut
for the relief of acute abdominal distension by flatus
is a well-known and frequently practiced procedure
in the treatment of domestic animals. Most farmers
at one time or another have had to resort to it in the
case of sheep which have blown themselves (supposed to
be due to change of pasturage) and on a farm in Cheshire
I have seen the operation successfully performed on a cow
that had eaten too freely of some succulent green food.
I believe it was kelp. Amongst the earliest references
to acupuncture for the relief of Tympany in the human
subject is a Thesis on Tympanite Hydropho by De la Font
1697. He advises puncture as a dernier resort for the condition.
During the 18th century puncture was advocated from time to time by various authors. Dr. Veale Sew of Leeds before an address before the Provincial Surgical and Medical Association in 1845, in touching upon the subject stated that paracentesis for symptoms of the abdomen had been unsuccessfull attempted by several British surgeons. and Dr. Houston in the Lancet for December 1854 mentions that Sir Henry Marsh was in the habit of relieving excessive distention of the abdomen by flatus, by puncturing with a small trocar, and without any bad effects. (The above history is taken principally from a paper by J. B. T. in the Lancet vol. xxvii. p. 56 et seq.) Acupuncture is not indicated so much by the amount of gaseous swelling as by the tension of the abdominal walls. It is usually recommended in the books that the centre of the area of resonance should be selected for puncture but where it is necessary to resort this procedure that point would be the centre of the abdomen. In the case of AE having decided the cause and position of the flatus trochanter aimed for certain parts of the bowel where I thought the flatulence was incarcerated, namely the transverse and descending colon. Dr. Houston advises that a trocar and cannula should be used having a diameter of to to $\frac{1}{2}$ of an inch (Vol. p. 890). I think the chief points to be observed in the choosing of the instrument are that it should be not shorter than four inches, fairly fine, very sharp, and such that the thumb can be applied without difficulty to the external orifice so as to prevent dripping from the end when the aspirator is withdrawn.
The aspirator should be kept in until the gas ceases to freely escape, when the whistling or hissing ceases, and whilst it is in it should be held steady as it is apt to wobble with each respiration movement, and this might lead to laceration of mucosa by the sharp point of needle inside gut. In support of this last suggestion I may quote Mr. Treves (Lancet, Oct. 10th, 1888) who mentions a case of Dr. Fagg's where it was proposed to retain the trochar in situ for some time. The instrument was carried round however by peristaltic action and so much pain occasioned that it had to be withdrawn. If the muscular coat retains the slightest amount of tonicity the puncture will be immediately closed since as the gut contracts the relative changes in the openings thru the various coats at once excludes the minute canal. By way of testing this whilst staying on a farm last year I obtained a piece of gut from a pig just killed (the lower end of bowel) one end was tied. Before tying the other end the gut which contained some feces had a little hot water poured in and very slightly shaken and finally was moderately distended with air. I then made a puncture with a very fine aspirating needle let out part of the air and then with slow steady movement the needle quickly the gut then was carefully lifted to in a horizontal position with the puncture underwent nothing whatever escaped. The whole operation was over within five minutes of the opening of the abdomen which was done as soon as pig was dead. Undoubtedly the principal and often the only
value of acupuncture is the temporary relief of the dis-
tension; but besides relieving the respiratory and circu-
tulatory difficulties and diminishing the chance of
rupture of the bowel, it also favours the reestablishment
of peristaltic action. It does this both by allowing the
overtretched and paralytic muscular fibres to regain
their power and by exciting peristalsis. This latter
was I think happened in the case of AE for on the oc-
casion of the first puncture patient complained imme-
diately afterwards of sharp colicky pain. It will be seen
at once that this also constitutes a danger, the reality
of which is shown by a case recorded in the Brit Med
Journal by Coupland & Morris (lost reference) in which
the violent peristalsis set up by puncturing led to ru-
pture. Besides being of temporary value acupuncture
is sometimes a curative measure. Petroff in the Brit.
Med Jour 1892, mentions a case of absolute constipation of six to
ten days duration respectively which simulated strangulation. In both cases
puncture and escape of a large quantity of gas was fol-
lowed within twenty four hours by copious stools and
recovery. Dr Cliver has also recorded a couple of cases
in which acupuncture though resorted to only as a-
palliative proved curative (Brit Med Jour II 89 p 13). The
first probably a case of partial obstruction rendered
complete by the development of flatuæe—the most fav-
ourable for acupuncture—The 2nd case in the opinion
of Dr Cliver was one of extreme atony of the bowel, though
whether the cause or effect of typhany he does not
clearly state. In the Brit Med Jour Vol II 82 p 167 is a case recorded by Dr. Worthington of Hens paralysis with acute symptoms of meteorism and stercoraeemia. The fluid and flakes were freely withdrawn, the hoover being left in 30 minutes; the following and 8th day a stool was passed and a good recovery resulted.

As regards the forms of obstruction most likely to benefit from acupuncture, Treves (in Sweet's Text of 1924) says evacuation of the contents of the upper segment of the bowel may completely relieve obstruction due to shrinking or acute bending of the bowel. It may also allow of the spontaneous reduction of a coil that is lightly held under a band or is involved, without severe strangulation, in some abnormal aperture. It may afford marked and long continued relief in cases of temporary complete obstruction, whether depending upon stricture, some form of encroachment, faecal accumulation, or upon infestation of a foreign substance. It may give decided relief in cases of chronic stoppage where symptoms of acute obstruction have suddenly developed as a result of changes following upon hyperdistension of the bowel. The dangers of the operation are held by some to be absolutely nil, whilst others hold exactly the reverse opinion. The chief dangers seem to be allowing fluid to pass by the tube, puncturing the bowel in the portion of ulcers or where it is gangrenous, or puncturing the bowel by setting up excessive peristalsis. Dr. Curtis in the New York Med Journal for 1888, p. 6252 sounds a warning note against the indiscriminate
use of puncture. He shows by reference to cases that even the smallest puncture may be followed by the coagulating of faeces. There is least danger of this when there is effusion of lymph on the surface of the bowel from peritonitis since this will limit the exudation even though the peritonitis may tend to cause paralytic of the muscular coat. Mr. Shield at a meeting of the Medical Society in Oct 91 (reported in Lancet of that date) gave notes of three cases in which he had punctured the large gut for destension, all three cases proved fatal. In Path. Trans. Vol. 5 is a case recorded by Dr. Bristow to which there was a stricture in the region of the sigmoid. Acupuncture was resorted to in order to relieve severe tympanites. Within half an hour symptoms of acute peritonitis manifest themselves & death ensued the following day. At the post mortem a perforation was found at the base of an ulcer at the lower end of the ileum. The puncture wounds had closed. In the other hand cases are recorded by Thomas Trowes Smith, where kocherizing has been used with good effect again & again in the same patient. (Trowes' last edit. p. 450) quotes a case where it was done 150 times, plaits the intestinal contents being drawn off. The evidence for it against might be indefinitely multiplied but I think owing to the arbitrary manner in which the question of post or preptic for has been answered the cases recorded in support of the dangers of the operation are not of much value. For instance Dr. Bristow's case, here it is quite possible that perforation perhaps hastened by extreme distension of the gut had occurred prior to acupuncture.
but fecal extravasation was prevented by the extremely close apposition of gut wall to gut wall, owing to distension, until acupuncture rendered the bowel fluid, when symptoms of peritonitis showed themselves. In Dr. Shields case also there is no actual proof that acupuncture was the cause of death. As for the danger of the acupuncture happening to be made into a friable piece of gut on the point of gangrene (Trousset intact both pouch) I think, given a case of obstruction in which a portion of the gut has become friable from commencing gangrene with and in which extreme Flanagan is present, the hopeless of such a case whatever the treatment renders this objection valueless. The case of the E was specially remarkable as showing the harmlessness of the operation in an extremely unfavourable case. The transverse colon was in an acute and probably friable condition and yet not only were there no signs whatever of peritonitis or of fecal extravasation having taken place but although carefully looked for not even the points of puncture could be found. This latter was accountable for by the small calibre of the instrument used and it not having been left in situ for more than a few minutes. In his case the treatment was only palliative, the atony of the gut being beyond recovery, but undoubtedly his only chance lay in the restoring of peristalsis, and as long as the meteorism existed this was impossible; and I still think, in the light too of the subsequent postmortem, that acupuncture was the
only hope in the way of operative treatment. Besides remedies for the relief of flatulent distension, Mereville, I believe, has suggested the injection of Belladonna, but it is doubtful whether such treatment would affect such an extreme symptoms.

The only other point in the treatment of such a case that I wish to refer to is the question of laparotomy, and I include all operative measures in the carrying out of which a laparotomy has to be performed, namely, colotomy, enterotomy, resection etc. Those who treat intestinal obstruction rank themselves on two sides. The one party is led perhaps by Mr. Jonathan Hutchinson who is a strong advocate for deferring operative treatment and for trying all other measures — measures which sound ridiculous (see case book of Surg. Vol. before quoted). The other side is led perhaps by Mr. Fred Rees who contends that when once it is decided that the constipation is due to some mechanical obstruction, it becomes the surgeon's duty to operate then and there. In a discussion on Intestinal Obstruction at the annual meeting of the British Medical Association recently the views of Mr. some of the leading association men were clearly expressed. I read my report of the discussion at which I was not present with unfortunately, in Therapeutic Gazette for Feb. 9th 94. Page holds that after careful examination under chloroform and failure to detect the seat of the trouble immediate abdominal section is indicated. Mr. Ruprecht said he it was his impression that the heavy mortality of laparotomy for obstruction in the London Hosp.
was due to the fact that the surgeon was called in too late. Mr. Hutcheson as I have already indicated depre-
cated laparotomy for intestinal obstruction of unknown
origin, and was considered that it was seldom successful
undertaken under those circumstances; and he advocated
his favourite treatment vigorous handling under an an-
aesthetic. Mr. Morrison stated that in all cases he had
operated and had proved fatal, when seen post mortem
—intervention exacted—he had never observed one likely
to benefit from Mr. Hutcheson's method of treatment
and he sought to show that Typhilitis and Syphilis
sometimes present symptoms of obstruction
and should attention to the probable result of vigor-
ous manipulation in such cases. My own idea from
reading this discussion is that in all cases of obstruc-
tion early examination under an anaesthetic is of
very great value and when in doubt remember that
delay renders the success of operation hopeless. (I
should have mentioned in support of Mr. Hutcheson's line
of treatment that in Lancer II 1931047 Dr. Swan gives a
case of obstruction relieved by abdominal tags under
an anaesthetic.) With modern appliances and methods
one would think that an exploratory incision two
or three inches long, just sufficient to admit two or
three fingers is attended with so very little danger to
the patient that it would be unjustifiable to delay
operation if relief is not obtained within a very short
time, and it is quite clear from Bryant's statistics,
to name one operator, that if an operation is to be
successful it must not be delayed until profound collapse has set in, and the patient is too far gone to bear it. As in all operative procedures, what the surgeon has to consider is, what are the chances of recovery if operation is not resorted to, and on the other hand what are the probabilities of success attending operative procedure. As regards the first the answer is practically, N. Medicine never cured an acute obstruction. Looked at from the standpoint of the pathologist recovery cannot be hoped for, whilst from the point of view taken by the clinician although spontaneous recovery does sometimes occur in certain forms of obstruction, the rarity of such an occurrence, and the difficulties in the way of making a differential diagnosis with certainty in cases of acute obstruction, does not justify any hopes being entertained of such a termination. Mr. Trevan in Tuxedobite p. 464 discusses at some length the question of laparotomy during peritonitis. I think the question is practically settled by what I have stated before on I think the authority of Thomas namely that all cases of acute obstruction sooner or later present the same train of symptoms rendering differential diagnosis a matter of great difficulty, and but apart from that, in most of the cases of acute obstruction quoted in this paper, besides many others I have read, was the separate diagnosis of peritonitis made. Laparotomy in such obstruction is therefore more of the nature of an exploratory in-
...is now, and is usually the first step of a more extended operation such as Whitaker's operation of enterotomy, colotomy, or resection. In some cases however all that is necessary is to unravel a twist. In the case of AE, in the light of the subsequent postmortem, one naturally asks oneself, the question, would an operation been of any avail? I think the probabilities of an operation being attended with success were very small. If the abdomen had been opened immediately over the lower end of the distended colon and an enterotomy performed, it is just possible that the bowel, if assisted by acupuncture, might have recovered itself; but as the delay of even a few hours to allow of a plastic adhesion between the surface of the wound and the gut wall would have been impossible, the danger of faecal extravasation would have been very great. The case illustrates the great advantage of early operation. If the diagnosis acule obstruction is made, without delaying in the slightest either operate at once, or if the other kind of operation is contraindicated we must be equally decided in our treatment, and never should that fatal compromise of calling in the surgeon when drugs fail, be made. The extreme slowness of growth with non-involvement of neighbouring structures and by specially lymphatic glands would have made the case of AE a very suitable one for resection of intestine - colectomy I believe - Mr. Bryant has recorded a case of malignant structure...
of sigmoid where the patient was still alive six years after the operation. Dr. B. Bradstreet lecture. This shows the extremely slow growth sometimes attended tumours in this region. The advantage of resection is of course that it is curative, whereas colotomy is never anything more than palliative. A paper in the New York Medical Journal Feb 13th 1886 gives 34 cases of colotomy with a mortality of 51.5 per cent. The chief difficulty in such an ease as Dr.'s of performing the operation would be owing to the difference in calibre between the gut above and the gut below the structure. This brings me to the conclusion of my dissertation. I would only add that I feel the practical importance of the cases makes it unneccessary for me to make apologies for having made it the subject of my thesis. For of all the cases that come under the care of the physician or surgeon, none are of greater moment than those presenting acute abdominal symptoms. Anyone of the profession whether General Practitioner or Specialist may suddenly be brought face to face with a case, such as this, of the utmost gravity, where a diagnosis must then I trust be made and the vital question is it a case for operation decided.

Temps