Researches on the pathology of the intestinal canal. Part I / by John Abercrombie.

RESEARCHES

ON THE

PATHOLOGY OF THE INTESTINAL CANAL.

PART I.

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RESEARCHES ON THE PATHOLOGY OF THE INTESTINAL CANAL.

PART I.

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AFTER all that has been written on this subject, the pathology of the intestinal canal still presents an interesting field of investigation. When we consider the delicacy of its structure, its great extent, and the important functions which it has to perform, we expect to find its diseases numerous and dangerous, and in their nature often obscure and intricate. Externally it is a serous membrane, and liable to the diseases incident to that particular structure; internally it is a mucous membrane, and liable to the diseases of mucous membranes; and it is, besides, through its whole extent, a muscular organ, upon the healthy action of every part of which it constantly depends for the proper discharge of its functions. It is six times the length of the body to which it belongs, and connected with it there are the delicate organs concerned in digestion and absorption, which have diseases peculiar to themselves.

The acute diseases of the intestinal canal seem to arrange themselves under two heads. (1.) Diseases affecting it as a

muscular organ, or derangements of its peristaltic motion. (2.) Inflammatory diseases. Under the former division, we are led chiefly to the important subject of Ileus; under the latter, to a class of diseases, which, though they agree in the general characters of inflammation, vary remarkably according to the particular structure in which they are seated, the serous, the mucous, or the muscular coats. The organic diseases, and several chronic affections of the intestines, are so connected with one or other of these leading classes, that the consideration of them must be very much combined.

Part I.

Of Derangement of the Peristaltic Motion of the Intestinal Canal.

The peristaltic motion of the intestinal canal consists of a series of alternate contractions and dilatations, to which nothing analogous exists in any other part of the body. In regard to the various conditions of the muscles concerned in it, there are several circumstances that deserve particular attention.

When healthy intestine is empty, it seems to contract entirely, so as to assume the appearance of a solid cord, white and corrugated. Nearly the whole tract of intestine may occasionally be seen in this state in the bodies of infants, who before death had been much purged, or had been affected with diarrhœa without disease of the coats of the intestine. A portion of intestine, again, that has been the seat of inflammation and gangrene, though it may be empty, does not contract in this manner, but falls flat, presenting a broad surface like an empty bag. (See Case 4th.) The contraction, therefore, in the former case, is a muscular action which is lost in the latter; it is that property of muscles, by which they contract when nothing opposes their contraction. It has been called by physiologists the tonic power of muscles: it is not a mere shrinking by elasticity, but a muscular action of great power, as may be seen on the surface of the body, in the force with which muscles contract when their antagonists are paralysed.

When intestine is thus empty and contracted, it is probable that the muscular fibres are at rest; and the presence of some contents is probably required to bring into action the peristaltic motion. One portion of the canal then contracts upon the matter contained in it, propelling it forward into another which is thus distended, and then contracts in its turn, propelling the contents forward into a third portion, and so on. Now various actions take place in this process. When a portion of

intestine, which I shall call No. 1., propels its contents forward into a portion, No. 2., which is supposed to be empty, it must contract with such force as not only to propel the contents, but also to overcome the tonic contraction of No. 2. Again, when No. 2. contracts and propels the contents into another portion, No. 3., by what power are they prevented from returning backwards into No. 1.? It is probable, that though No. 1. and No. 3. are both in a state of contraction, they are nevertheless in a different condition, No. 3. being contracted merely by its tonic power, and No. 1. retaining, besides this, a degree of the actual force with which it had lately contracted in propelling the contents into No. 2., and being thus in a state less liable to be distended than No. 3. There are also circumstances which render it probable that relaxation to a certain extent takes place in the fibres of the lower part, while the peristaltic motion is going on in the healthy manner.* Thus in the healthy condition of the parts, the motion is propagated downwards, not perhaps in the simple manner which I here suppose, but in a manner sufficiently analogous to it, to answer the purpose of this illustration. In the actual condition of the function in a healthy body, a part does not probably empty itself at once, but by a succession of contractions, propelling forward its contents in small portions. There are other circumstances also by which the action is complicated, but they do not affect the case which I have given as an illustration, and which is perhaps precisely, or nearly that which occurs under the action of a purgative, and in certain diseases of the canal in which its action is morbidly increased.

Now this process is entirely a muscular action, and there are various circumstances by which it may be deranged. When the portion No. 1., for example, has contracted and propelled its contents into No. 2., if this does not contract in its turn, the matters will lodge in it as in an inanimate sac, and the process will be interrupted: the same will take place, if No. 2. does not contract with such power as to overcome the tonic contraction of No. 3. If No. 2., again, contracts with its regular power, while there exists some obstacle to the dilatation of No. 3., the contraction will dilate No. 1. instead of No. 3., and the action will be inverted. A remarkable example of this will be found in Case 19th, in which the action was propagated downwards, till it reached the extremity of the colon, where it was inverted by an organic cause impeding the dilatation, and thence regu-

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* See Mr A. Cooper's account of the phenomena observed in a case of artificial anus. Treatise on Hernia, page 38.

larly propagated upwards till it terminated in a fit of vomiting, a certain proportion of the contents, however, being continued downwards, and discharged by the rectum in the natural way.

The causes, therefore, which may interrupt the peristaltic action, are principally referable to two heads. (1.) A part having its muscular power destroyed or weakened, so as to render it incapable of acting in unison with the other parts. (2.) A part being, from some cause, incapable of that degree of dilatation which is necessary for enabling it to propagate the action. Let us consider briefly each of these cases.

I. Suppose that the series of contractions and dilatations have gone on through successive portions of intestine, which I shall call Nos. 1, 2, 3, 4, and 5, and that No. 5. has its muscular power so diminished, as to be incapable of dilating No. 6.; an interruption will take place, and an accumulation of matter in No. 5. The healthy parts above are still acting, and propelling additional matter into No. 5., and if by this additional stimulus it shall be excited to contract with additional force, the interruption will be removed. If not, the healthy parts above will be excited by the interruption to increased contraction, and one of two consequences will probably follow. No. 5. being considered as an inanimate sac, by the increased impulse from above, the matters may be forcibly driven through it, so as to distend No. 6., and so continue the action, allowing No. 5. to contract and recover itself; or, if it fail in this, the increased impulse will only tend to increase the distention of No. 5. until it is distended beyond its power of contraction, or paralysed from over distention. Thus, I conceive, is formed a paroxysm of simple ileus, and the effects vary according to particular circumstances. From the part thus diseased, the action may be inverted and communicated upwards, or if the healthy parts above are loaded with contents, they may be thrown into still more violent action downwards. If this action should still fail in restoring the natural course of the function, the parts will be exhausted in their turn. The dilatation will extend to No. 4., and the parts above continuing to act, this also will be distended beyond its power of contraction, and so on. The appearances on dissection in fatal ileus correspond with these conjectures. The lower part of the canal is found empty, contracted, and healthy. This terminates abruptly at a certain point, and is succeeded by a portion distended to the greatest degree, loaded with feculent matter and flatus, in some cases quite thin and transparent, in others inflamed and gangrenous. From this portion, the distention is traced upwards, sometimes to the very commencement of the canal. The immense quantities of gas

which are found in the distended intestine in these cases, are probably separated from the stagnant matters contained in it, and, not being thrown off, must prove a powerful cause of distention.

II. Suppose the series of contractions and dilatations to be propagated downwards as before, and that, from some cause, No. 6 is rendered incapable of the same degree of dilatation as the other parts, though without being by any means actually obstructed.—The effect here will vary according to circumstances. From the state of the action in general, and the usual quantity of contents, it may happen that, in ordinary cases, no greater degree of dilatation is required than No. 6 is capable of transmitting, and the process will go on without interruption. But if, from an increased quantity of contents at a particular time, or an accidental accumulation of flatus, a greater degree of distention shall be communicated to No. 5 than No. 6 is capable of, then an interruption will take place in No. 5 in the same manner as in the former case,—and the parts above continuing to act, it will be in danger of being over distended. The interruption may be temporary,—may frequently take place, and be soon removed, until at length, from some cause which eludes our observation, it terminates in perfect ileus. This form of the disease is strikingly illustrated in Cases 9 and 10, in which it is to be particularly observed, that there was no mechanical obstruction. In such cases also, it is to be remarked, that a certain quantity of the contents may pass through, as occurred in Case 19, and probably in Case 9. In Cases 9 and 10, the cause was evidently of long standing. Cases 11 and 12 exhibit remarkable examples of the affection from causes of a more recent kind. This form of the disease may also arise from organic contractions of a mechanical nature, as in Cases 13 and 14, in which the contraction had gone on, producing little inconvenience, until it terminated at length in fatal ileus. This modification of the disease may also be fatal by gradual exhaustion, without perfect ileus, as in Cases 19 and 20.

In this manner, I conceive, is formed the paroxysm of ileus. The farther progress of the affection varies in different cases. After a certain period, the parts may recover their healthy relations, and the disease be removed,—or it may continue till an extensive portion has been paralysed by over distention, and the case probably becomes irremediable. There is reason to believe, that it may in this state be fatal, without farther disease; but the common progress of it is to inflammation and its consequences. We cannot explain this phenomenon; but we know, that all parts that are rapidly distended are liable to in-

flammation. We see it in the inflammation which attacks the distended urinary bladder, and the integuments covering certain tumours which have increased rapidly. We see the converse in the remarkable effect of collapse of the cornea in relieving inflammation of that organ.

The opinion which I have proposed in regard to the pathology of ileus, differs considerably from a doctrine which considers this disease as originating in spasm. According to this system, the parts which on dissection are found contracted, are supposed to be contracted by spasm, and, consequently, to be the primary seat of the disease. Many considerations induce me to doubt this hypothesis.

1. Though all muscular organs may be considered as liable to spasm, I think it very doubtful whether such fibres as those of the bowels are really affected by it in such a degree as to prove a cause of disease. Our knowledge of the pathology of such muscles must be derived chiefly from the urinary bladder, as this organ admits of a more correct knowledge of its condition under disease than any other internal muscular organ. Now, we are familiar with a state of the bladder in which it is distended beyond its power of contraction; but we have no reason to believe, that it is ever spasmodically contracted so as to resist distention. We talk of spasm of the stomach; but if the stomach were contracted by spasm, in the manner which this hypothesis supposes in regard to the intestines, its cavity would be so much diminished that very little could be received into it. But, instead of this, we find persons labouring under the affection which has received this name, swallowing hot water and other liquids in large quantities.

2. Spasm, even in powerful muscles, is generally of short continuance, and it is very uncommon to find it continuing for such a length of time as this hypothesis supposes. The only example, perhaps, is in trismus, in which very powerful muscles are concerned. It is certainly very doubtful whether such fibres as exist in the intestinal canal could contract with such force, and continue in powerful contraction for so long a time as would be required to constitute an attack of ileus.

3. A great extent of intestine, perhaps the lower half, may occasionally be found in this contracted state. It is not probable that such an extent should be at once contracted by this powerful spasm; and that the whole of this portion is not contracted by spasm, appears from the facility with which, in many cases, it admits of large quantities of fluid being thrown in by injection.

4. In fatal ileus, which has been going on for many days,

the contracted portion may be still found perfectly healthy, the morbid appearances, inflammation, adhesion, ulceration, and gangrene, being entirely confined to the distended portion.

5. That the distended part is really in a state of paralytic inaction, is probable, from the remarkable case (Case 12) in which the disease was seated so low, that the contracted part could be fully dilated by mechanical means, but without relieving the disease.

6. That spasmodic contraction is not the primary disease, is probable from many cases in which there is really no obstruction, but the bowels are freely moved at various periods of the complaint. (See Cases 1, 3, 8, and 9.)

From these considerations I am induced to believe that, in simple ileus, the proper seat of the disease is the distended portion,—that this portion has lost its power as a muscular organ, being distended beyond its power of contraction, and that the contracted part (which has probably been emptied by injections) is kept in that contracted and quiescent state by its tonic power, and the suspension of the action from above, by which, in the healthy condition of the parts, it would have been distended.

VARIETIES OF ILEUS.

It is probable that the morbid action at the commencement of an attack of ileus, is a derangement of the relation in muscular action, betwixt one part of the intestinal canal and another immediately adjoining, with which it ought to have acted in concert. When we endeavour to investigate the manner in which this derangement may take place, we find the disease appearing under three modifications.

1. Simple Ileus, without any organic affection.
2. Ileus, proceeding from an organic affection, but of such a nature that it acts by deranging the muscular action, without mechanical obstruction.
3. Ileus with mechanical obstruction.

Sect. I.—*Simple Ileus.*

Simple Ileus is to be viewed as the disease of a muscular organ, and originating in derangement of muscular action. The leading appearances which the fatal cases present to us are, one part of the intestinal canal empty and contracted, and another part highly distended. In attending farther to the phenomena of the disease, the following varieties deserve our attention.

I. The disease may be fatal in this state of over distention, without inflammation.

Case 1.—A man, aged 40, (a shoemaker,) had been for some time affected with slight symptoms which were referred to the liver. On the 25th of August 1814, he was seized with an attack resembling cholera, which, after some medicine that was given him, was speedily succeeded by the usual symptoms of Ileus. He had severe pain of the abdomen; urgent vomiting; and costiveness; his pulse was generally about 96, and at last rose to 120. The pain was at times increased by pressure, but not uniformly so. He was twice bled, and the other usual remedies were employed without avail. He died on the 30th. I saw him for the first time on the 30th, when he was moribund. His bowels had been freely moved by medicine on the 29th.

Dissection.—The lower part of the right lobe of the liver was unusually soft. The only other morbid appearance was a considerable part of the intestinal canal in a state of great distention, without inflammation.

This is perhaps an unusual termination of the disease in adults, but I believe infants are frequently cut off in this manner, by the mere interruption of the healthy action of the intestinal canal.

II. The disease may be fatal with recent inflammation, without gangrene, or any of its other consequences.

Case 2.—A woman, aged 20, (23d June 1813,) was affected with violent pain of the upper part of the abdomen and towards the left side, at times increased by pressure, and varying considerably in its degree of severity; frequent and violent vomiting; obstinate costiveness; belly tumid and tense; tongue white; pulse 76, and rather small. On the 16th she got wet during the flow of the catamenia, which ceased, but returned at night; pain about the umbilicus began on the 17th, and increased gradually; vomiting began on the 21st, with hiccup.

Blood-letting; blistering; various purgatives; injections; warm baths, &c. were employed by a physician of eminence.

24th. Incessant screaming from the violence of pain; every medicine vomited instantly; pulse 88, and rather small; frequent hiccup; pain increased on pressure; no stool.

25th. No stool; pain almost gone; every thing vomited; pulse very feeble.

26th. No stool; free from pain; vomiting continued, with hiccup. Died in the night.

Dissection.—The whole of the colon, and about 12 inches of the lower extremity of the ileum, were empty, contracted, of a white colour, and seemed perfectly healthy. The remainder of the small intestine was distended to the greatest degree, and appeared thin and transparent. It contained chiefly watery matter and air. On the surface of the distended part there was in several places considerable inflammation, especially at the lower part, near the contracted portion. These parts were of a vivid red colour, without any tendency to gangrene,

and without exudation. There was a small abscess in the left ovarium; the stomach, liver, &c. were healthy.

III. The disease may be fatal with extensive inflammation and gangrene.

Case 3.—A young man, aged 19, (17th October 1813,) was affected with violent pain round the umbilicus; incessant vomiting; abdomen hard, tense, and a little tumid; bowels obstinately costive; pulse 84; countenance depressed and anxious; had been ill six days, during which a variety of remedies had been employed without relief.

In this severe case, every variety of practice was employed in the most active manner; repeated general and topical bleeding; blistering; various purgatives and injections; tobacco injections; cold applications; cold injections; crude mercury, &c. &c.

18th. Pulse 120; no relief; belly tympanitic; some feculent discharge by injections; urgent vomiting, but not feculent.

19th. Pulse 112; symptoms rather abated; some feculent evacuations.

20th. Pulse 92 to 96; symptoms aggravated; belly much swelled; every thing vomited almost instantly; pain continued violent; some evacuation of watery matter.

21st. Pulse not to be felt at the wrist; in the humeral artery it was 80 and regular; violent pain; no stool; great depression. Died an hour after the visit.

Dissection.—The stomach was healthy. Almost immediately below it, the intestine was distended to the greatest degree, in some places quite thin and transparent; in others highly inflamed and gangrenous, bursting when handled; in other places firm, though perfectly black. This state of disease continued to the middle of the small intestine, where a portion 12 inches in length was empty, contracted, and in its appearance quite healthy. Below this the canal was again diseased as above, distended, inflamed, adhering, and gangrenous, until three inches from the termination of the ileum, when it became suddenly contracted, empty, and white; but this and the other contracted portion were perfectly pervious, easily dilated, and in their coats quite healthy. The colon was healthy and collapsed, except at the lower part, where it contained some consistent feces; the other viscera were sound. The diseased portion of intestine was chiefly distended by air. It contained in some places thin feculent matter, but in no great quantity, and no consistent feces could be found in any part of it.

Case 4.—A boy, aged 12, (26th October 1813,) was affected with violent pain of the belly, chiefly around the umbilicus, vomiting, and some degree of swelling of the belly; pulse 50, soft and regular. Had been ill two days, during which he had had no stool. Various remedies were employed without benefit. 27th. Pulse 120, pain increased, with tension of the belly and tenderness on pressure, had only vomited once. Blood-letting was used in the morning, and again at 3 P. M. after which the pulse fell to 112. The other usual means were em-

ployed without procuring any stool; the pain continued unabated; the pulse rose again to 120, and became extremely weak, with coldness of the body; and he died between seven and eight o'clock in the evening, having continued in violent pain until immediately before death. I did not see this case during the life of the patient. I was present at the examination of the body. *Dissection.*—The stomach was sound, the small intestine was a little distended and slightly inflamed, especially at the lower part, where it had contracted some adhesions. The whole right side of the colon was in a state of gangrene, especially the caput cæcum, which had burst and discharged into the cavity of the peritonæum a large quantity of fluid feces. The diseased parts appeared to have been much distended, and, after being emptied by the rupture, had not contracted, but had fallen flat, presenting a very broad surface like an empty bag. At the upper part of the ascending colon, this diseased part terminated at once in healthy intestine, white, collapsed and empty. This was the state of the remainder of the colon, except the sigmoid flexure, which, with the rectum, contained much consistent feces.

The causes of simple ileus are not well ascertained, and the operation of them is involved in considerable obscurity. It is probable, that they may be referred to two heads: 1. The presence of substances which oppose some resistance to the propelling power of the canal. 2. Causes which diminish the muscular power of a part of the canal itself. 1. The action of the former is illustrated by those cases in which ileus has been distinctly traced to the presence of a large biliary calculus, or other concretion in the intestine. Some of these cases have been fatal, and, on dissection, the usual appearances of ileus have been found above the seat of the concretion. In others, after violent symptoms of several days continuance, the extraneous body has been expelled with immediate and complete relief.* It is probable that masses of indurated feces, and indigested articles of food, may act in this way as a cause of the disease. One severe case which I am acquainted with, seemed to have been induced by a large quantity of nuts, which had collected into a mass in the bowels, and were at length discharged, with relief of all the symptoms. If one portion of the canal were in that state of dilatation which precedes its contraction, and this contraction were impeded by a cause of this kind lodging in the portion immediately below, while the healthy parts above were forcibly propelling new matters downwards, it is, I think, easy to conceive how the former part might be-

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* See a Case by Mr Thomas, Med. Chir. Trans. Vol. VI. p. 98.

come over-distended, in the manner which I have conjectured to constitute ileus. 2. The causes of the second class are more obscure, and perhaps still more founded in conjecture. We know the uneasy feelings that are produced by an accumulation of gas moving slowly through the bowels, distending one part after another, in the affection which is called flatulent colic. The distended part in this case can often be felt externally, so as to be ascertained to be the seat of the pain; and it is sometimes so firm and tense, that I have more than once seen it mistaken for a mass of organic disease. In a short time, perhaps in a few hours, it is gone. Now, were a distending cause of this kind, in its progress through the canal, to arrive at a part, the muscular power of which had been impaired, it is, I think, easy to conceive how this part might be distended to a degree from which it could not contract,—the consequence, I imagine, would be an attack of ileus. That this is a real disease of muscular fibres of this kind, we know from the effect of distention of the bladder, and we know also, that when the fibres have been once weakened by such an attack, it is liable to occur again from a smaller degree of distention than that which originally induced it. On the same principle, a person who has suffered an attack of ileus is often for a considerable time liable to violent attacks of pain in the abdomen, upon any irregularity in his diet, or want of attention to his bowels. What are the causes that may weaken the muscular power of a part of the intestine in the manner which I here suppose, we know not with certainty; perhaps cold is one of them. All muscles are liable to the rheumatic inflammation, and we see that it not only diminishes their power, but, in many cases, produces perfect paralysis; and even without the rheumatic state, cold is capable of directly paralysing muscular fibre. Perhaps another of these causes is over-excitement. We see ileus supervene upon cholera, and upon diarrhœa which has been attended with much irritation, especially in old people. But, without speculating farther on this point, I think we have much reason to suppose, that many cases of ileus are connected with a certain predisposition in the state of the parts. In what a different manner these may be affected by the same cause, is strikingly illustrated by the two following cases. In the one, a mechanical cause of some continuance produced violent symptoms, which ceased whenever the cause was removed. In the other, a similar cause of short continuance was followed by ileus in its most violent form.

Case 5.—A gentleman, aged about fifty, was affected with pain of the abdomen, urgent vomiting, and obstinate costiveness; the ab-

domen was tumid and tense; the pulse natural. He had been in this state for three days, during which a variety of remedies had been employed without benefit. On examining the groin, I discovered a hernia the size of a pigeon's egg, which was soft, and not painful, and was reduced at the first touch. A laxative injection being then given, operated freely, and all his symptoms were relieved immediately.

Case 6.—A woman, aged about thirty, on 10th October 1814, was suddenly seized with umbilical hernia, which protruded to the size of an egg, and was accompanied by severe pain across the upper part of the abdomen. I saw her about two hours after the appearance of the hernia, and it was very easily reduced, but the pain of the abdomen continued, and various purgatives and purgative injections were given without benefit. Without detailing the particulars of the case, it is sufficient for my present purpose to state, that it turned out to be ileus in its most violent form, which resisted the most active treatment for six days, and then terminated favourably, by perseverance in the usual remedies.

In these two cases, the cause was the same, and a corresponding interruption took place in the muscular action of the intestine; but in the one, this was recovered from as soon as the cause was removed; while in the other, it is probable, that a part of the canal had been injured in its muscular action in the manner which I have already alluded to, as calculated to give rise to an attack of ileus.

There are various circumstances in the history of ileus which favour the opinion, that a portion of the intestine is for a time deprived of its muscular action, and reduced to the state of an inanimate canal. When the disease is beginning to give way, the first discharges are generally watery; and we frequently see fluid matter discharged of such an appearance as gives every reason to believe that it had come from the higher parts of the canal, and in such quantity as leads us to suppose that the bowels must be emptied. Yet after this, the patient who has been taking very little nourishment, and chiefly liquid, begins to discharge, and often continues for days to discharge, quantities of indurated feces that are almost incredible, and which must have been lodging from the commencement of the disease. This can only be accounted for by supposing, that a portion of the canal had been distended, and incapable of action; that there the hardened feces had lodged, while fluid matters were driven through by the action of the healthy parts above, but that the hardened matter was not discharged till this part itself had recovered its muscular power.

Another circumstance, which I think can only be explained on

the same principle, is, that there is a modification of the disease, in which there is no obstruction, but, by the usual purgatives, liquid stools can be procured through nearly the whole course of the disease. Recovery in these cases is sometimes accompanied by immense discharges of hardened feces, which must have been lodging from the commencement of the attack.

Case 7.—A lady, aged 35, (3d December 1813,) was affected with vomiting, and pain over the whole abdomen, which was rather tense and painful upon pressure. Pulse rather frequent. She was bled and blistered, and took laxative medicine, which operated freely, bringing off thin feces of a natural appearance. After another bleeding, on the following day, she became much exhausted, her features shrunk, her pulse feeble, and of extreme frequency; laxative medicine, which had been given again, brought off fluid feces. She now took wine in large quantities for three days, and, under this treatment, she gradually recovered from the state of exhaustion, and the pulse came down in frequency. An injection given on the 7th operated freely; and, on the 9th, she took castor oil, with which she began to discharge hardened feces in the most extraordinary masses, and in immense quantity. This discharge continued spontaneously for four or five days, and the whole quantity discharged was almost incredible. On the 15th she was well.

This modification of the disease may be fatal without obstruction.

Case 8.—A gentleman, aged about 40, (10th November 1812,) was seized with vomiting and pain of the left side of the abdomen, his pulse varying from 40 to 60; took purgative medicine, which operated fully; and on the 11th, the vomiting had subsided, but the pain continued severe, and was more general over the abdomen; pulse 70.—12th. A tympanitic swelling appeared on the left side of the abdomen, which, on the 13th, had extended also to the right side; violent pain continued; pulse natural. On the 13th, he took purgative medicine, which operated fully four or five times. On the 14th, he was free from pain, but the swelling had extended over the whole abdomen; pulse still natural. On the 15th, the pain returned with great violence, with vomiting, and frequent pulse. It continued violent through the day and night, and he died early on the morning of the 16th. The body was not examined; but, from a case considerably similar, which is related by Morgagni, I think it probable that the distended parts had run rapidly to gangrene.

Sect. II.—*Ileus, with Organic Disease of such a Nature that it acts by interrupting the Muscular Action of the Intestine, without Mechanical Obstruction.*

Case 9.—A gentleman, aged 24, had been, for several years, liable to violent attacks of pain in the abdomen, chiefly affecting the right side. The attacks usually continued a few hours, and were very un-

certain in their recurrence; sometimes they returned every evening for weeks together, and sometimes he was, for weeks or months, perfectly free from them. One of his longest intervals was ascribed to taking daily a small dose of Epsom salt. On the 11th of June 1818, he suffered one of these attacks, which came on in its usual manner, and affected him with violent pain across the lower part of the abdomen, which was drawn into balls; no vomiting; pulse 60; pain alleviated by lying on his belly across the edge of his bed. Was seen by an eminent practitioner, who gave him an opiate and a purgative with relief; bowels freely moved; 12th, was better, but felt weak; 13th, walked out, but at night the pain returned with violence; pulse 60; an opiate was given without relief. At four o'clock in the morning of 14th, pain continued unabated; pulse 108; was bled to ℥xii. and injections given, by which his bowels were moved freely, four times; at 9 was found pale, cold, and exhausted, and pulse scarcely to be felt; but there was still severe pain in the abdomen, which was a little tympanitic, but not tender to the touch. He died at two P. M. I saw him two hours before death.—*Dissection.*—The small intestine was greatly distended, and, on many places, especially on the ileum, there were inflamed portions, with effusion of coagulable lymph, and others of a dark colour, approaching to gangrene. The greatest inflammation was at the very extremity of the ileum. The right extremity of the colon was singularly turned upwards upon itself, towards the outside, so that the surface of the caput cæcum was in contact with the surface of the ascending colon, and a firm adhesion had taken place between them, about two inches in extent. The adhesion was very firm, and was evidently of long standing; the parts immediately concerned in it appeared to be a very little thickened; the colon and the caput cæcum were in other respects quite healthy, and without any vestige of inflammation; other viscera healthy.

Case 10.—A man, aged 63, had been affected with double inguinal hernia for 40 years, both of which were easily reducible, and he had been for many years liable to violent paroxysms of pain in the abdomen, during which the herniæ were generally "forced out." He suffered one of these attacks more severe, and longer continued than usual, in November 1812. It began with shivering and nausea, with pain in the abdomen, and continued with various remissions and aggravations. He had been able to walk out about a week before his death, but was never free from pain in his bowels. During this attack, the ruptures had protruded frequently, but he always reduced them with ease till the morning of the 29th, when he failed. They were, however, readily reduced by a gentleman who then saw him, but at night, when I saw him, they had again protruded. They were easily reduced, but protruded again almost immediately, though he was lying on his back. He had some vomiting, but not urgent; violent pain over the abdomen, which was tender and extremely hard; pulse 120, and irregular; features collapsed; bowels had been freely moved by injections. Died in three hours after the visit.

Dissection.—Both ruptures were completely reduced, and without any adhesion to the sacs. The sacs were considerably thickened; the mouths of them were large and free; the inner surface of the sac of the left side was inflamed and sloughy. The small intestine was, down to the middle of the ileum, greatly distended, and, in many places, inflamed and gangrenous. The disease stopped at the part of the ileum which had formed the hernia of the right side; the surfaces of this portion, which had been in contact in the hernia, had formed a firm adhesion to each other, about three inches in extent. At this place, the coats of the intestine were somewhat thickened, but so as to produce very little diminution of its area, and it was otherwise quite healthy.

Case 11.—A boy, aged eight, was affected with frequent vomiting and obstinate costiveness; his belly was swelled and tympanitic, but without much pain or tenderness; he was pale and emaciated; his pulse frequent and feeble; he had been ill for ten or twelve days. The complaint had begun with severe pain and diarrhœa; this was succeeded by costiveness, which, for seven or eight days, had resisted every remedy; for the last two days every medicine had been vomited; his exhausted state left little room for active practice, which indeed had been fully tried before; in two days more he died. *Dissection.*—The small intestine was distended to the greatest degree, down to a point in the ileum, where the following cause of the disease was discovered. Between two turns of intestine, there was a narrow band of adhesion, rather more than an inch in length. It was evidently of long standing, and, while the parts had remained contiguous, had produced no bad effect, but by some relative change of situation of the parts, another turn of intestine had insinuated itself between the two adhering portions. This portion, however, was healthy. The effect appeared to be, that the band of adhesion being thus put upon the stretch, the peristaltic motion had been interrupted. At the lower attachment of the adhesion, the intestine was drawn aside into "puckers," and precisely at this point the distention ceased, and the canal became white, empty, and collapsed. At this point, however, there was no obstruction, and the coats of the intestine were perfectly healthy, except a circumscribed redness on the inner surface, at the point corresponding with the attachment of the band of adhesion. On the distended intestine there was slight appearance of superficial inflammation, but it was of small extent, and appeared to be quite recent.

Case 12.—A man, aged 60, (23d April 1815,) was affected with vomiting; pain of the abdomen, which was swelled and tympanitic; obstinate costiveness; pulse 108, and soft; countenance pale and exhausted; pain not increased by pressure; had been ill a week, during which powerful remedies had been employed without benefit; had formerly had two attacks of the same kind, one of which continued a week. This man lived in great distress till the 28th, without any remarkable change in his symptoms. The swelling of the

abdomen increased gradually, until it resembled that of a woman at the most advanced period of pregnancy, yet to the last he could bear pressure upon every part of it. His pulse varied from 108 to 116: his death was sudden; he had been out of bed, and dressed the day before, and in the morning of the day on which he died he did not appear worse than usual. Every powerful remedy was employed, without the slightest benefit. *Dissection.*—On opening the abdomen, a viscus came into view, which appeared to be the stomach enlarged to three or four times its natural size. On a more accurate examination, this turned out to be the sigmoid flexure of the colon, in such a state of distention, that it rose up into the region of the stomach, and filled half the abdomen. The stomach was contracted and healthy. The small intestine was healthy at the upper part, lower down it became distended, and of a dark colour; at the lower part it was very much distended, with some spots of gangrene. The colon was greatly distended; in some places it was not less than five or six inches in diameter, and terminated in the distended sigmoid flexure already mentioned; the rectum was healthy and collapsed; the sigmoid flexure was of a dark livid colour, and contained air and thin feces. What appeared to be the cause of this affection remains to be mentioned. The enlarged sigmoid flexure was found to have taken a remarkable turn upon itself, so that what was naturally the right side of it lay to the left, in contact with the descending colon, and the left, or ascending part of it, lay on the right. The consequence of this was, that the rectum, as it descended from the former, passed down behind the lower, or first turn of the sigmoid flexure, where it first takes the turn from the descending colon; also the rectum itself, at this part, received a twist as if half round. Exactly at the point where this twist was, the distention and dark colour of the intestine terminated abruptly, and it became white and collapsed. At this part, however, there was no mechanical obstruction, for the parts were pervious, and, except the twist, perfectly healthy; and farther, it happened in this singular case, that I had an opportunity of ascertaining the state of them during life. On the 25th, three days before his death, having exhausted all the ordinary means, I was induced to examine the rectum with a large ivory-headed probang, and I found at a certain depth, (which was afterwards found to correspond with the point where the rectum was twisted,) a slight obstruction to the passage of the probang; however, it passed up with little difficulty, and was withdrawn without any. A piece of the intestine of an animal tied at the end was carried up beyond this point, and then strongly distended by injecting water into it. In this distended state it was retained for some time, and then slowly withdrawn; but no discharge followed it, though, as I have already mentioned, the distended part contained only air and fluid feces.

To this part of the subject are to be referred the well known cases of very small herniæ, which include only a small portion of one side of the intestine. I have seen several of these, and I

have a preparation from a fatal case, in which the strangulated portion is not above one-third of an inch in depth, and in diameter like the point of the little finger, the area of the intestine, except this little portion, being quite free. The symptoms and the morbid appearances were precisely similar to those in the cases already mentioned; the intestine above the hernia being greatly dilated and highly inflamed, with some portions gangrenous, and, below the hernia, empty, collapsed, and healthy.

The cases which I have described under this article appear to me to be of considerable importance, and to throw some light upon the pathology of ileus. The disease in all of them was distinctly referable to a cause which was obvious on dissection, and yet the cause was such as produced no mechanical obstruction. This was most remarkable in Cases 9 and 10, in which the cause was evidently of long standing, and in Case 12, in which there was an opportunity of fully dilating the contracted portion, three days before the death of the patient. In these cases, then, the seat of the disease must have been the distended portion. We have seen it existing without inflammation, and the only idea we can form in regard to the nature of the primary disease, I think, is a muscular organ distended beyond its power of contraction. The paroxysms which had often occurred in Cases 9 and 10 were also remarkable. It is probable that, while the intestinal contents were in small quantity, and the action extremely moderate, the diseased portion was able to act in concert in the natural and healthy manner, but that, when a certain greater degree of dilatation took place in the parts above, a corresponding dilatation could not be communicated downwards, and an interruption occurred which occasioned the paroxysms of pain. The over distention, in these cases, was after a certain time removed, until at last, from some cause which eludes observation, it took place in a greater degree, which was not recovered from, but, passing into inflammation, was fatal. In Case 11 it is worthy of observation, that the mere distention was fatal; the appearance of inflammation being so slight and recent, that it could not be considered as the cause of death.

Sect. III.—*Ileus, with Mechanical Obstruction.*

On this part of the subject, I shall do little more than relate a few remarkable examples; and they are referable to three heads, contraction of the intestinal canal,—intus-susceptio,—and internal hernia.

Case 13.—A man, aged 70, a tailor, had complained for several

weeks of a deep-seated pain, referable to a particular spot at the lower part of the abdomen; but it was not so severe as to prevent him from following his usual occupations. On 27th July 1815 he was seized with violent pain of the belly, vomiting, and costiveness; on 28th, belly became swelled, tender, and tympanitic; pulse natural; 30th, some feculent discharge was procured; pulse about 100. Died rather suddenly on 31st.

Dissection.—The whole of the small intestines, and the colon, were in a state of uniform distention, and of a dark colour. The distention stopped at the second turn of the sigmoid flexure, before it turns down to terminate in the rectum. Here the intestine was for about an inch and a half very much thickened in its coats, and its area was so diminished as scarcely to admit the point of the little finger. The inner surface of this portion was covered with red fungous excrescences, like granulations; much feculent matter was collected above this place. There was no adhesion in the other parts of the intestine, nor any appearance of active inflammation; but a dark leaden colour was nearly uniform over the whole of it.

Case 14.—A woman, aged 60, had complained for some time of frequent uneasiness in her bowels, with flatulent distention.—27th August 1817. Uneasiness increased; no stool for four days; but no violent symptoms. From this time, she resisted every remedy, but still without any violent symptoms; the belly became gradually more and more enlarged, but there was no fixed pain, only occasional griping; no fever; no tenderness, and little vomiting. She died on 4th September, having lain for the last three days in a state of extreme lowness, with coldness of the whole body. *Dissection.*—The whole tract of the intestinal canal was prodigiously distended, and there was, in several places, recent inflammation, with exudation of coagulable lymph. The disease extended to the rectum, about four inches from the anus, where the intestine was so contracted as scarcely to admit the point of a small finger. Behind this spot, there was a mass of diseased glands, and the contraction was occasioned by a firm flat substance, which was connected with this mass, and crossed the intestine in front. This being cut through, the intestine was set at liberty, and its coats were sound.

Case 15.—A woman, aged 22, (9th November 1818,) while sitting dressing her child, was suddenly seized with vomiting, and pain at the stomach; the pain soon after moved downwards, and fixed, with great severity, in the region of the head of the colon; the whole abdomen became painful and tender.—10th, Urgent vomiting, violent pain over the whole abdomen, with frequent paroxysms of aggravation which produced screaming; abdomen tender; pulse 120, very small and feeble; countenance extremely faint and exhausted. Died on the 13th, without any particular change in the symptoms.—*Dissection.*—Small intestine greatly distended, with a slight blush of redness in some places. About three inches from the lower extre-

mity of the ileum, there began an inversion of the intestine, to such an extent, that more than 18 inches of the ileum had passed into the cavity of the caput coli. The inverted parts were much diseased, inflamed, and gangrenous, and some portions were reduced to the state of a soft pulp. At the commencement of the inversion a portion was much thickened; the colon was healthy; there was some effusion in the abdomen.

Case 16.—A boy, aged two years and five months, (7th May 1812,) was seized with vomiting, pain of the lower part of the belly, and tenesmus, with which he passed small quantities of bloody mucus, and some pure blood. He was hot and restless, and his countenance was anxious and depressed; pulse very frequent; abdomen, to the touch, natural. On the 8th, while straining at stool, a tumour, of a dark bloody colour, protruded from the anus to the bulk of an egg. It was easily reduced; but, on examination by the finger *in ano*, was distinctly ascertained to be inverted intestine, and a probang being carried up, passed to a great depth by its side, without reaching the commencement of it. Various unsuccessful attempts were made to restore it to its natural situation. The child died on the morning of the 9th. *Dissection.*—A most remarkable inversion of the intestine was discovered, which began at the middle of the arch of the colon, and the parts concerned in it, including the remainder of the colon and a corresponding portion of the ileum, when freed from the inversion, measured 38 inches. The part that had protruded at the anus was the inverted caput coli. The inverted portion of colon was of a dark livid colour, very soft, and, in some places, thickened. The portion of ileum included within this was healthy; a portion of omentum was also included, besides a considerable extent of mesentery. The other intestines were slightly inflamed, and there was some serous effusion in the abdomen.

I have seen another case, exactly resembling this in its symptoms, and differing from it only in the extent of the inversion, which began at the lower part of the colon. The patient was a boy aged about four years, and he survived five or six days.

Case 17.—A girl, aged 17, (5th July 1818,) was seized with violent pain in the belly; vomiting; obstinate costiveness; pain increased by pressure; pulse frequent. Various remedies were tried without benefit; pain continued; belly enlarged. I saw her on the 9th; the belly was then enormously enlarged; very tense, and tender; no evacuation; pulse 140, and weak; features collapsed; died at night.—*Dissection.*—The small intestine was much distended and inflamed; and, in several places, had burst and had discharged much thin feculent matter into the cavity of the abdomen. At the root of the mesentery, on the right side, and on a line with the head of the colon, there was a mass of diseased glands, the size of a large egg. To this mass, the appendix vermiformis had contracted a very firm adhesion by its apex, and as it stretched across from the caput cæcum to

the mass of glands, it left beneath it a space which admitted three fingers. In this space a turn of intestine, about six inches in length, was strangulated and gangrenous.

Case 18.—A man, aged 28, (15th August 1815,) was suddenly seized with pain of the belly and frequent vomiting. 16th. Symptoms continued, with hiccup; pulse natural; no stool. 17th. Symptoms abated, but no stool; pulse natural. 18th. Severe vomiting and hiccup; features collapsed; a good deal of pain, but not increased by pressure; pulse 90; died in the night.—*Dissection.*—There was a hard mass of considerable size formed by disease of the mesentery. To this mass several turns of intestine had contracted adhesions of long standing, and, at these points, the coats of the intestine were much contracted by bands of adhesion, and the cavity diminished; at one point, it would only transmit a directory. At one place, a portion of intestine adhered to the diseased mass at two points, leaving betwixt them a space which admitted a finger; in this space, a small portion of a contiguous turn of intestine was strangulated. In the upper part of the small intestine, before these adhesions commenced, there was distention and gangrene; below, it was healthy, except several narrow bands of adhesion in several places betwixt contiguous turns. About two years before his death, this man had been for some months in very bad health, being affected with a deep-seated pain in the abdomen, want of appetite, great weakness, and emaciation. He went to the country, and got well. After that time he enjoyed tolerable health, except two attacks of pain of the belly, and vomiting, which were of short continuance; the second was about a fortnight before the fatal attack, and was relieved by a dose of castor oil.

The following case differs from these examples of ileus. I add it here as a remarkable example of inverted peristaltic motion.

Case 19.—A man, aged 53, a marble-cutter, (May 1814,) was affected with vomiting and uneasiness in the bowels, which attacked him in the following manner: The attack commenced with a sense of commotion, or, as he termed it, "a working," which began at the very lower part of the belly, and rather to the left side. It moved gradually upward till it reached the stomach, and then he vomited every thing that he had taken since the last attack. He was attacked in this manner at uncertain intervals, several times every day, and the complaint had continued about a fortnight. He had been for 15 years affected with a small hernia of the left groin, which often came down, but was easily reduced. He had used a truss, for the first time, a few weeks before he applied to me. From that time his hernia had never appeared, but very soon after he applied the truss, the above mentioned complaint began. There was no fixed pain in the belly; his pulse was natural; his bowels costive, but not obstructed.

A variety of remedies was employed without benefit. For a month after I saw him first, he continued to attend to his work. He was then confined to his house, and soon after to bed, with increasing debility and emaciation, without any change in the complaint; his hernia never appeared; his pulse was generally natural; his bowels were easily kept open; his belly, to the touch, quite natural, rather collapsed, except at times, when a circumscribed hardness was to be felt in it, but this was not always felt in the same place, and often not felt at all. He was liable to violent paroxysms of pain in the abdomen, which affected sometimes one part of it, sometimes another, and he died of gradual exhaustion, about ten weeks from the commencement of the vomiting. *Dissection.*—The hernia was found to have been femoral; a portion of the sigmoid flexure of the colon adhered to the mouth of the sac, and a fine ligamentous band, connected at its extremities to the mouth of the sac, surrounded the intestine at this spot, but without producing a great degree of constriction,—the area, to the extent that the band admitted of its dilatation, being free, and the coats of the intestine healthy. There was intus-susceptio of considerable extent in two places of the small intestine, and the lower end of the ileum was inflamed. The colon was collapsed; the pylorus was hard, and a little thickened; the inner surface of the stomach, at the pyloric extremity, was considerably eroded.

The following case exhibits another modification of the symptoms.

Case 20.—A woman, aged 63, enjoyed tolerable health, till within three months of her death. She then had vomiting and costiveness for a week, and was relieved by purgatives. She then complained of nausea without vomiting; no pain; the belly was at first tumid, but afterwards subsided. After a month she was confined to bed, but complained of nothing except constant nausea, and increasing debility and emaciation. Bowels very costive; no organic disease to be detected. She had repeated attacks of vomiting, which sometimes continued for several days. In the intervals she lay without complaint, except nausea and want of appetite, till she died of gradual exhaustion. Her bowels had been kept open by injections, purgative medicine being vomited. *Dissection.*—There was a great thickening and induration of the coats of the ileum at its termination in the colon, which so narrowed the opening, that it only admitted the point of the little finger. The ileum was distended and dark-coloured, the other viscera healthy.

On a review of the whole phenomena of ileus, as they are presented to us in these cases, there are various principles, pathological and practical, which seem to result from them. Some of these may be considered as legitimate conclusions; others I submit for farther investigation.

1. It is probable that the morbid condition which constitutes

ileus, is the distention of a portion of the intestinal canal beyond its power of contraction.

2. It is probable, that, when a considerable extent of the canal has fallen into this condition, it may in that state be fatal without farther disease.

3. The usual progress of the unfavourable cases is to inflammation and its consequences; and we have seen the disease fatal, while the inflammation was in various stages of its progress, from a slight blush of recent redness to extensive mortification. Farther, we have seen remarkable varieties in regard to the period of the disease when the inflammation appears. It seemed to be quite recent in Case 2d, which was fatal on the 9th day, and in Case 11th, which was fatal about the 13th. On the other hand, in Case 4th it had passed on to extensive gangrene on the third day.

4. It is probable that ileus is not necessarily connected with obstruction of a part of the canal, for we have seen it occur without obstruction, and in connection with causes which did not seem calculated to produce obstruction; and in one case we have seen the obstructed part dilated by mechanical means without relieving it.

5. Ileus does not appear to be necessarily connected with feculent accumulation, or with any condition of the contents of the canal, for we have seen it fatal while these contents were of a natural appearance, almost entirely fluid, and in very small quantity.

6. Pain of the abdomen, increased upon pressure, does not appear to be a certain mark of inflammation. It occurred in Case 1, where there was no inflammation, and in several other cases at an early period, before probably the inflammation had commenced. From various observations I am satisfied, that intestine which has been rapidly distended, is painful on pressure; it is, however, a kind of pain which by attention can in general be easily distinguished from the acute tenderness of enteritis.

7. Cessation of the pain, and great sinking of the vital powers, are not certain indications of gangrene; for in Case 2d these symptoms were connected with recent inflammation; and in Cases 7th and 21st, they were recovered from. To this important subject I shall have occasion to refer more particularly when I come to the subject of enteritis. I shall then mention several cases in which recovery took place where the symptoms usually considered as indicating gangrene had occurred. On the other hand, in Cases 3d and 4th, in which there was extensive gangrene, the pain continued violent to the last.

8. The pulse appears to be rather an uncertain index of the

condition of the parts in ileus. In Case 2d, in which there was considerable inflammation, it was less affected than in Case 1st, in which there was none. In Case 14th there was neither frequency of pulse nor tenderness of the belly, though there was inflammation, with exudation of very considerable extent. Other interesting circumstances in regard to the pulse may be remarked in the cases. One of the most important is in Cases 4th and 9th, which were fatal, with extensive inflammation and gangrene, within eight or ten hours after the time when the pulse was first observed above the natural standard.

9. In cases of Ileus, we must be cautious of forming a favourable prognosis from the appearance of feculent evacuations. These, we have seen reason to believe, may occur while the disease is going on to a fatal termination, and much feculent matter may lodge in the lower part of the intestine which is healthy, and may be brought off while the disease above remains unchanged.

10. Organic disease of considerable extent may exist in the bowels without giving rise to any urgent symptoms, until at length, from some cause which eludes observation, it suddenly produces fatal ileus. Cases 13th and 14th.

11. On the other hand, such organic disease may be fatal without ileus. Cases 19th and 20th.

Outline of the Treatment of Ileus.

If the principles which I have proposed in this paper shall be considered as worthy of any credit, it will follow, that ileus is not an accumulation to be forcibly removed, nor an obstruction to be forcibly overcome, but a muscular organ to be restored to its healthy action. In the treatment there would be three distinct objects of attention,—the part which is distended beyond its power of contraction,—the healthy part above,—and the healthy part below, which is contracted and empty. Those principles, however, I only propose at present for further investigation, and do not presume to think them so established as to be applied to the treatment of ileus. But there are some points in regard to the treatment which present a most interesting field of investigation, and on which I would propose a few observations. One of the most important of these relates to the use of purgatives in ileus, and the question, Whether, in every case, the use of active purgatives be advisable? The action of purgatives must be chiefly and primarily upon the

healthy part of the canal above the seat of the disease; and the important question, in regard to this portion, is, Whether, in every case, it requires to be excited; or whether there are not modifications of the disease in which its action is already as great as can be desirable, and even some, in which it might be moderated with advantage? The violent tormina occurring in paroxysms, which we observe in many cases of ileus, certainly give reason to believe, that there is not any deficiency of action in the higher intestines, but rather a violent action, resembling that which is produced by a purgative,—a strong though ineffectual effort to overcome some interruption to the healthy action of the canal. Now, if a part of the canal be really in a state of inaction from over-distention, and if the action of the healthy part above fails in relieving it in the manner which I have already supposed, may we not conceive a case in which it is actually increasing it,—in which, by propelling new matter into the distended part, it is presenting an obstacle to this part recovering its healthy action. In such a case, might not benefit be obtained from allaying the action of the upper part, instead of increasing it? I think there are circumstances in the history of ileus which give some probability to this conjecture. Several of the remedies which are beneficial, are such as are calculated to allay muscular action; among these may be reckoned blood-letting, cold applications, and tobacco injection; and I have seen a severe case of ileus yield in a few hours after the use of a full dose of opium, which had for several days resisted the most active remedies. I by no means intend to say, that this principle is applicable to every case, but, from the whole phenomena of ileus, I do suspect that there are most important differences in the circumstances of the disease in different cases; particularly that there are some cases in which the upper part of the canal requires to be excited; others in which its action is already sufficient for every purpose that it can be supposed to answer; and some in which it may even require to be moderated. I think there is also some reason to suppose, that, in the cases which require the use of purgatives, there are important differences in the degree of excitement that is adapted to each,—that in some, the most active medicines are requisite, while in others, the mildest in very moderate doses, produce that beneficial action, which, by a stronger excitement, would be defeated. These remarks are not entirely hypothetical. The most accurate observers have often been heard to remark, that there are facts in the history of ileus which seem to be totally at variance with our ordinary ideas in regard to the action of purgatives,—that very mild medicines seem, in

many cases, to answer better than the more active,—and that the beneficial result sometimes follows the very mildest in very small doses, after the most powerful in immense quantities have been given in vain. I am aware of a source of fallacy which is inseparable from such observations, but I conceive they are by no means to be disregarded; and when we add to them the fact, that a full dose of opium is sometimes followed by the result which we have sought for in vain from the most powerful purgatives, I submit, whether the whole phenomena of the disease do not give considerable probability to the principles which I have proposed. In regard to the use of purgatives, I suspect, that the best practice in general is to give mild medicines in moderate doses, repeated at very short intervals, while, at the same time, we keep in view, that the use of purgatives is but a part of the treatment, and that the main object is to remove, if possible, that condition of the canal, as a muscular organ, by which purgatives are prevented from producing their usual effects. Every one, indeed, must have experienced, that, in regard to the use of purgatives, there is a point in the treatment of ileus when he is often brought completely to a stand, when he is convinced that it is in vain to urge them farther, and is led to look around for remedies calculated to act upon some other principle. Important remedies of this kind are bloodletting, blistering, and the effectual application of cold, either externally, or by glyster; but, as far as my observation extends, the remedy of most general utility is the tobacco injection. It should be begun with caution; perhaps for an adult in the quantity of 15 or 20 grains infused in four or six ounces of hot water. After the interval of an hour or two, it may be repeated in a quantity a little larger, until such effects are produced by it, viz. slight giddiness and muscular relaxation, as shew that it is exerting its proper effect upon the system. It may then be repeated at proper intervals a great many times, if the case do not yield. With these precautions I have given it in states of great nausea and exhaustion, with the effect of diminishing instead of increasing them, and, in one case, to a child three years of age, with the happiest result. In one of the most severe and obstinate cases I have had occasion to treat, it was repeated nearly twenty times with various partial effects, and at length with complete success. The obvious effect of this remedy upon the system, is to produce relaxation of all muscular parts, and the mode of its operation in ileus is involved in considerable obscurity. I have supposed, that, in this disease, the upper part of the canal is healthy, sometimes in strong action,—that a part below this is inactive from distention,—and that the lower part

is healthy and contracted, being kept in that contracted state by its tonic power, and the suspension of the action by which, in the healthy state of the parts, it would have been distended. A certain force is, indeed, acting upon it by the propulsion of matters from the upper part, but this acts with little effect after being communicated through the intermediate portion, which is in the state of an inanimate canal. It is, therefore, unable to overcome the tonic contraction of the lower part, which thus opposes an obstacle to the parts recovering their healthy relations. The same observation applies, if we suppose, that the distended part itself retains some degree of action, though feeble and imperfect. Now, in this state of the parts, could the tonic power of the lower part be for a time considerably diminished, it might perhaps be brought, as it were, more into unison with the other parts,—might be dilated in the natural manner by the weakened force which is acting upon it,—and the parts might thus be enabled to recover their healthy relations. Is this the action of the tobacco injection?—It is mere conjecture, and I urge it no farther. I add the following case, illustrating the effect of this remedy in a state which seemed to be nearly hopeless, and exemplifying an important fact to which I have already alluded,—that symptoms resembling those of gangrene may be recovered from.

Case 21.—A woman, aged 20, (17th November 1813,) was affected with violent pain in the right side of the abdomen, and obstinate costiveness; pulse natural; had been ill three days; used purgative medicine and injections with some relief.

18th.—Pulse 96; urgent vomiting; pain of abdomen violent; was bled and blistered, and purging injections repeated.

19th.—Pulse 120; no stool; no relief; pain violent over the whole abdomen; urgent vomiting. Was bled again; various medicines given without effect; every thing was vomited. Towards the afternoon, the pain nearly ceased, with collapse of the features, and coldness of the surface; pulse 140, and very weak; vomiting continued; appeared to be moribund. Wine was now given, about a glass every hour. After a few hours, her appearance being improved, the tobacco injection was given at first in small quantity, and it was repeated several times. It did not increase the sinking, but seemed rather to abate both it and the vomiting; wine continued.

20th.—Pulse improved; some scanty evacuations; tobacco injection given several times with partial effect; vomiting abated; some Epsom salt was retained, and operated; free from pain; pulse 96.

21st and 22d.—Continued to improve; pulse 80; bowels kept open by small doses of Epsom salt. From this time continued well.

I have already alluded to the effects of blood-letting, and the application of cold. In the state of collapse produced by a full

bleeding, I have repeatedly seen the disease give way so suddenly, that there was no time to raise the patient out of bed. If there are symptoms indicating inflammation, this remedy of course must be urged in the most decided manner. In regard to the remarkable effects of cold, I refer to a valuable paper by Mr Smith of Kingussie, in the 9th Volume of this Journal, page 287. Of the other remedies that have been proposed, I have had little experience. Crude mercury in doses of lb. i. or more I have tried in several cases. In some of them, it appeared to abate the vomiting. I have not observed any other effect from it, and I am not convinced that the principle on which it is given is correct. In the Memoirs of the Medical Society of London, Vol. II. some remarkable cases are described, in which the forcible injection of fluid to the extent of six or eight pounds, was used with advantage.

Whatever practice is employed ought to be zealously persevered in, notwithstanding the most unfavourable appearances; for the disease has been known to resist for a long time the most active remedies, and yet terminate favourably, as late as the 17th day.