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ON

# INTESTINAL OBSTRUCTION

BY THE

## SOLITARY BAND.

BEING A

Paper Read at a Meeting of the Medical Society of London,

MARCH 25TH, 1861,

AND REPRINTED FROM THEIR TRANSACTIONS.

BY

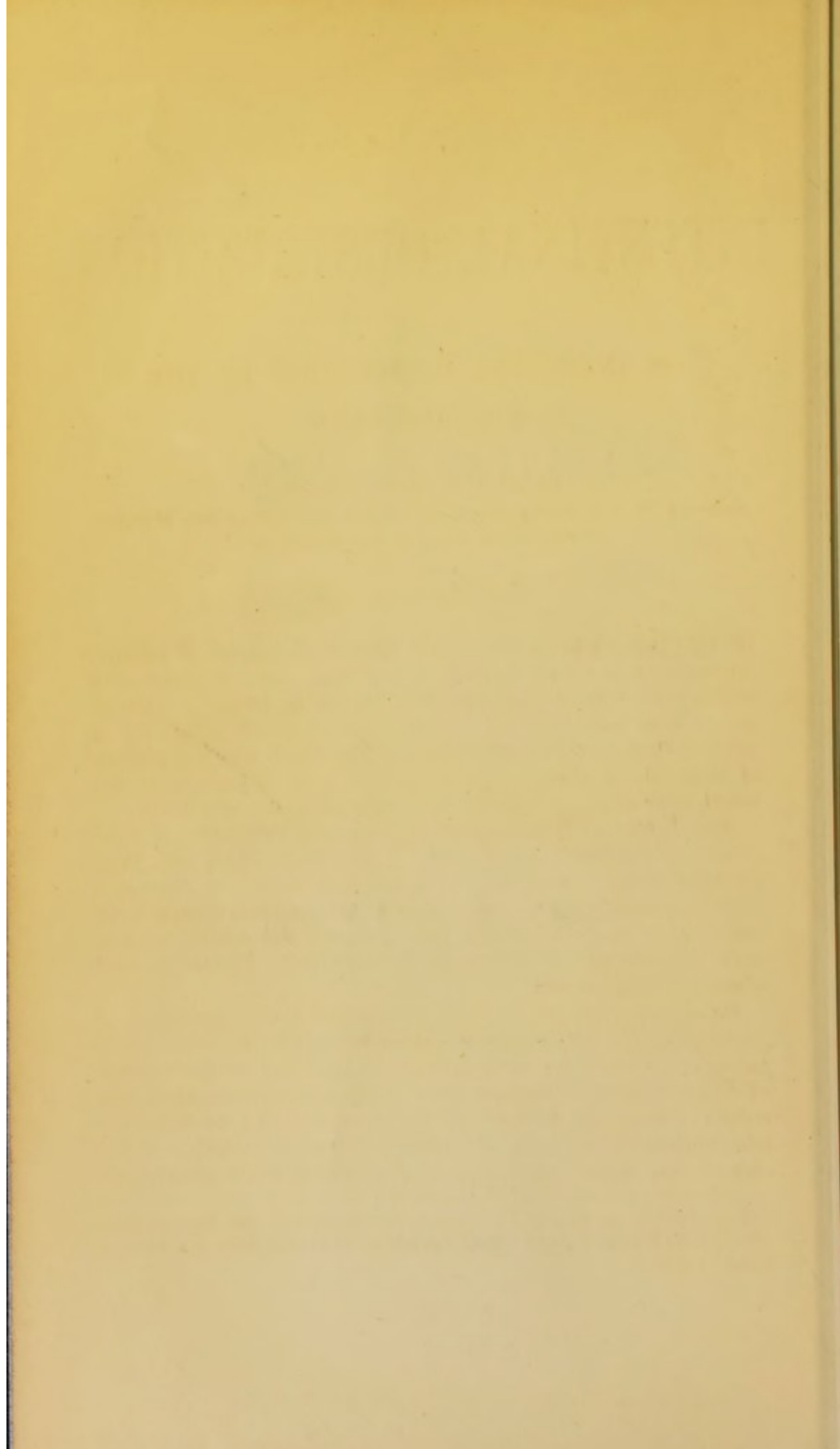
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THE IDIOT ASYLUM, ETC., ETC.

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## ON INTESTINAL OBSTRUCTION BY THE SOLITARY BAND.

By JOHN GAY, F.R.C.S.,

SURGEON TO THE GREAT NORTHERN HOSPITAL; CONSULTING SURGEON  
TO THE IDIOT ASYLUM, EARLSWOOD, ETC.

*Read March 25th, 1861.*

IN this paper I propose to give, from such sources of reliable information as I have been able to obtain, some account of a well known "band" that is often met with in the peritoneal sac. This band, by its terminal attachments, often forms with normal or other structures a *ring*, into which a portion of intestine is almost sure sooner or later to glide, with the usual consequences—obstruction, strangulation, and death.

The Registrar-General annually reports a number of fatal cases of "internal obstruction,"\* many of which are thus brought about; and the surgeon often finds, on the *post mortem* examination of such cases, a state of parts which, with sufficient venture, he might have relieved during life, with a very fair chance of saving his patient from premature and often agonising death.

But surgeons often hesitate to proceed to the operation of gastrotomy (as it is somewhat absurdly called) in these cases, however inviting by their general aspect and by the futility of other remedies, because they have no reliance upon the means of diagnosis, with which the experience of past observers has furnished them, as to the precise nature or situation of the obstructing agent; and they very naturally avoid staking the

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\* In 1855, according to the *Reports*, 420 males and 435 females died of "Obstruction of Bowels," independently of deaths from the various forms of hernia.



credit of their science as well as their art upon the chances of failure which might be discreditable to both.

I have consequently brought together, for the purpose of inductive analysis, a number of cases in which the cause of obstruction has been directly or indirectly the same, viz., a band; hoping thereby to clear the way for giving to abdominal surgery hereafter both a wider and a surer basis, without exposing it to the charge of being either too cautious or too rash.\*

The proposal to open the abdomen for the relief of simply incarcerated or impacted intestine is not of modern date. Paul Barbette, at the end of the seventeenth century, asks very naïvely with respect to intussusception, or, as it was then termed, "ileus", or "miserere mei": "An non etiam præstaret, factâ dissectione musculorum et peritonæi, digitis susceptum intestinum extrahere, quàm morti ægrotantem committere?"† The operation, however, has the sanction of having been put into practice at a much more remote period; for Dr. Clifton relates, on the authority of Cœlius, that Praxagoras went beyond both Hippocrates and Diocles; for, in the case of an ileus, "when other remedies failed, he would open the belly and put the guts to rights."

In the course of some reflections on a case of intussusception, Lebaud in the last century summed up the general views of that period on "*étranglement par une bride*," in the following observations, which, as they nearly represent the present state of our knowledge on this important subject, I cannot refrain from quoting entire. "Il y a une autre espèce d'étranglement, formé par une bride, qui serre le tube intestinal

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\* I believe it will be found that obstruction by a band may, in well marked cases, be distinguished from obstruction arising from other causes, of which the following are the most constant.

1. Simple deviation from the natural position and relation of parts: including—*a.* Intussusception; *b.* Twisting of bowel, with or without its appendage; *c.* Internal hernia.

2. The impaction of a knuckle of intestine in abnormal apertures. These are found in—*a.* The mesentery; *b.* The mesocolon; *c.* The omentum.

3. Bands or unnatural adhesions: including—*a.* The solitary band; *b.* Filamentary bands; *c.* Plastic adhesions.

4. Abnormal growths and changes of texture affecting the intestinal walls.—*a.* *Retrecissement*; *b.* Stricture.

5. Growths and other productions independent of the intestinal walls.—*a.* Tumours of all kinds; *b.* Polypi; *c.* Concretions; *d.* Abscesses.

6. Functional disorders; such as—*a.* Enteritis; *b.* Peritonitis; *c.* Ileus; *d.* Hysteric obstruction.

† *Oper. Chirurgic. Anat.*, 1677, lib. x, cap. 2.



comme une vraie ligature. Ce cas, s'il pourrait être discerné, prescrirait promptement gastrotomie, vis-à-vis le point sensible où repondent toutes les douleurs de coliques qui précèdent le vomissement. Malheureusement, on ne distinguera par aucune signe cette cause extraordinaire, *la plus rare certainement de toutes celles qui peuvent produire la passion iliaque.*"

Here, then, lies the difficulty ; and the records of cases in which the abdomen has been cut into for the purpose of relieving internal obstructions, upon the presumption that the symptoms were due not only to a physical but to a removable agent, shew that the difficulty of distinguishing the exact nature and seat of this agent in each case has not been satisfactorily overcome. I need not refer to the cases of Manoury, Dupuytren, Monod, Hilton, Druitt, Avery, Fergusson, Erichsen, Recamier, Curling, Luke, Holt, and my own. In some of these cases, the seat of stricture could not be discovered ; in others, the stricture was ascertained to be occasioned by irremediable or irremovable disease ; whilst in another class the state of the parts was anticipated, but relief was too long deferred.

It is true that in a few cases, such as those recorded by Fuchsius, Caryoche, Dr. Wilson, Dr. Manlove, and Schack, success has followed these operations ; but, on the whole, the best surgeons have deemed them too speculative ; and a lull in this species of abdominal surgery chides us for the neglect of those investigations which may render it more exact and therefore more useful.\*

Of the various causes of internal obstruction which come under our notice, I have chosen the "band" for present consideration : 1st, because time would not permit of my dealing with all ; and 2nd, because it is that, of all the obstructing agents, which holds out the greatest prospect of being successfully dealt with by the art of the surgeon.

And here I must premise that by the term "band" I mean a structure distinct from ordinary adhesion, and having in its origin, texture, and relations, characteristics peculiarly its own. As these bands are generally limited in each individual—seldom exceeding one, and never (as far as I have been able to discover) more than three—I shall take the liberty of applying to them the generic term "solitary," in contradistinction

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\* I have not designed to make any more than a passing allusion to the literature of this interesting subject, in consequence of the necessary limits of my paper ; but would here just refer to a paper in the *Association Medical Journal* for May 20, 1853, by Mr. Joseph Hinton of Hinton, Bath.



to the filamentous bands which are often met with in the abdominal cavity, and which are only a variety of the common plastic exudations of its serous membrane. From these the solitary band differs ;

1. In size.

2. In the fact that it is rarely if ever attached but at its extremities. The filamentous bands are attached throughout their length to that which they embrace or connect ; while the solitary band is seldom so, its attachments being most generally terminal.

3. In having a distinct glistening surface, as though it possessed a peritoneal investment continuous with that of the abdominal viscera.

4. In the fact that it is frequently found to be *tubular when it stretches from one hollow viscus to another*, and forms a channel of communication between them.

5. In having always some definite length.

These distinctions have not, as far as I am aware, before received the consideration due to them ; for, excepting Hunter, Dr. Stokes, and one or two other writers to whom I shall hereafter allude, the majority of pathologists have, with Rokitsansky, included these bands among ordinary plastic exudations. I may, perhaps, make another exception ; viz., that of Professor Harrison, who, from one or two specimens which came before him, in which fatal obstruction was said to have been caused by the remains of the omphalo-mesenteric vessels (in which he was in all probability right) concluded that *all* these bands were in this respect alike. It cannot be denied (and my note-book furnishes examples) that, occasionally, peritonitic exudations will result in small isolated threads which may produce, equally with the solitary band, fatal constriction ; but these are comparatively rare, and the rules of diagnosis and treatment applicable to the one become applicable to the other as well.

Let us now look more narrowly into the ordinary conditions of the "solitary band."

It has mostly *two* attachments ; viz., terminal ; and sometimes, though rarely, it has but *one*, being free to float among the abdominal viscera. On examining into the points of attachment in all the well authenticated cases that I have been able to bring together, I find they have been as follows. The band has been observed :—

1. As a simple loop ; the extremities being attached to various parts of the mesentery.\*

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\* Dr. Todd, *Lancet*, 1840, p. 542 ; Mr. Phillips, *Medico-Chir. Trans.*,



2. As a loop from the omentum.(?)\*
3. As a loop from the parietal peritoneum.†
4. As a band between the extremity of the omentum and the parietes or bowel.‡
5. Between the mesentery and the parietal peritoneum.§
6. Between the mesentery and the mesocolon.||
7. Between the jejunum, mesentery and ileum.¶¶
8. Between the jejunic mesentery and the jejunum.\*\*
9. Between the ileic mesentery and the ileum.††
10. Between the mesentery and the colon.‡‡
11. Between the mesentery and the cæcum. §§
12. Between the mesentery and the rectum. ||||
13. Between the mesentery and the urachus. ¶¶¶
14. Between the mesentery and an ovary.\*\*\*
15. Between the ileum and the sigmoid flexure.†††
16. Between different portions of the ileum.‡‡‡
17. Between the ileum and the Fallopian tube. §§§
18. Between the ileum and the vermiform process. |||||
19. Between the ileum and the parietal peritoneum. ¶¶¶¶
20. Between the ascending and the descending colon.\*\*\*\*\*
21. Between the colon and an ovary.††††

vol. xxxi, p. 10; *British and For. Medico-Chir. Review*, vol. iii; Dr. Barlow, *Guy's Hospital Reports*, 1844; Mr. Robinson, *London Journal of Med.*, 1851; Maillé, *Mém. Acad. Fran.*, vol. iv, p. 285; Preparations in Museum of St. Bartholomew Hospital.

\* Mr. Birkett, *Pathol. Transactions*, vol. ii.

† Dr. Crisp, *Lancet*, 1847; Dr. Abercrombie, *Diseases of Stomach*.

‡ J. Hunter, *Medical Observ.*, vol. iv; Abercrombie, *Diseases of Stomach*; Dr. Bristowe, *Pathol. Trans.*, vol. iv.

§ Jobert de Lamballe, *Canal Intest.*; Sir A. Cooper, *Hernia*; Preparations in St. Bartholomew's Museum.

|| Mr. Phillips, *Medico-Chir. Transact.*, vol. xxxi.

¶ Davignau, *Mém. de l'Académie de Chirur.*, tome iv.

\*\* Webb, *Transactions of Abernethian Society*.

†† Hunter and Dr. Garthshore, *Medical Observ.*, vol. iv.

‡‡ Webb, *Transactions of Abernethian Society*.

§§ Manoury, *Thèse de Paris*.

|||| Ward, *Pathol. Transactions*.

¶¶ Harrison, *Dublin Journ. of Med. Science*, 1842.

\*\*\* Rokitansky, *British and Foreign Medico-Chir. Review*, vol. iii.

††† Ormerod, *Lancet*, 1846.

‡‡‡ Garthshore, *Medical Observ.*, vol. iv; Abercrombie, *Diseases of Stomach*; Bristowe, *Pathol. Transact.*, vol. iv.

§§§ Ormerod, *Lancet*, vol. ii.

||||| Hancock, *Pathol. Trans.*, vol. ii; Faye, *Mémoires de l'Acad. de Chir.*, vol. iv; Recamier, *Lancette Franç.*; Gay, MS.

¶¶¶ Oubrè, *Pathol. Trans.*

\*\*\*\*\* Seerig, *Rust's Mag.*, band xlvi.

†††† Rokitansky, *British and For. Medico-Chir. Rev.*, vol. iii.



22. Between the cæcum and the adjoining peritoneal surface.\*

23. Between the rectum and the uterus.†

24. As a mesenteric band free at one extremity.‡

25. Between the appendices epiploicæ and the colon.§

26. Between the tunica vaginalis and a knuckle of herniated intestine.||

Of the cases which form the basis of the foregoing arrangement, forty-three in number, in twenty-seven the bands were attached by one or both ends to the mesentery. In one, the band had a single terminal attachment to that structure; the other end, which was bulbous, floated loosely among the viscera. In twelve instances the bands were attached by one extremity to some portions of the mesentery, and by the other to intestine, while in three the second attachment was to some contiguous organ. When attached at the one end to bowel, these bands have been found attached at the other to mesentery; or to another portion of bowel, as was the case in ten instances (including attachments to the vermiform appendage, into which the bands were inserted in five instances); to neighbouring viscera, as in three cases; or to the parietal peritoneum, as in two. From these facts there is no difficulty in arriving at the inference that, whatever be the terminal attachments of these bands, one at least is always to some one of those abdominal structures or viscera which are very prone to become at some period of life the seat of serious and destructive disease; and that, in all probability, these bands differ in their origin from those abnormal products with which they have been allied, inasmuch as they are the results of those graver disorders to which the abdominal viscera and their appendages are liable.

The view just enunciated becomes, I think, strengthened by an examination of the comparative liability of different abdominal structures to become the seat of bands, as well as of destructive disease. I need not state the liability on the part of the mesentery in early life, as it is well known. In my collected cases, the jejunum was the seat of attachment in three; the ileum and small intestine in eighteen; the vermiform appendage in five; while the large intestine, taking its whole tract, was the seat of attachment in nine cases; viz.,

\* Dr. Peacock, *Pathol. Transactions*; Solly, *Medico-Chir. Trans.*, vol. xxxi.

† Rokitsky, *Brit. and For. Med.-Chir. Review*.

‡ Preparation in London Hospital Museum.

§ Gay, MS.

|| Dr. Crisp, *Lancet*, 1847.



the cæcum in two; the colon in four; and the rectum in three.

According to the observations of Andral (and perhaps few have been made with greater exactness) the different portions of intestine become the seat of ulcerative and perforating affections in the following order and comparative frequency: the jejunum in one; the ileum in thirty-eight; the colon in twenty-three; the rectum in four. These statements, I think, strengthen the position advanced, that it is uniformly from serious and destructive lesions of the bowels or their appendages, especially the mesentery, that these bands derive their origin. I proceed now to shew that the production of these bands is the process by which such lesions have been repaired.

A band of varying length—in some instances over seventeen inches—may seem at first sight a very unlikely provision for the cure of an ulcer of the mesentery, or of a penetrating wound of the intestine; but the improbability fades away before the following facts.

1. Traumatic injuries of the bowels are frequently remedied by the formation of a band, which ties the bowel at the seat of injury to some coincidently vicinitous structure or organ. Jobert de Lamballe (*On the Intestinal Canal*, vol. i, p. 505), cites an instance in which a stiletto entered the body of a man. The patient recovered from the immediate effects of the injury, but died subsequently from the strangulation of a knuckle of intestine by a band, which stretched between the parietal peritoneum and the point in the intestine which had been wounded. In a case which came under my observation a few years since, the transverse colon was punctured by a trocar in the operation of paracentesis. The fact was obvious. The woman, however, recovered; but died many months afterwards of fever. I examined the body. The wound in the intestine had healed; but a firm and large band, two inches long, took its origin from the peritoneum immediately around the wound, and was attached at its other extremity to the parietal peritoneum.

2. Morbid specimens abound, in which the connexion of a band with an intestinal cicatrix is shewn. A few years ago, while I was engaged in making the observations which form the basis of this paper, Mr. Canton pointed out to me, in the Museum of the Charing Cross Hospital, an interesting specimen in which two ulcers had penetrated the small intestine. They had healed by the effusion of plastic material, which had



become stretched into a firm band of connection between them. This mode of repair, which most usually obtains in cases of intestinal ulcer, was pointed out long ago by John Hunter, who shewed two cases of internal band to Dr. Garthshore, remarking that "they were formed in both cases by inflammatory adhesion of the part, and subsequent stretching of the band by peristaltic motion and exercise;" and subsequently by Dr. Stokes, who says, "It might happen in many chronic and even in some acute cases, that, in consequence of adhesions being formed between the two surfaces of the peritoneum at a point corresponding to the situation of the ulcer, the contents of the tube are prevented from escaping into the general cavity." And, in illustration of the mode by which these bands become *tubular* and *intercommunicating*, that close observer further remarks that "it may happen that this new base of the ulcer may, in its turn, give way, and an unnatural communication be thus formed between two essentially different portions of the tube." (*Cyclopædia of Practical Medicine*.) Dr. Stokes then narrates a case in the Meath Hospital, of acute bronchitis complicated with gastric tenderness. The intestines were, on *post mortem* examination, found glued together; "on separating their folds, we found" (says the doctor) "four perforations, each sufficiently large to admit of a quill. These corresponded with recent ulcers in the muciparous glands, which had penetrated all the coats of the intestines; and, in fact, rested on the serous membrane of the opposite fold." No fæcal matter had escaped; for the formation of plastic lymph had commenced around each of the orifices. In a case of Mr. Obré's (*Pathological Transactions*), a band was attached to the convex side of the ileum. The mucous and muscular coats had been entirely destroyed; whilst the peritoneum at the seat of the attachment had become very much thickened. In a case shewn me by Mr. N. Ward (*Pathol. Trans.*, 1851-2) in a child of six years old, a band terminated by a well marked nipple-like projection within the cavity of the rectum. Dr. Hare relates a similar case (*Trans. Pathol. Soc.*, vol. viii), in which, from constriction of the ileum in consequence of a herniated diverticulum, an ulcer perforated its coats. Lymph in considerable quantity closed the aperture, and glued the intestine to a neighbouring knuckle by a band. Dr. Bristowe mentions a case illustrative of the mode in which these bands become tubular; a circumstance which, with Dr. Peacock, I many years since observed in a band which passed between the vermiform appendage and the adjoining portion of ileum, in a case where I opened the abdomen for the relief



of the constricted bowel. This condition I have repeatedly seen since. Dr. Bristowe says that the ileum became ulcerated in consequence of the lodgment of plum-stones within it. Many of the ulcers were cicatrising; some had healed; but, between two which had perforated, "two contiguous portions of the gut had become firmly attached, and a small communication (one readily admitting a director) had formed between the two." (*Pathol. Trans.*, vol. iv.)

These ulcerative disorders of the bowel or mesentery arise :

a. From impaction of hard bodies, such as gall-stones, plum-stones, etc., in the bowels or in certain diverticula, especially in the vermiform appendage ;

b. From the ordinary destructive diseases of the abdomen, such as mesenteric tabes ; idiopathic typhlitis ; typhoid ; catarrhal and dysenteric diarrhoea, etc. ;

c. From sloughing of portions of the intestinal cylinder, in consequence of injury done by physical incarceration and strangulation.

3. A band may be produced by the retention of a viscus for a longer or shorter period in an abnormal situation. The most common instances of the formation of a band in this manner, are those in which a long unreduced hernia has become attached by a band to the hernial sac. Such bands, it is true, will arise from injury to the bowel either from without, as blows ; or from within, as ulceration and slough ; but they may be formed under the circumstances above described, I am inclined to believe, without the intervention of either of these causes. They have been recognised as the obstacles in the way of the reduction of an old hernia ; and their existence is always to be suspected when a hernia, easily reducible, *pro tempore*, is found to be really irreducible.

For the repair of these intestinal injuries, then, lymph is poured out ; and, once formed, the fibrous texture into which it differentiates itself stretches by a force, which we have now to consider, into a band ; examples of which I have seen varying from a part of an inch to nearly twenty inches in length.

Short bands are always found between parts that in their normal state are in juxtaposition or almost so ; as, for instance, between the vermiform appendage and some portion of the ileum, or between the opposing surfaces of an intestinal convolution ; whereas longer bands indicate that, at the time of the deposition of the plastic matter whence they were formed, the connected parts were in incongruous juxtaposition.

It must be remembered that the lesions, to which we presume that these bands are due, are so severe as readily to ac-



count for contemporary abnormal relations of the parts connected together. Thus a bowel, in process of or immediately after perforation, lies *flaccid*, perhaps on the mesentery, or perhaps, according to the position of the individual, on some organ, viscus, or peritoneal surface that, in a state of healthy activity, may be at a distance from it. The bowel thus lying in an unnatural position will, on recovering its functions, find its natural position among the contents of the abdomen; and, in doing so, will gradually force the as yet extensile band to accommodate itself to the change by augmentation of its length. Or the distension or other disturbance of related portions of the viscera may cause these to approach parts from which they are otherwise widely separated. The frequent overlapping of the cæcum by the ileum; of the small intestines by the colon and rectum; are well known examples of this temporary abnormal relation of parts.

Time will not permit me to make an analysis of the cases which I have selected for the sake of tracing this proposition in detail; but I know no other theory by which the required "means to an end" can be supplied so satisfactorily. Perhaps the most striking illustration is afforded by those morbid specimens in which a portion of bowel, placed naturally high up in the abdomen, has been herniated. Strangulation has ensued; the bowel has been returned by operation; but a portion of the cylinder has sloughed. For a time the injured intestine has rested against the edge of the ring; in that position it has been sealed down by plastic lymph, exuded between it and the parietes; but, as soon as the bowels have recovered their functions, a process of restoration is commenced, and in this way (as in a case shewn me some years since by Mr. Oubr ), a band of great length may be formed. The band referred to connected a portion of the ileum to the edge of the femoral ring, and was seventeen inches and a-half long. In a case related by Mr. Webb (*Trans. of Abernethian Society*), a band was found between the transverse colon and the right iliac region; and Rokitansky cites a case in which the sigmoid flexure, partly from distension of its walls, had passed across to the right hypochondrium and formed an attachment, by a strong band, with a knuckle of the ileum in that situation (*Pathological Anatomy*). In a specimen shewn me some years ago by Mr. Luke in the Museum of the London Hospital, a long band had thus formed; and it would appear that the force which stretched it at last broke it from one of its terminal attachments. It consequently floated loosely among the viscera, encircled a knuckle of intestine, and caused the death of the individual by obstructing it.



The solitary bands, be it remembered, do not always constitute the whole or even a part of the immediately constricting agents—bridle or ring; although such agents could not have existed *as such* without them. Thus a twisted or elongated mesentery may constrict, through the adhesion of its bowel by a band to some other structure. The omentum may also become the constricting agent through a like attachment, as in cases in which it has been thus tied to the edge of the femoral ring or to the sac of a hernia. A portion of intestine may in like manner become the bridle; in one case, a band so united the extremities of a knuckle of bowel, that together they formed a ring, into which another portion of bowel insinuated itself and became mortally obstructed. My limits do not allow of my treating this part of my subject less cursorily.

I now turn to the pathological conditions of the parts involved in obstruction by bands.

They are as follows :—

1. Obstruction of the bowel by the pressure of the band.
2. Repletion of the bowel above the band, and collapse from absence of the usual contents below.
3. Peritonitis, with adhesion and effusion into the abdominal cavity.
4. Softening, ulceration, and gangrene of the coats of the bowel, sometimes with hæmorrhage, generally in small patches, and the occasional formation of a passage from this part of the intestinal cylinder to another.
5. Ulceration or gangrene of the band; in consequence of which, in several instances, the constricted bowel was, at the time of death, on the point of being released from its confinement.
6. Thickening and stricture of the bowel at the seat of constriction.
7. In some cases, hypertrophy of the muscular coat of the bowel above the seat of constriction, and atrophy below; but these are changes which have depended upon a favouring condition of the intestine, which has been in existence some length of time before the fatal issue.

These pathological changes clearly shew that constriction by a band is speedily followed by consequences of the utmost danger to the parts involved. In all cases the band is the offending agent.

I must hasten to the last stage of my inquiry: viz., how, in a given case of internal obstruction, we are to determine



*à priori* that it arises from a band, and therefore that it is one in which the surgeon would be justified in hazarding a severe operation rather than giving the patient over, in all probability, to certain destruction. As we have already seen, there are many cases of intestinal obstruction from intraparietal causes, which it would be deemed a folly to attempt remedying by a surgical operation—cases which we must leave to nature—at all events in the present stage of our art ; such as stricture, mesenteric twist, invagination ; although I am far from thinking the period distant, when, even in such cases, surgery will, with the best intention and perhaps with success, interfere by means more direct and positive than any that have hitherto been suggested. How, then, are we so to diagnose the cases, as to arrive at a reasonable conclusion with regard to a given one ?

In reply, I will attempt a brief analysis of the cases I have collected.\*

The evidences may be divided into those derived from

1. Antecedent history ;
2. Mode of attack ;
3. Sensational indications ;
4. Physical indications ;
5. Functional indications.

1. *Antecedent history.* It is to be regretted that, in the histories of the cases I have collected, there has been a very general omission upon this point. But, if we adopt the view I have taken as to the pathological genesis of the bands (and I know no other), it is very obvious that we could not be satisfied of the existence of a band, in a given case, unless the previous history of the patient furnished some reliable proof of his or her having had some attack of abdominal disease adequate to its production. It is obvious, too, that the history must not be limited to a few months or years, but must embrace the whole of the patient's life. Of seventeen cases in which the history is given, the patients had been subject to hernia in three ; to accidental injury in three ; while in thirteen they had been subject, for periods varying from many years to a brief interval—viz., that of five weeks (which is the shortest period recorded between the time at which the

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\* I feel it due to myself to confess that this part of my inquiry is very imperfect, owing to the shortness of the time allotted for a paper by the Society's laws. The predisposing influence of age and sex has not, on that account, ever been referred to ; nor have I been able to advert to those able experimental researches of Dr. Brinton, which have thrown so much light on the subject of obstruction.



band was formed and the death by obstruction)—to some one severe attack of abdominal disorder; which has in the majority of cases been followed by more or less urgent and frequently repeated attacks of constipation, with pain, sickness, and abdominal swelling. In some of these cases, the first attack is stated to have been mesenteric disease, peritonitis, or some such affection of the abdominal viscera. In others, in which the band was attached on the one side to the vermiform appendage, and obviously attended at the time of its production with severe symptoms, no reference to any such antecedent disorder has even been made.

2. *Mode of attack.* Of fifty-four cases, I find that in nine the fatal attack is stated to have been sudden, whilst the patient was in his ordinary state of health. In the other cases no statement on this point is made; but it is to be remarked that, in all in which there has been a proper attention to minutiae in detail, the suddenness of the attack is invariably noted.

3. *Symptoms of sensation.* These have been found to vary. Of forty-one cases in which pain was referred to, it was severe in eighteen, and moderately severe in twelve. In ten, there was only "tenderness;" and in one of these the tenderness was relieved by pressure; while in the others it was evidently associated with inflammation of the parts involved. In six only is the pain said to have been paroxysmal. On more close analysis it appears that the severity of the pain does not at all times, although it most frequently does, depend upon the sharpness of the band, upon its proximity to the gastric terminus of the bowel, or upon its tightness; but upon the state of distension as well as the condition of the adjoining intestine. Thus, in a case in which twenty inches of small intestine were involved, and the stricture was tight, there was scarcely any pain; while in two other cases, in which considerable portions of bowel were but slightly cinctured, the pain was severe. In the former case the bowel was comparatively empty; in the latter cases it was much distended.

Nor does it depend, as Dr. Barlow states in *Guy's Hospital Reports*, on the greater sensibility of the higher bowels; for, in a case which occurred at St. Bartholomew's Hospital, and is recorded by Mr. Webb in the sixth number of the *Transactions of the Abernethian Society*, the jejunum was constricted so tightly as to have become gangrenous; and yet no pain is said to have been felt until the eighth day of the strangulation.

Again, pain and tenderness have their relative value in de-



termining the nature of these cases. Pain denotes direct physical injury to the parts involved, and is more or less violent in its accession, according to the severity of such injury; whereas tenderness denotes inflammatory action of the peritoneum or bowel, consequent upon the injury. Hence, generally, the tenderness follows in the course of a few days from the invasion of the attack. When the constriction is not tight, as is most usually the case when the mesentery or the omentum is its immediate source, little or no pain may be at first experienced; but, sooner or later, tenderness will denote the approach of the consequences of the act of constriction—viz., distension, inflammation, etc., and in part betray their cause.

The localisation of the pain, as far as I have been able to discover, is ever, *at first*, due to the constricting agent, and marks its seat. It afterwards follows and indicates the course of consecutive disturbances, such as peritonitic or enteritic inflammation, distension, etc., which most usually overtake the bowel above the stricture. Most frequently the pain is referred to the right of and just below the umbilicus; thence it spreads to other regions, and sometimes becomes almost universal.

It follows that pain is not always an immediate symptom of internal strangulation, and that, alone, it can furnish no positive sign. It is, however, not without great significance, when it does exist, at every stage of the case.

4. *Physical indications.* These include the condition of the abdomen as to size and tension. They are given in twenty-seven cases: in all distension is the earliest symptom, tympanitis follows in a few days, but, in the majority of cases, not until the eighth. In two cases the tension was confined to the seat of pain; the abdomen in other parts remaining soft. In these cases the bowel affected was the jejunum and the first portion of the ileum. In two cases, general dulness on percussion was observed at first; but subsequently the lateral parts of the abdomen became resonant, and the dulness, with the fulness, converged to that part of the abdomen in which the constriction was found to exist. This I believe, from my own observation, to be a very common feature in these cases. Dulness over the cæcum, a not uncommon sign, is due in these cases to repletion of the small intestines, by which that bowel becomes in the end completely overlapped. Towards the last, irregularity of surface from distended convolutions by flatus, and general tympanitis, take place.

The order of physical signs is then: distension; tympanitis; general dulness on percussion, which subsequently be-



comes localised to the seat of constriction ; irregularity of the abdominal superficies ; and ultimately general distension.

5. *Functional disturbances.* In thirty-nine cases in which these have been recorded, constipation is marked as the first symptom, and it continued throughout. The only exceptions were the following three. In one case, enemata brought away faecal matter on the ninth day after the commencement of the attack. The band involved the ileum. (Case of Mr. Webb). In another case, in which the jejunum was encircled, the bowels acted on the third day. And in a third, related by Dr. Hare (*Path. Trans.*, 1850-51) scybala came away repeatedly. The band in this case was not tight, and the patient lived thirty-seven days.

In thirty-seven cases, vomiting was a marked symptom ; in twenty-six of these, the vomited matter became stercoraceous at a time varying from the second to the ninth day from the commencement of the attack. In the case in which the lower part of the jejunum was constricted, the vomited matter is said to have been faecal on the seventh day.

Excessive thirst, great restlessness, syncope, delirium, and partial suppression of urine, occurred in some few of the cases ; but neither of these symptoms is said to have been by any means constant.

In one case, although the constriction was unrelieved, the vomiting ceased on the eighth day, and the stomach retained food to the last, fourteen days and a half from the commencement of the attack.

Perhaps this survey of the means of diagnosis is somewhat discouraging. It amounts to this :—

1. The history of the individual should point to some antecedent disease or injury equal to the production of a solitary band.

2. Pain does not of necessity follow immediately on the constriction of a portion of intestine by a band, although a portion of higher intestine be constricted, and that tightly. If it be coincident with the first symptoms, the pain is local, and arises from the physical injury to the bowel : if not, it comes on sooner or later as the consequence of over-distension, of peritonitis or its results, or of both combined. The pain is often, but not always, paroxysmal.

3. Distension is an early and prevailing sign. When the constriction involves the higher bowel, it is generally confined to a limited area around the seat of injury. Where the obstruction is lower, the distension is more general from the commencement. Dulness is a sign of uncertain value ; but



generally it is found gradually to concentrate itself, together with greater distension, towards the seat of constriction.

4. Vomiting is a prevailing symptom ; and is especially characteristic of complete obstruction when it becomes faecal.

5. The suddenness of the attack, and its not being preceded or accompanied by any indications of alteration in the prevailing state of the patient's health, is an important symptom.

The practical conclusion at which I arrive from the foregoing remarks is, that our present means of diagnosing internal obstruction by bands are imperfect ; and that consequently many cases will escape the most careful scrutiny to ascertain their cause. On the other hand, the inductions from the confessedly superficial analysis of the cases which I have collected and thus cursorily examined, encourage and even authorise the surgeon, in a case presenting a certain combination of features or evidence, in other words, in a well marked case, rather to explore the abdominal cavity than to allow the patient to sink without the chance that such a procedure might afford. These evidences should be :

1. An antecedent abdominal affection, of such severity as to lead the surgeon to believe that it might have been attended with some ulcerative or perforative process of either the bowel or the mesentery.

2. Suddenness of the attack, without previous visible deterioration of the patient's health.

3. Pain, first localised, then tenderness over a large area.

4. Distension, with general dulness at first ; and subsequent concentration of dulness and tension towards the original seat of pain.

5. Vomiting, especially if it speedily become faecal.

I believe that no such conjunction of symptoms as these can arise without some sudden alteration in the relation of parts within the abdominal cavity ; and that in most cases a bridle will be found to be either directly or indirectly constricting a portion of intestine. As soon as the last of the series of symptoms—faecal vomiting—has set in, the surgeon is, in my opinion, justified in proceeding to explore the abdomen. Should a band or bridle be found, some caution must be observed in its treatment. It should be divided ; but, in case it unites two portions of a hollow viscus, there is a probability of its being tubular : consequently, the two ends should be twisted or tied, to ensure their not allowing the escape of the visceral contents.