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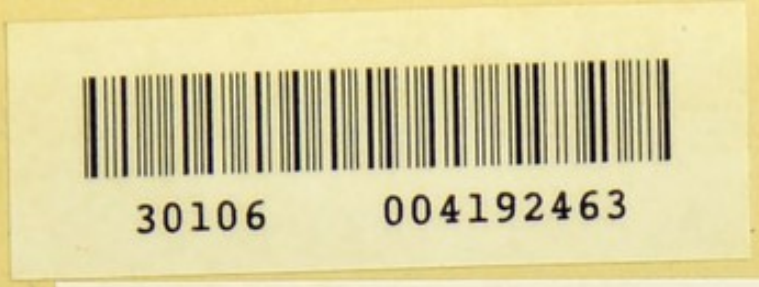
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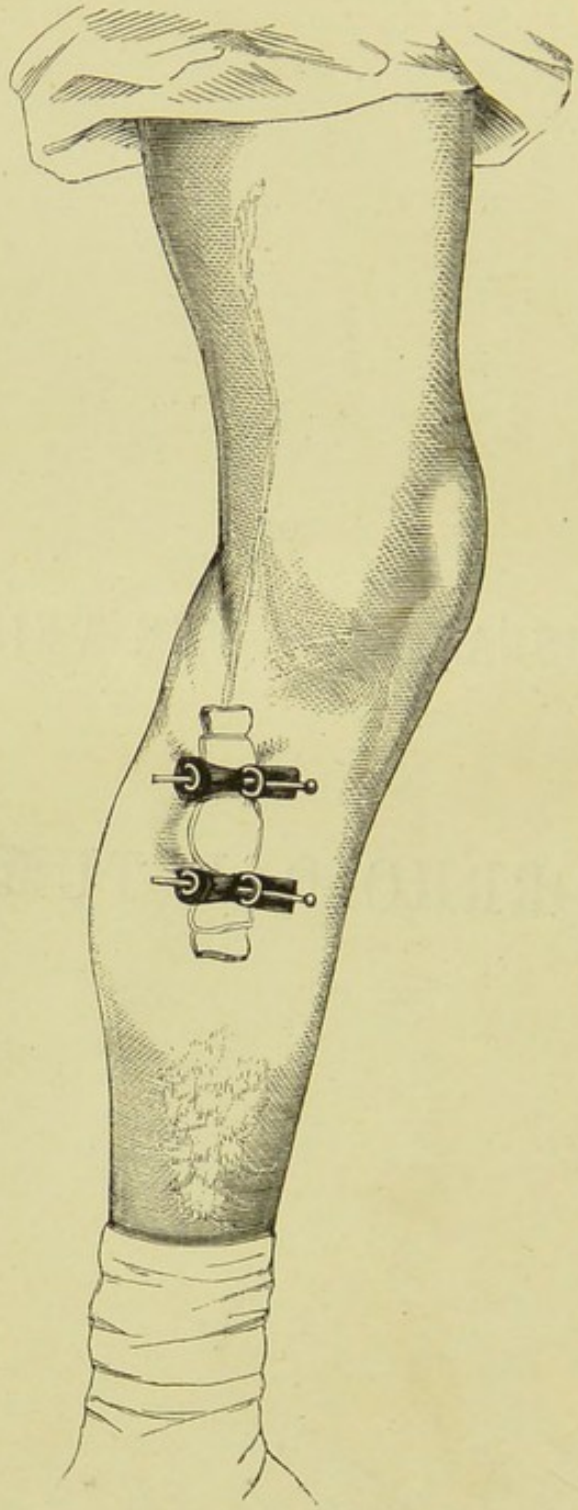
ON

DISEASES OF THE VEINS

AND

HÆMORRHOIDAL TUMOURS.



ON

DISEASES OF THE VEINS,

HÆMORRHOIDAL TUMOURS,

AND OTHER

AFFECTIONS OF THE RECTUM.

ENTIRELY RE-WRITTEN.

BY

HENRY LEE, F.R.C.S.,

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ADVERTISEMENT.

The present work consists of two parts: the first a treatise on "Diseases of the Veins," the second an essay on "Affections of the Rectum." These two classes of disease naturally associate themselves in the consideration of hæmorrhoidal tumours. The first essay on the "Treatment of Hæmorrhoidal Tumours," was published by the author, in the "London Medical Gazette," for 1848, and the subject was more fully dwelt upon in his "Pathological and Surgical Essays," for 1854. The first edition of the "Diseases of the Veins" was published in 1850, having formed the Jacksonian Prize Essay for the preceding year.

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PREFACE.

' is not too much to assert that more lives are lost in nsequence of the slow, insidious affections of the veins an by injuries and diseases of the arteries. The currence of hemorrhage from a wounded artery has all ages rivetted the attention both of the profession d of the public, while the fatal effects of lesions of the ins has attracted comparatively little attention. The od which flows from an artery is at once seen, and e danger recognised; but even with all the attention ich arterial hemorrhage necessarily commands, many nturies elapsed before a simple and effectual remedy it was discovered. It is not, then, surprising that processes consequent upon diseases and injuries of veins, unattended as they are by any striking symp-ns in their origin, and not often, even in cases of unds, accompanied by much hemorrhage, should e been allowed to do their silent, secret, but deadly k, almost unopposed by surgical art.

'The blood which flows out of an artery is a loss to general system, but it can in no other way produce injurious effects; and the blood which flows ough a diseased artery, and thereby partakes of its eased action, carries whatever it may have received

away from the centre of the circulation. The blood which flows through an injured or diseased vein, on the other hand, carries whatever it may have received *towards* the central vital organs; hence the very serious results produced by these affections. One of the principal objects of the present work is to demonstrate how far such results may be remedied or prevented, and how far the system may in certain cases be saved from the dangerous train of symptoms which naturally follow the disintegration, decomposition, and removal of blood clots in living animals.

So many of the observations which have tended to advance our knowledge of the effects of the introduction of diseased fluids into the blood have been recorded in connection with phlebitis and diseases of the veins that I have retained these titles, although they are obviously inadequate to express those constitutional affections which form the most important and characteristic features of the complaints with which they are naturally associated.

In preparing the second edition of this work I have had the assistance of Dr. Marston, whose known accuracy of observation and soundness of judgment afford the best guarantee for the truthfulness of any scientific investigations in which he may engage.

HENRY LEE.

9, *Savile Row*,
February, 1866.

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INTRODUCTION.

IN publishing a second edition of the succeeding essay, the author feels that some remarks are called for in reference to the very altered aspect which the whole question of phlebitis and its concomitants has assumed. It is not without pleasure that he feels his very humble and imperfect labours to have been among the first which served to indicate the paths by which the subject should be approached and followed.

The pathology of those diseases which have been grouped under the title of phlebitis has undergone the most rigid scrutiny of late years; and Virchow, in particular, has endeavoured to unravel the complicated skein of difficulties. Discarding the term phlebitis, and laying hold of one of the main phenomena—the coagulation, or clotting of the blood—he has followed out, from this stand-point, all the subsequent and remote effects to which it might give rise; he has made this the thread by which we may trace the continuity and relation of the chain of the phenomena. His attack upon the ordinarily received views has been so trenchant, and the advocacy of his own doctrines so skilful and perspicuous, that he may be said to have revolutionised the whole pathology of these disorders. Whether subsequent researches will ratify Virchow's views in their entirety, remains to be seen. In every revolution of opinion we incur the risk of losing something; for it too often happens that the rising of a new truth is the signal for the setting of another and older one.

Much as has been accomplished by an acute analysis of

the different and allied phenomena, included under the terms phlebitis, metastatic abscesses, pyæmia, and the like, it can scarcely be said that the pathology of these disorders has been thoroughly elucidated.

The point upon which the greatest amount of interest has been concentrated is the cause of the coagulation of the blood in an affected vein. Different observers have endeavoured to indicate how far this was an expression or effect of inflammation; under what circumstances it takes place; in what relation the phenomenon of blood-clotting stands to a local phlebitis on the one hand, and to those secondary multiple abscesses in the viscera, which are the frequent concomitants of injuries and wounds, on the other; and to point out what is the true pathology of pyæmial diseases, and the relations which the morbid processes discovered in veins bear to them. It has yet to be determined that the formation of a coagulum, or thrombus, is the invariable attendant and precursor of any of these diseases. The author's later experience has convinced him that it is by no means an essential element, although a most common one in such affections.

This part of the subject is confessedly one of extreme difficulty, since a complete and perfect theory of the proximate cause of the coagulation of the blood yet remains to be constructed.

Admirably reasoned, and conclusive as Dr. Richardson's essay—"Coagulation of the Blood"—appears, it fails to convince us that his theory is capable of representing the whole truth. In examining dead bodies, the most variable conditions of the blood will be found to exist. In some parts of the venous system coagula are present, while in other parts the blood retains its fluidity; although, as far as one could determine, it was subject to exactly the same conditions, as affecting the evolution of that free ammonia, upon the presence of which the fluidity of the fibrin is said to depend. In limbs amputated for disease and injuries, the author has been often struck with the same thing. The explanation of the phenomena of clotting in the living frame is equally difficult of explanation upon this theory.

The addition or presence of a foreign body, as pointed ut by Professor Andrew Buchanan; the admixture of two ifferent varieties of serum, or the simple addition of water ill sometimes determine the coagulation of a portion of lood. The effect of these indicates something different to ne mere evolution of ammonia. It would seem that coagula- on of the blood may be induced by its contact with ordinary natter,* and, as pointed out by the author in the first edition f this work, is favoured in a very remarkable degree by the dmixture of pus, especially when derived from an acute bscess.

* The reader is referred to Professor Lister's very suggestive observations poon this subject (Edinburgh Medical Journals for April, 1858, and December, 859); as well as to Brücke's Paper in the British and Foreign Medico-hirurgical Review, No. XXXVI: and Professor Gulliver's Lectures "On the lood of Vertebrata," delivered before the Royal College of Surgeons.

In 1863, Dr. Marston tells me, that he was desirous of determining the amount ' ammonia present in some barrack-rooms. For this purpose he used the test nown as Nessler's test, and found it a very delicate one. He then made an ttempt to detect ammonia in the blood by this process, but without any results. he observations were far too few to be of any great value; but Dr. A. Gamgee, the last Meeting of the British Association, related experiments made by him-lf with this reagent, as well as some by Dr. Kühne, in which negative results hly were produced.

DISEASES OF THE VEINS.

THREE distinct affections have hitherto been described under the general name of phlebitis, viz., a primary inflammation of one of the larger veins of the body; the secondary affections, which occur in veins situated at a distance from the original lesion; and the general infection of the system, which results from the admixture of diseased secretions with the blood.

The symptoms which occasionally accompany or follow inflammation of a vein after bleeding, are of so marked a character, that they must at all times have attracted the observation of surgeons, but it is not until comparatively recent times that they have been distinctly or separately described. Among those who first directed particular attention to these diseases we find the most vague and unsatisfactory theories maintained, and it is remarkable, even in more modern times, how slowly the true pathology of the affections has been developed. The actual condition of the parts in persons and animals who had suffered after bleeding, was first clearly described by Hunter. His remarks, though short and simple, being founded upon the unprejudiced observation of nature, have remained as guides for all future enquirers. He found in several cases, both in men and animals, when fatal consequences had supervened after bleeding, that the coats of the injured vein were inflamed and thickened, and that this inflammation extended for a considerable distance along the vessels. In some cases these appearances were found to

have reached even to the lining of the heart, but in the majority they appeared to have spread in an opposite direction.

Mr. Hunter describes under the name of "union by the first intention," a rejoining of divided parts, without the production or interposition of new material, and "a union by adhesion," or "adhesive inflammation," effected by the organisation of an interposed new material. He clearly distinguished between these processes. In his account of "union by the first intention," he evidently considered that this was effected through the medium of the fibrin of the blood, extravasated between the opposing edges of a wound. The fibrin that is derived from the blood directly, and deposited in the form of a membrane, without being secreted by any vessel, assumes so much the appearance of that derived by secretion from inflamed capillaries, that they have been described as identical. But the mode of their formation in the two instances is altogether different. In the one case, the process is a local one, confined to the blood itself, and subsequently to the membrane with which it happens to be in contact. In the other case, it is an effort of the constitution, accompanied by constitutional symptoms. The presence of pieces of fibrin, adhering to the reddened lining membrane of a vein, was for a long time very naturally regarded as the product of its inflammation. The altered colour of the membrane is, however, commonly only a blood staining due to the imbibition of colouring matter from the neighbouring clot, and no proof of inflammatory action. Although the closest adherence of coagulated fibrin to a membrane against which it is opposed is, in itself, no proof of any organic or physiological union between them, still, there is ample evidence for believing that portions of coagulated blood may coalesce with neighbouring parts, and become vascular and organised. As illustrative of this, the clots in the serous sac of the arachnoid, and those in veins and arteries obliterated by ligature, may be mentioned.

Mr. Prescott Hewett has admirably described the changes which ensue in blood-clots extravasated within the cavity of

ee arachnoid. These are at first attached to the parietal yer of that membrane, and afterwards become encysted and ganised. Mr. Hewett has witnessed a clot acquire these aracters, and become plentifully supplied with blood-vessels, venty-three days after an injury. We shall have to speak of ee organization of clots within the vessels subsequently.

Hunter also clearly described the process of suppuration veins, and showed that a series of abscesses would fre- uently form in their course, and he came to the conclusion at the lining membrane of veins was liable to inflammation, hich might terminate in abscess. These observations ppeared to prove satisfactorily that the cause of the severe mptoms which were occasionally observed after bleeding, as to be attributed to an affection, often accompanied by, if t dependent upon, inflammation of the veins.

Quite independent of any observations regarding affections the veins, Ambrose Paré, Morgagni, and other pathologists, served and described with greater or less accuracy the rmation, anomalous as it appeared to them, of abscesses in e liver and tubercles (indurations) in the lungs, after injuries other parts. Much ingenious reasoning was used to count for the formation of these hepatic abscesses. Those the lungs attracted less attention, and, when noticed, were obably mistaken for vomicæ. Cases sometimes occurred, owever, which could not be accounted for by any of the en existing theories.

Multiple abscesses were recognised in other parts of the ody, but still without any distinct idea of the way in which ey were formed. Even Hunter's attention appears to have een directed in an especial manner to abscesses in the lungs, d to the condition of the veins in their immediate neigh- ourhood; yet he has left us no hint that he ever entertained e idea that the appearances which he there observed could in any way connected with an alteration of the blood, used by the entrance of a morbid product into the vessels om a wound, or by an affection of veins in other parts. unter appears to have believed that the injurious conse- uences of inflammation of the larger veins were to be attri-

buted to the propagation of the inflammation in an uninterrupted course along the lining membrane of the vessels, and, especially, by its extension to the heart. In this notion he was followed by nearly all the writers upon the subject, until Mr. Arnott proved, by a careful collection of cases, that the signs of inflammation and irritation are by no means generally to be found either in the heart, or in the large veins connected with it. Still, the idea of irritation being propagated in some undefined way along the lining membrane of the veins, was by most surgeons held to be sufficient to account for the severe symptoms which, in many cases, accompanied or followed slight injuries to veins, such as that made in bleeding.

MM. Dance, Cruveilhier, Castelnau, and Ducrest at length entered into a long series of investigations, which terminated by establishing in the fullest manner, a connection between the inflammation of a part originally injured and the secondary abscesses observed in internal organs. It remained only to determine, with precision, the way in which these abscesses are formed, and the circumstances which determine their formation in some localities in preference to others. In the dissections performed by Hunter, he found that the blood was almost always coagulated in inflamed veins, and he concluded that by this means the contents of the veins were cut off and separated from the general circulation. It occasionally happened that the coagula were not present, and then Mr. Hunter believed that if purulent matter formed in the vein, it might become mixed with the blood, and be carried in the general course of the circulation. This opinion of Hunter's probably gave rise to the idea, long maintained and ably supported, that pus might be taken up from one part of the body and deposited in substance and in the same condition as it was absorbed, in another. MM. Dance, Cruveilhier, and Sedillot have all in succession maintained this view of the mode of formation of secondary abscesses by metastasis. These enquirers were but the advanced guard of a series of scientific investigators.

This theory of the arrest of pus-cells in the capillaries of

the lungs or liver, not only cannot be proved, but there is much evidence against it. There is a great similarity in size and appearance between the white blood-corpuscle and the pus-cell; and it is improbable, to say the least, that the former, on account of their size alone, should be transmitted through channels in which the latter are arrested. This theory is altogether too mechanical to account for the various facts associated with the occurrence of secondary inflammations; and that pus from a chronic abscess may circulate with the blood without producing any such results was proved by a Committee of the Physiological Society of Edinburgh in 1852.

Cruveilhier's observations, as expressed in his "Traité d'Anatomie Pathologique Générale," went to establish the occurrence of a suppurative phlebitis in the vicinity of a wound, as the origin of those secondary metastatic abscesses with which all pathologists were at that time acquainted. Cruveilhier conceived when inflammation of a vein, caused by some wound or injury, took place, that the action might never—and, ordinarily, did never—pass the limits of adhesion; but that a suppurative phlebitis sometimes ensued, and then, that the pus either became mixed with the current of the blood, or that it became isolated and shut off from it by being confined and included within a blood-clot. As long as the pus remained so localised, he thought that it might determine a local inflammation and discharge itself by an abscess at the part; but that if the barriers opposed by the blood-clots became broken down, the pus might then gain an entrance into the circulation, and the pus-globules so introduced, being carried to the capillaries of the viscera, might there excite a capillary phlebitis, and circumscribed inflammations and suppurations of the neighbouring parts. Cruveilhier concluded, therefore, that the visceral abscesses discovered in pyæmia and its allies, are the result of a secondary capillary phlebitis; that this was excited by the presence of pus-cells derived from a primitive phlebitis in a vein or venous capillary. The experiments which Cruveilhier made, by injecting quicksilver into the circulation of animals,

afforded a strong support to his theory. He was enabled to produce visceral abscesses in a dog, into the medullary canal of whose femur he had inserted some quicksilver. Minute particles of the mercury were carried to the pulmonary capillaries, there arrested, and the globules became the separate centres of so many circumscribed inflammations and abscesses.* Now, it was no objection whatever, (as Tessier urged) that these visceral abscesses might sometimes be found after surgical injuries, in which either no phlebitis at all was discoverable, or wherein the pus, if present, was confined by blood-clots; because, first, every vein in the body must be examined before we can decide upon the non-existence of phlebitis; and, secondly, Cruveilhier conceived the barriers opposed by the clots to the transference of the pus were only temporary, tending to break down and pass away; or the pus-cells might, he thought, permeate a thin porous clot by a capillary filtration, and gain an entrance into the circulating current. Cruveilhier further supported his idea by showing, in cases of multiple visceral abscesses occurring after amputation where no phlebitis was discoverable by dissection of the soft parts, that upon further examination pus might often be found in the medullary cavity and spongy textures of the bones. This highly ingenious and beautiful theory has not withstood the test of later investigations. It is open to many objections, the main one being the erroneous description of the production, constitution, and composition of the blood-clots, which Cruveilhier perceived were the almost invariable attendants on his phlebitis. The doctrine of the absorption of pus, moreover, rests upon no satisfactory evidence, and the appearance of pus-cells, which many have thought they detected in the blood, may have been in reality due to an absolute or relative increase in the number of white blood-

* If mercury be shaken with freshly drawn blood its particles will soon be found to be firmly adherent to small portions of decolorised fibrin. The same result would take place in the living body, and it is therefore highly probable that the mercury became arrested in Cruveilhier's experiments in the lungs of animals, not because the tubes were too minute to allow the mercury to pass, but because the particles of mercury and of fibrin had adhered together.

lls. The preponderance of these white cells is by no means essential symptom of pyæmia, but it is a character of the ood common to many diseases, attended by depression d wasting, particularly where there exists any attendant itation of the lymphatic glands.

The origin, the exact constitution, and composition of the ts found in veins has been a fruitful source of discussion d discrepancy of opinion among pathologists.

Mr. Hunter regarded the puriform-looking products found veins as ordinary pus, derived from a suppurative inflam- ition of its lining membrane; but M. Cruveilhier discovered at there was a coagulation of the blood, and this he thought e initial step in all inflammatory processes, and that the pposed purulent fluid always occupied the centre of the agulum, and not that part of it in connection with the ining membrane of the vessel in which it was contained. ow, clotting of the blood in a vein may exist, and very ten does exist, without any evidence of phlebitis at all, d, conversely, a phlebitis may exist without any such agulation. No one has yet satisfactorily demonstrated the esence of an inflammation limited to the lining membrane a vein. The author's observations, published in the year 352, in vol. xxxv. of the "Medical and Chirurgical Transac- ons," substantiated the fact, that the lining membrane of eins did not comport itself under the effects of irritants in e same manner as the other serous membranes do, and at local irritants show their effects first upon the blood self, and not upon the lining membrane of the vessels. irchow discards the primary and secondary phlebitis of ruveilhier as non-essential phenomena, and starts with the rmation of, and the subsequent changes in, a coagulum or hrombus.

The fact of these purulent-looking deposits occupying the entre and not the circumference of a clot is an evidence of heir origin in the elements of that clot, irrespective of any ction in the internal coat of the vein. Cruveilhier had to ccount for the presence of the puriform material by the ypothesis that the pus-cells permeated to the interior of

the clot by capillarity. But there was another and fundamental error, which arose from the assumption that such puriform matters were identical with ordinary pus. Had this been the case, then, indeed, the clots or polypi containing puriform-looking fluid in their centres so often found in the right side of the heart, ought to have been an indication of a pre-existing pyæmia; yet it did not escape the observation of pathologists that such was not the case.

In reality, the cells resembling pus-cells are pre-existing elements, and not the product of any inflammatory action. The microscopic appearances are those of the white blood-cells, the shrivelled and altered remains of the red corpuscles, and the molecular *débris* of the fibrin-mesh, in which these were suspended. A clot undergoes those retrograde changes to which all bodies capable of organization are liable when removed from the sphere of the vital forces. Thus, a coagulum of dead fibrin, kept for awhile at a temperature of 100°, becomes so softened and altered as to attain a puriform appearance. Professor Gulliver, in his lectures "On the Blood of Vertebrata," has traced and illustrated these changes very accurately. As the *centre* of every thrombus or clot is the farthest removed from the tissues through which an organic union could take place, so do we find that *here* retrograde and degenerate changes are earliest in point of time, and most marked in degree. The process is one of liquefactive degeneration of the fibrin of the blood-clot setting free its cellular constituents. To borrow Virchow's lucid illustration: "It is with this process just as when water which is thoroughly impregnated with solid particles is frozen and then exposed to a higher temperature. When the ice melts the enclosed particles must, of course, again come to light."

The only mode by which a clot can remain *in situ*, without its undergoing these retrograde changes, is through its becoming organically incorporated with the neighbouring tissues. In many instances where the coagulation has been progressive and not immediate throughout the whole clot, this process will be found to bear the evidences of having com-

nced at the outside first, on the lining membrane of the in; and afterwards to have received additional deposits or ers; for the coagulum will be found externally composed of rin, firm and free of blood globules, while towards the erior of the vessel, it is soft, loose, dark, of a mottled aspect, th numerous blood globules, like an ordinary blood clot. e can scarcely avoid perceiving in these differences of appearance the evidences of a different method of production, e first being a process of fibrinous deposition, the latter a tting, in which all the constituents of the blood at the rt are involved.

As has already been said, phlebitis has an undoubted istence. When some external injury has been applied to varicose vein, for example, and pain, heat, tenderness, and velling follow, the symptoms leave but little doubt of the esence of inflammation, and coagulation of the blood at e part injured is the effect; but then the inflammation ppears to have been propagated from without inwards. The ein is enlarged, the coats are unnaturally distended and uscular, and they may even be separated from one another y effused serum, lymph, or pus. The internal coat may be und thickened, opaque, and covered with an adherent lood-clot. The vessel may become patulous, and gape on ection. Any one who has examined an injured and inflamed ile, may have witnessed the formation of a coagulum in connection with inflammation; but, it may be urged, the coagulation often appears to precede any of the local signs of inflammation, and the relation of one to the other then becomes very difficult question to determine. Now, it really appears, that the phlebitis is sometimes the cause, sometimes the consequence of the clot—the former when the vein has sustained any mechanical injury, the latter whenever some irritating substance has been included in the clot.

The coagulation that is the effect of a phlebitis seems to be occasioned by some morbid impression made upon the blood through the lining membrane. The clots which are found firmly adherent to one side only of an artery or vein are, almost invariably, connected with a diseased condition of

the vessel at that part, and are the result of some localised irritation. Although it is undoubted that the internal coat is not liable to be inflamed in the same way as serous membranes are, there is no reason why it should not be affected with a perverted nutrition allied to a state of inflammation. The coat being a non-vascular one, and composed of very delicate epithelial cells supported on a fine substratum of connective tissue, we cannot expect to find the phenomena identical with those in inflamed vascular tissues; changes in the structure and contents of the cells, marked by a cloudiness or opacity of the epithelial layer, and the production of very fine and elementary growths in the connective tissue, here take the part of that lymph and false membrane, which are the results of an inflammation of the peritoneum or pleura. The researches of Mr. Lister and others sufficiently indicate what very slight deviations from the normal relations existing between the membrane and the contained blood may lead to a coagulation of the blood within a vein.

Since the publication of the first edition of this work in 1850, the process of obstruction of veins by coagula has been investigated by the late Dr. Mackenzie, and the results published in vol. xxxvii of the "Medico-Chirurgical Transactions." In reference to some experiments there detailed, upon the effects of pus mixed with blood out of the body, Dr. Mackenzie shows, that there are many other agents besides pus, and vitiated or decomposing fluids, which hasten coagulation when added to the blood; and that these are very variable indeed in their nature; hence, he very justly deems that conclusions drawn from observations upon the re-action of the blood out of the body when re-agents are applied, must be very untrustworthy.

Dr. Mackenzie appears to think that the coagulation of the blood, at any rate in cases of obstructive phlebitis, is to be referred to an irritated (not inflamed) state of the lining membrane, produced by the introduction of some irritant into the vessel, or by the action of a vitiated blood upon various points of it. In fine, that the phenomena of coagulation depend upon a disturbance of the relations which normally

bosist between the blood and lining membranes of veins, and at they are due to the irritation of the latter.

This explanation appears to be the true one in those cases here the coagulation has followed an injury to, or a disease the venous coats; but there can be no doubt that the blood ay be found coagulated in veins where there has been, and no evidence whatever of an irritated lining membrane. ome of the experiments cited by Dr. Mackenzie are open to different explanation to that assigned by him. For example, hen nitrate of silver or lactic acid was applied to the lining embrane of a vein previously emptied of blood, and the ood coagulated on its re-admission, such coagulation might ve been caused by the action of some of the irritant remaining undecomposed, instead of its being an evidence of the tion of an irritated lining membrane. Again, it must be membered that the application of such irritants involves ne alteration and destruction of the epithelium, rendering it xe ordinary matter instead of living tissue. It is almost mpossible in some cases—seeing that an irritating fluid, and n irritated state of the lining membrane of a vein may coxist, and equally induce coagulation—to say to which agency uch coagulation should be referred.

That the clot should be apposed or adherent to the lining membrane of a vessel which has been subjected to the injecon of some fluid irritant, is not conclusive evidence of an rritated condition of that membrane, because this adhesion, o some extent, commonly ensues under all circumstances of lood clotting within the vessels. The movement of the tream of blood along different parts of the channel would ot appear to be equally free; that at the periphery being more sluggish than that occupying the centre, where the riction is less. Coagulation of the fibrin is, therefore, both more likely to ensue, and to become firmer, where the blood s in contact with the lining membrane. The extremities of uch clots are, however, often not applied to the lining membrane, but taper off or terminate in a rounded or oval head, which is free in the interior of the channel. This generally comes to be the case when the coagulum contracts.

In those cases where a generally vitiated state of the blood is said to have been the cause of the morbid irritation of the lining membrane, it is difficult to explain why the coagulation should be limited to certain points instead of being general, seeing that the vitiated blood is applied to every part in its circulation through the veins. A retardation in its movement can hardly yield the explanation; since, then, coagula ought to be found in the smaller tributary veins and capillaries, out of all proportion to those in the larger venous channels.

These difficulties seem to be more easily met upon the assumption that the blood conveys minute portions of the original clot to various parts of the system, and that these become arrested or impacted where the circulation is slow, and where the stream becomes very minutely subdivided by numerous vessels. Subsequent morbid processes may or may not follow in the vessels and neighbouring textures, and the character of these will vary, according to the agent producing the decomposition and the nature of the vitiated blood.

In phlegmasia alba dolens, for example, of which Dr. Mackenzie's essay specially treats, the obstruction of veins occasionally arises from a spontaneous coagulation of the fibrin; but it generally results from the influence upon the tributary branches; the opposite, or cardiac portion, lying free in a large vein, and terminating by a large rounded end. The marks of phlebitis are rarely present. If the clot be of a simple kind, it will generally liquify and become so thoroughly disintegrated as to disappear, without leaving any blood of materials absorbed through the uterine veins. At its distal extremity the venous clot is multiple, adherent, and composed of root-like processes, extending into the trace of its existence, and without having induced any constitutional symptoms. But it sometimes happens that a large portion of the coagulum is detached and arrested in the heart or large pulmonary trunks, producing fatal forms of cardiac or pulmonary emboli. If several small portions are detached, they become arrested in the smaller pulmonary vessels, and give rise to obstructions, local œdema, or to an

ıbolic pneumonia of a less active and dangerous form than ıere the pulmonary emboli are formed of decomposing or ttrefactive matters.

Upon reviewing the morbid processes which have been, one time or other, included within the term "phlebitis," find three distinct varieties of thrombosis, the two first of ıich have no connection with disease of the venous coats.

1. A spontaneous coagulation of the blood within the ssel, unconnected with the entrance of any extraneous ıterial. This may take place in several cachectic states of e body, wherein there is a diminished force and movement the circulating fluid, conjoined with anæmia, and an abso- e or relative increase in its fibrinous constituent. Such are e cases delineated by Dr. Richardson and Mr. Humphry.

2. A coagulation induced by the entrance of some abnor- ıl material into the venous current, and its action upon the culating fluid.

3. Coagulation caused by irritation, injury, or any disease ecting the venous coats themselves. Here the blood coagu- es by virtue of some morbid impression made upon the ssel, which may be accompanied by injury to, roughening, vation, or ulceration of its lining membrane.

The first variety differs very materially from the others. ıe clots shew little or no tendency to become organized, tt, softening, are generally removed. Coagulation, conse- ent upon mere vital prostration, is very seldom the cause persistent obstruction. The clots rarely appear to be the use of death, unless they ensue in the heart, or the large ssels in its neighbourhood; nor are they productive of the mptoms which attend traumatic inflammation of the veins.

Any of the above varieties may exist without the produc- n of other than local mischief, thus:—In the first, the ıgulum may break up, liquefy, and be removed entirely, or come converted into a form of connective tissue and pig- ent: it may become organised, and occlude the vessel; ntract, so as to leave a free channel; or, while in a cavern- s spongy state, it may become tunnelled by several minute reams. In the second and third varieties an abscess or slough

may ensue, by which the coagulating agent and the coagulum may alike be extruded.

The general symptoms, which may arise under any one of the above circumstances may be caused by a general infection or decomposition of the blood, or by the translation of some one or more portions of the clot or thrombus to other parts; and here it is, that great differences will arise in the gravity of the symptoms induced, according to the parts to which the fragments are conveyed, and, more particularly, according to the agent by which the original coagulation was induced, and the character of the decomposition it has set up in the blood.

1st. When softening and disintegration of a clot take place, in which is contained the coagulating virus, or some septic principles generated in the decomposing mass, or materials already degenerated, symptoms of pyæmia or septicæmia may ensue.

2nd. *Emboli* of mechanical origin may arise by the detachment of larger or smaller pieces from a blood-clot exposed to the current of the circulation. Hence, as Virchow so well remarks, we have to deal with fragments of coagula in a more or less altered condition, and according as this alteration has assumed this or that character, the nature of the processes which arise in consequence of the obstruction, may also be very different. For example, a metastatic deposit derived from the original site of a coagulum undergoing a gangrenous softening will also assume a gangrenous character, just as would be the case if gangrenous matter were inoculated.

The term pyæmia unquestionably includes a more complex causation than the above would imply, for the occasional rapidity of its course can only be accounted for upon the assumption of some rapid chemical or zymotic changes in the blood. In several cases which the author has examined, he has been unable to trace blood-clots or metastatic abscesses. In a case which he dissected recently wherein the symptoms observed during life were very characteristic of pyæmia, he discovered neither abscesses nor blood-clots, except coagula in the cavities of the heart. Th

ood was very fluid throughout the body. There was a markable "bloodiness" and hyperæmia of the internal gans generally. The mucous membrane of the stomach d small intestines was softened and congested in patches. e lungs were much injected, and their surface presented t peculiar ecchymotic staining so commonly witnessed death from blood diseases; but there were neither clots, durations, nor abscesses present. Blood poisoning, as the se of death, had to be arrived at as much by the gative evidence as by any positive signs.

PHLEBITIS.

PATHOLOGY.—When any morbid matter passes into the veins there is but one means by which it can be prevented from entering the general circulation, and that is by the obstruction of the vessels in which it is contained. The method adopted by nature in order to produce this obstruction is, under ordinary circumstances, the coagulation of the blood. In the absorbent system of vessels, morbid matters are arrested in their course towards the circulation in a different way. Every absorbent vessel conveys its contents in the first instance to a lymphatic gland, where the fluid undergoes a kind of digestion, which fits it for being received into the blood, or when such a conversion is found impossible, the morbid matter is expelled from the system by suppuration. When inflammation of a lymphatic vessel has arisen — be it a simple or a specific inflammation — the diseased action always pursues a course to the gland, or to the group of glands "first in order," and there it generally terminates; those "second in order" very rarely indeed being affected. If the absorption of vitiated fluids from a wound continues, then the noxious matter may accumulate in the lymphatic ramifications, and give rise to pustules or abscesses "wherever it filters over the vast area of skin subordinate to the obstructed glands." "The inflammation and suppuration of the glands appear also to be eliminative as regards the afferent lymphatics, and the injured distal parts, and protective as regards the circulating blood."* When symp-

* *Vide* Article on Absorbents, by Mr. C. H. Moore, in Vol. 3 of Holmes' Surgery.

ms of pyæmia ensue in such cases, it seems probable, that me of the same morbid materials that caused the disease the lymphatics have gained an entrance into the veins ectly, and not through the intermediate channel of the mphatics. It is only in very rare instances indeed that the ection of the blood arises from a diseased gland by the ssage of matters along the efferent lymph tubes.

The number of vitiated fluids which may traverse the ins without leaving any trace of their course, is probably eat; but there are some which leave evident indications of eir passage towards the general circulation. With the tter class we are principally concerned in relation to lebitis. These morbid agents may practically be divided o three classes.

I. Those which, on admixture with the blood, determine coagulation.

II. Those which do not produce a direct coagulation of e blood, but have a tendency to cause the fibrin (in com- nation with albumen) to separate from its other elements, d to deposit itself in some part of the circulating stem.

III. Those which, upon admixture with the blood, pro- ce its decomposition.

What is the exact determining cause, or causes, of these ects is at present beyond our knowledge. We have not t ascertained what all the products of decomposing animal bstances are, nor which of these are especially noxious; other words, we have not determined what the changes the secretions of a wound are, for example, which precede e general blood contamination. The term pyæmia was pposed to express the nature and cause of many of them; t this theory has been abandoned for want of any satis- ctory evidence of the absorption of pus, or its existence in e circulation. The blood may become poisoned by its posure to the action of any of the products generated by composing or putrid animal substances; and many of the rious and grave results described in this essay are produced consequence of the introduction of septic and ichorous

matter from the raw surfaces of wounds. Now, whatever may be the exact nature of this septic matter, its production holds a very frequent, although by no means a necessary, connection with the suppurative process. The nature and composition of pus, and the chemical changes to which it is liable, have, therefore, naturally attracted a good deal of attention. The composition of pus seems to vary with the locality in which, and with the circumstances under which, it is formed. Thus, the pus of a chronic abscess appears to decompose more rapidly, and to generate sulphuretted hydrogen much more quickly after exposure to air, than that of an acute abscess. Pus is not a simple fluid, but the reverse. It contains a large amount of organic matter of different kinds, and it is, therefore, unstable in composition, and liable to undergo putrefactive and other changes. When it decomposes, very various and diffusible bodies may be generated, such as ammonia, gas products, leucine and tyrosine, with acids of the butyric group, &c. Pus may also undergo an acid or alkaline fermentation. The former is rare, but when it does occur, volatile and fatty acids are developed.*

The author has ascertained from some experiments that butyric acid will readily induce a coagulation of the blood; but the cause of the local clotting in veins about wounds cannot be the same in all cases. It will be shown hereafter that very different degrees of severity and danger exist in different cases. We have long suspected the cause of pyæmial and septic diseases to be due to the generation and absorption of some one or more peculiar organic poisons, rather than to the introduction into the blood of some product arising out of the ordinary decomposition of pus or other animal fluids; and that, when the poison is introduced into the system, the subsequent phenomena may then depend upon the presence or absence of a fit nidus or pabulum in the blood: and the experiments of Professor Panum on putrid infection would indicate that there exists a fixed, non-volatile, putrid poison, of a peculiarly indestructible

* *Vide* Aitken's Science and Practice of Medicine, Vol. 2, p. 862, 2nd Edition.

aracter, which resembles, in the intensity of its action, the sson of serpents, curare, and vegetable alkaloids, and fers from all ferments by retaining its power after boiling ll treatment with alcohol.

The results obtained by experimental investigation have en very contradictory however. This has probably arisen m several distinct, but allied diseases having been embraced thin the terms phlebitis and pyæmia, and attempts have en therefore made to seek out a cause common to them all, the way of isolating a special agent. It does not come thin the scope of the present work to enumerate all the sults of recent investigations, even were this possible; but must refer the reader to the labours of Professor Weber*, Bonn, and to those of Dr. Polli, of Milan. The former, in der to study the effects of putrid animal matters introduced to the blood, endeavoured to eliminate, by filtration of the rrupted blood, all the solid matters that it might contain, as not to confound the effects of a septicœmia with those embolism and obstructed vessels. He was enabled to pro-uce fever with rigors, sopor, &c., by the injection of filtered utrid blood, and he recognised the signs of gastro-enteritis, emorrhagic effusions into the mucous membranes, &c., upon *st-mortem* examination. By this plan he has demonstrated aat, without any mechanical causes produced by embolism, ne introduction of septic materials induced characteristic ffections.

The effect of injected solution of sulphuretted hydrogen as quite the same as that of the putrid fluids themselves, iz., profuse diarrhœal evacuations, croupy inflammations of ne bowels, congestions of the lungs, liver, spleen, and kidneys, ver, irritation of the spine, and opisthotonos. In some cases ne symptoms were quite choleraic, with decided lowering of ne temperature of the body. The blood corpuscles were uch contracted and wrinkled; the blood became dark, and oagulated slowly.

* *Sitzungsberichte der niederrheinischen Gesellschaft* in Bonn, August, 1864. *Versuchen über die Entstehung der Septicemie mit Dr. Urfey angestellt*; and ydenham Society's Year Book for 1864, p. 227.

Sulphide of ammonium acted in the same way, but less powerfully. On the other hand, butyric acid produced nervous phenomena, viz, somnolence, convulsions, paralysis, tetanus, and death. Dr. Polli, as the result of his laborious investigations of the subject of septicœmia and its allies, has constructed a theory, by which he holds that we must regard a true fermentation of the blood in the living animal, produced by the action of special ferments or catalytic agents, including such living organisms as bacteria and vibriones, as alike the exponent of this class of diseases and the source from which all our indications of treatment should be drawn.* The interest attending these inquiries insensibly leads us to pause over them; but to proceed with the three classes into which we have divided these morbid agents.

I. Coagulation of the blood in a vein may be either a primary or secondary affection; it may be either the cause or effect of the inflammation of the coats of the vein. In the one case the coagulation is determined by a diseased condition of the blood, quite independent of the vessels in which it is contained; in the other, it is produced by some impression conveyed through the coats of the vessels. Practically, however, these two classes of cases are not easily distinguished, for it is impossible in any individual case to say how far the blood in a vein may have become directly influenced by the contents of the *vasa vasorum* which are poured into it. The blood from the inflamed cellular coat may in this way be directly conveyed to the interior of the vein, and thus be a means by which the impression is produced which causes the coagulation of the blood in the interior of the affected vessel; or, on the other hand, should the coagulum be first formed, the obstruction of these minute vessels may be the means of producing the characteristic congestion of the venous coats. It is evident, then, that the vein and its contents may act and react upon each other. A description of the diseased actions in one will, therefore, necessarily involve a consideration of the morbid conditions of the other; and although for con-

* The reader is referred to a future section for the results of Dr. Polli's experiments.

nience these may be described separately, yet must they considered as often occurring simultaneously in practice. he gravity of the symptoms will depend upon the con-yance, and, still more, upon the nature of the matters con-yed from the diseased part, into the circulation. The local mptoms need therefore bear no direct proportion to the nstitutional affection. From whatever cause phlebitis may ise, whether from the nature of the morbid contents, from echanical injury, or from the extension of inflammation om surrounding parts, the seat of the inflammation is e cellular coat of the vein, and in a less degree the circular rous coat. No one has yet succeeded in producing un-quivocal marks of inflammation of the lining membrane only a vein.

In *acute* phlebitis the cellular coat of the vein is preterna-rally vascular, presenting a red appearance of greater or ss intensity. It becomes at the same time distended with flammatory products. These consist of serum, lymph, and us, according to the kind of inflammation, either separately mixed together in different proportions. Fluids secreted on he outer surface of a vein readily extend along it, permeat-g the areolar tissue which connects it with surrounding arts. This may be particularly noticed where a vein is urrounded by a sheath, as is the case with the jugular. The ircular fibrous coat of the vein becomes also injected, and hickened by deposit. The inner coat soon loses its natural ransparency, and becomes wrinkled and even fissured. It is f a dull, opaque, dirty white colour, stained more or less by he contents of the vein. It will, consequently, in different ases, assume every hue of red, violet, or brown; the inten-ity of the colour following very accurately that of the oagulum with which it is in contact.

Exudation often occurs between the inner and the outer oats, and the different layers of the former then become dis-ntegrated, or the lining membrane may be cast off in large ortions into the interior of the vessel. All the coats of the ein may, under these circumstances, be easily detached from ach other, or may be separated by serous, fibrinous, or puri-

form exudation. When these form under the lining membrane, they may be seen as patches of various sizes and shapes through the transparent structure, so long as this retains its consistency. Afterwards they may be poured, together with the fragments of the disintegrated membrane, into the cavity of the vessel. The inflammatory exudation between the different coats of the vein destroys its natural pliability, so that when divided it will remain open like an artery.

The coats of veins, when mechanically injured, would appear to be as little susceptible of inflammation as any structures in the body. The same vessel may be opened several times in succession, and, provided it be properly closed after each operation, no inconvenience will result. The way in which veterinary surgeons unite the edges of veins after bleeding, by means of a pin and twisted ligature, shows the amount of injury which these vessels will bear with impunity, and the same point is frequently illustrated in the present day by the operation of dividing large veins for the cure of varicose ulcers. These remarks apply to instances in which the veins are mechanically injured only; the case is widely different when any irritating fluid has entered their cavities. The amount of disturbance which is then produced, apparently with the object of getting rid of the noxious element, offers the strongest contrast to the simple process of union, by which the coats of the vessels are repaired after injury. The internal surface of veins reacts upon the application of extraneous matter as quickly and extensively as the serous membranes of the body, yet, in order that this effect may be produced, it is necessary that the morbid matter should be maintained for a certain period in contact with the lining membrane, which cannot be the case as long as the circulation of the blood through the vessels is continued.

When irritating substances are introduced into the veins, they must expend their injurious influence either upon parts with which they first come in contact, or upon some more distant vessels, or upon the system generally. If the morbid matter causes coagulation of the blood in the vessel into

hich it is first introduced, and the coagulum be maintained ere, a local disease only is produced, and the constitution is ared. To effect this, is, in many cases, obviously the design nature. A part is sacrificed for the good of the whole. t in this, as in every other remedial action, the object may carried out more or less perfectly. The original intention ay not quite succeed. The deleterious agent may not be rested at once in its course, but a portion of it may be conyed to some distant part of the vascular system; or it may temporarily retained by a clot, which afterwards disttegrates and gets conveyed elsewhere. The presence of e morbid matter will then produce disease of the part in hich it is contained. It matters little in what part of the rculating system this irritating matter is arrested. The ssential character of the disease will be the same in any case, d the same morbid alterations will take place in the stagnant ood.

The so-called primary and secondary phlebitis are, therere, essentially the same disease; the latter being so much ore dangerous in its results on account of the greater imortance of the organs usually attacked, and on account of e general mass of the blood having usually become more or ss infected. In both instances, the altered condition of the ontents, rather than of the coats of the vessel, being the prinpal and main phenomenon. When the blood coagulates in ne of the larger veins on the surface of the body, the affecon is recognised by the cord-like induration of the vessel. There is at first no swelling, nor tenderness of the limb, and o constitutional irritation. The subsequent changes depend ery much upon the nature of the coagulum which has formed. f this is composed of healthy blood, such as may be produced y introducing a needle connected with the negative pole of n electric battery, or by passing a ligature round a vein, hen, when the original cause of the obstruction is removed, he coagulum will slowly dissolve, and be carried in the course f the circulation. There will generally be but little local, nd no constitutional disturbance, and the circulation through he vein will become completely restored. In a few cases,

the coagulum, instead of becoming dissolved, will remain and obstruct the vessel permanently to a greater or less extent. Other changes will then supervene. The coagulum will lose its colouring matter, and become tunnelled by numerous channels of blood, or it will remain in unorganised, perhaps, concentric layers, moulded to the shape of the contracted vessel for an indefinite period. Sometimes it will become organised, but this will very seldom happen so as permanently to obstruct the passage. If the coagulum be small, it will become attached to one side only of the vessel, to which it will become so intimately connected that, after a certain time, it will be impossible to distinguish the inner lining of the vessel from the inner surface of the newly organised substance. This unilateral position and adhesion of the clot points to the existence of some local cause of irritation. As the progress is continued, the coagulum will shrink and recede further from the opposite wall of the vein to that with which it was originally attached. If the coagulum be large, the outer layers will be firm, and contain within them the more fluid portions. The outer layers will then sometimes become organised. The coagula will sometimes assume the form of dark blood-stained masses, adhering to the lining membrane of the veins for a considerable distance. The more fluid parts generally disappear, being probably carried in the course of the circulation, and the passage through the vein is re-established. The venous channel may then be lined on one side, or on every side, by the newly-formed membrane. In the earlier periods of these formations, the layers of fibrin may be peeled off the inner coat of the vein, but subsequently these become inseparable from it.

When an artery is ligatured, the base of the internal coagulum comes into contact with the outer coat and the lymph effused around the internal and middle coats divided by the ligature. During the subsequent stages vessels extend from these parts into the clot, and organic union ensues; but the circumstances are different in the case of a vein. It is difficult to account for the way in which a coagulum may there become united to adjacent parts, and whence the vessels

derived which pass from one to the other. It is probable tt in such cases the vessels are formed in the coagulum lf, and are subsequently met by others, which shoot out m the adjacent parts to inosculate with them. This idea in accordance with that which is known to take place in original organization of parts in the embryo. During the ocess now described there may be little or no thickening the parietes of the vein, and little constitutional disturb-ce. When the coagulum is composed of vitiated blood, it ll, however, become a source of irritation, and its presence ll give rise to the symptoms of acute inflammation of the vein which it is contained. The parts of the venous system in ich stagnation of vitiated blood is most likely to take ace, are in the veins connected with the part originally ured, for here any vitiated fluid acts with the greatest ensity; and here, also, generally, some of the veins are echanically injured, and, therefore, offer a mechanical im-diment to the circulation. For this reason, when any of e larger veins of a limb have been interfered with, the stal veins become distended, and are more liable than hers to be injuriously influenced. We have thus the solu-n of the fact observed by Hunter, but not explained either him or by subsequent writers, viz., the tendency that in-mmation of a vein so frequently manifests to spread in a urse opposite to that of the circulation. The next most equent situation for the stagnation of vitiated blood is in e smaller vessels of parts at a distance from the original urce of injury. The different currents of blood, uniting returning to the heart, increase the velocity of the stream, d it seldom happens that any obstruction occurs when a pid motion of the blood is maintained; but as soon as it is parated again into small portions, and its motion retarded the increased aggregate dimension of the vascular chan-ls, portions removed from the original clot get impacted, or e tendency to coagulate may again come into operation. his fully accounts for those dark patches of congestion fre-uently observed in the skin, and in the structure of internal urts.

The purely mechanical view of accounting for *all* these secondary obstructions appears most imperfect. In the skin we may, indeed, observe the process by which these secondary congestions are formed. A circular patch will assume a livid hue, and every point will be equally affected. The blood in each capillary branch will become stagnant, while the surrounding skin will retain its natural appearance. It is quite unreasonable to suppose that all the vessels in the affected portions of skin should be obstructed by minute portions of the original clot, and that none of these should have passed into the unaffected parts of the skin. Such an action can only be accounted for by the coagulation of the blood in the part.

All the changes which take place in inflammation of one of the larger veins may take place in the secondary affections. The coagulum may be dissolved in the smaller as in the larger veins, and (together with any extraneous matter that it may contain) may be removed to some other part of the body, or, the coagulum remaining, it may lose its colouring matter,* undergo a fatty or pigmental degeneration, or it may shrink and acquire the character of a fibrillated tissue, and become part of the organized structure of the body. Should the coagulum consist of irritating fluids in conjunction with the blood, inflammation will be set up in the immediate neighbourhood of the obstructed vessels. Lymph will be deposited, and will add to the induration which previously existed, and the circulation through the part will be still further obstructed. At this stage of the disease it is not at all uncommon for portions of the affected part to mortify; when the skin is affected this is probably the most frequent termination. In the lungs, which are supplied with blood from both sides of the heart, mortification is less seldom observed, and in the spleen and liver it scarcely ever takes place, but the structure of these organs becomes broken down in a manner which much more resembles the effects of decomposition or softening than of inflammation.

* It was probably this decolorised blood that M. Dance observed in the centre of the congested masses, and supposed to be pus, deposited there in substance.

Should the part not pass into a state of mortification, then, following changes generally occur: the centre of the urated mass becomes softened, and converted into puri- m fluid. This fluid is often of a dirty-brown colour, as ough some blood or small portion of the organ had composed in it. It is not contained, like an abscess, in a tinct cyst, but surrounded by the purple induration, caused the effused lymph mixed with the stagnant blood. By grees all the affected portions lose their consistency and come broken down. The softening takes place from the ntre towards the circumference of each discoloured spot, ll they become converted into so many distinct abscesses.

II. The admixture of diseased secretions with the blood, stead of inducing coagulations, may give to the blood a ndency to separate into its different elements. Fibrin in mbination with albumen will then be deposited in some rt of the vascular system, where it may become united to ljacent parts, or the portions of fibrin so deposited may ndergo further changes, which bear some resemblance to dinary suppuration.

There is scarcely any artery or vein in the human body that as not been found narrowed, closed and impervious to blood. rofessor Tiedemann, in his work on the closure of arteries disease, has collected together a great number of instances, nd these he refers to four heads, viz.:—1st, to inflammation f the inner smooth coat of arteries. 2nd, to growths nd morbid excrescences of the inner coat. 3rd, to deposits f solid or earthy concretions, or purulent matter between ne coats; and, 4th, to clots of blood, which like plugs lose the sides of arteries. The first and second of these ivisions the author believes to be commonly referable to eposits from the blood. The lining membrane of an artery s a non-vascular structure, and so long as it maintains its ntegrity, lymph cannot be effused upon its surface. That which has been supposed, therefore, to be lymph effused as he result of inflammation, must in reality be fibrin deposited rom the blood. The morbid changes of the lining membrane ave to be traced, like those in cartilage and the cornea, in

certain alterations of its minute structure, in the rapid growth of germinal matter within the cells and connective tissues, and in the degenerative changes which ensue in these new growths. The results of Professor Tiedemann's third and fourth divisions demand consideration. Upon a microscopic examination of the white fibrinous plugs discovered in arteries, they may be found to consist of a delicately fibrillated material, resembling that which constitutes ordinary fibrinous coagula, and in the meshes of this may be seen an abundance of roundish corpuscles, not acted upon by acetic acid in the same manner as pus, but not unlike pus globules in general appearance. The fibrinous concretions also contain, ordinarily, numerous refractive globules, which, from their solubility in ether, are evidently fatty in their nature. These concretions may be very slightly, or not at all, adherent to the vessels in which they are found, or they may adhere with more or less firmness to the sides of the vessel, and sometimes they may become so intimately connected with the artery, as to be with difficulty distinguished from it. In such instances they may resemble an excrescence from its lining membrane. A thin, smooth, polished membrane often forms on the surface of these fibrinous plugs, which is continuous with the neighbouring parts, and gives the appearance of the lining membrane being continued over them. These white fibrinous plugs are found of almost every degree of consistence. They may extend to any distance along the arterial canals. When they lodge in one of the larger arteries, they commonly adhere to one side of the vessel, or to a part at which it is diseased. When some lesion of the internal coat of an artery takes place, steatomatous, atheromatous, or calcareous products become entangled in the meshes of these fibrinous plugs. The concretion is mostly fusiform, more or less rounded at the extremity, where it is in contact with the diseased part from which these materials have been introduced; firm, fibrinous, and tapering at the other extremity, where the deposit of fibrin has been more gradual and progressive.

These concretions are often carried along with the cur-

t of the circulation and lodge in the substance of the ans to which the arteries are distributed. In some rare ances, the fibrinous deposit may be traced continuously m the artery to its remotest ramifications. Thus, in an eriment performed by the author, in which some viscid was injected into the jugular vein, fibrinous cords were nd to extend from the right side of the heart to the utest ramifications of the pulmonary artery. In a case ntioned by Sir B. Brodie, in which there was mortification the right foot, the muscular structure of the heart was , thin, flaccid, and easily torn, one coronary artery was ervious, and the right iliac artery for the extent of three nes was impervious also, in consequence of its being com-tely filled by a mass of firmly coagulated blood. In ther case, in which there had been mortification of the nt foot, the muscular structure of the heart was pale and cid; one coronary artery was contracted and impervious, cavities were dilated, a mass of dense coagulum, resem-g that found in the sac of an aneurism, occupied the ap-dix of the left auricle, and there was a similar coagulum tructing the popliteal artery and vein of the right side, l extending some way down the branches of those vessels he leg.* Now, Mr. Gulliver has shown that the deposit ich constitutes the most ordinary form of disease of the eries, is a fatty degeneration or deposit. This material, en it occurs in arteries and becomes softened down, causes upture of the thin, brittle, internal coat, and it then either comes covered with fibrin, or is discharged into the blood.

* There can be no doubt whatever that many of the fibrinous plugs in arteries had their origin at other and remote parts, and have been conveyed by the ent of the circulation to the positions in which they are discovered. The late Kirkes (Medico-Chirurg. Trans. vol. xxxv., 1852), Professor Virchow, and Paget have shown, that clots may be conveyed from the heart into branches he pulmonary artery, into the arteries of the brain, spleen, and other parts. same thing occurs occasionally in aneurisms—a portion of fibrin being dis-ed from the clot in the sac, and conveyed by the circulation into a distant rial or capillary vessel. This arterial embolism has been successfully worked and described of late years. With these forms of disease we are not now so ctly concerned as with those deposits which occur in connection with ase of the arterial tunics.

If covered with fibrin, this may remain firm, or it may itself become softened down and find its way into the circulation. In old aneurismal sacs such portions of fibrin may be found softened and containing globules of various sizes, some not unlike pus, but not acted upon in the same way by acetic acid. Concretions of the above kind are usually found in cases where the product of fatty degeneration has become mixed with blood, or where portions of liquefied fibrin have been poured into the circulation. If then we find fatty degeneration in diseased arteries mixed, it may be, with liquified fibrin, and find, moreover, these very same conditions of the fibrinous concretions in the arteries themselves, or their branches, it is impossible to avoid the conclusion, that the diseased condition of the artery is, in many cases at least, the real cause of these fibrinous coagula. When found within the arteries these deposits undergo most important changes. They are at first little or not at all adherent to the healthy parts of the vessels. They may be carried, in larger or smaller portions, along the course of the circulation till arrested either in the smaller tubes or in the actual substance of organs. Wheresoever they stop, other changes occur. In some cases the fibrin, adhering in its new bed to surrounding parts and becoming absorbed, may cause a puckering and contraction of surrounding parts.

Nearly all arteries that have been thus obstructed, have been found contracted after a certain time. This is so generally the case, that Professor Tiedemann, in describing this disease, has assumed for his title *Arctation and closure of the arteries.*

In general, however, post-mortem examinations reveal that softening, accompanied by fatty degeneration, has taken place in portions of fibrin that have been stopped in their course. When this occurs, the arrested fibrin first becomes attached to adjacent parts. If this arises in one of the larger arteries of a limb, it may so impede the circulation as to induce gangrene; if in the structure of organs, it is more frequently accompanied by softening of the part. This softening is a molecular necrosis. If we find then, as the result of disease of

arteries, that morbid materials find their way into the ood, and produce a separation of fibrino-albuminous deposits ich, in their ulterior changes, are liable to poison the erent organs to which they are conveyed, we are led ther to enquire, whether there are any chronic forms the same affection? In cases of long standing disease the arteries, the products of morbid deposits between ir coats must constantly pass into the circulation, as st also any portions of disintegrating or liquefied fibrin, ich have temporarily adhered to those parts where the ng membrane has given way. Where the quantity of se is very small, it is probably disposed of without any at inconvenience, but when larger, it would appear that contaminated blood has a tendency to lodge in the sub- nce of the first organ to which it is conveyed.

In parts where the circulation is vigorous the impediment y be readily overcome; but in those parts in which the culation is most languid, although, perhaps, they may ntain a large quantity of blood, there we find the injurious ects produced. Now, these are exactly the conditions der which senile gangrene occurs. The age of the ividuals attacked by it; their physiognomy; the presence an arcus senilis, or a thickened condition of the radials; signs of a defective aeration, and an impeded circulation the blood; the existence of valvular or aortic murmurs, h concomitant enlargement of the heart,—these all tell the ne tale of degenerative disease of the heart and blood- ssels. Some degenerative lesion or molecular softening y ensue in the endocardium, in the old lymph products out a valve, or the disintegrating materials from a diseased rta or some other large artery, and these are gradually, t constantly, poured into the blood, by which they are nveyed to the most distant and dependent part of the culation.

The excessive pain coincides with that which experiment oves to be the result of the injection of arteries with fluids ich do not readily pass into the veins. The skin, which ntains the largest amount of blood, and, therefore, the

largest quantity of the morbid material, perishes first, and, in succession, the cellular membrane, bone, tendon, and ligament. If this be the true pathology of senile gangrene, it explains how futile amputation is likely to be, while the original source of disease remains in the fatty degeneration of the artery supplying the limb. It explains also, why opium and tonics are found to agree so much better than the antiphlogistic plan, formerly recommended by Dupuytren. Finally, it explains how, when the morbid material, which produces the gangrene, ceases to be supplied, the patient may recover.

III. Decomposition of blood in living vessels. There can be now doubt that the blood is veritably poisoned by the introduction of putrid matters, and that death in pyæmia more often results from this condition than from any local effects. The symptoms which follow the injection of putrid fluids are altogether more severe, rapid, and diffused than those which follow the injection of fluids containing solid particles. The phenomena of coagulation and embolism may be present or not; but the blood is so vitiated that it is no longer fitted for the nutrition of the tissues, and the interchanges which should take place between these no longer take place, and the circulation through the capillaries may consequently become arrested.

Decomposition may take place while the blood is yet in the living body. If once commenced it may rapidly be communicated either by contact, or by the removal of the decomposing blood or its clots, to a distant part of the circulation. If a very small piece of cotton wadding, for instance, be soaked in a putrid fluid, and introduced into a vein, in 24 hours the blood, for many inches up the vein, will have formed a dark gelatinous clot, which if left will soon pass through the various stages of putrefaction. This action will be generally accompanied by inflammation of the vessel in which the decomposing blood is contained. The surrounding parts will then become involved, and the whole will form, if the action be sufficiently long continued, a putrid abscess. The following experiments of M. Gaspard indicate how

dily the results of decomposition may be conveyed from part of the body to another.

Experiment. "Two ounces and a half of thick fetid d, derived from the maceration of cabbage leaves in an al quantity of water for two days, at a temperature of Fah., were injected into the right jugular vein of a derate sized dog. During the operation the animal became it, and vomited several times. Some hours afterwards re was a great uneasiness and oppression, with recurrence the vomiting, and continued faintness during the day. er nine hours a most copious and very fetid evacuation k place. The discharge was as black as soot, and com- ed of mucus, with a little fœcal matter, and a large quan- of what appeared to be corrupted blood. Some time erwards there was a second evacuation of bloody mucus, ctly resembling the first. On the following day there s much loss of strength—the animal lay upon its side, or ggered as it walked. There was great and insatiable rst, with a small, feverish pulse; but the most remarkable mptom was the occurrence, at intervals, of palpitation of heart, accompanied by great increase of impulse and nd. On the third and fourth days the animal was better, t there was still great thirst, fever, and occasional rejection fluids from the stomach. On the fifth day the symptoms came aggravated. There was extreme weakness, a totter- g gait, excessive thirst, the eyes red, and filled with gum, e nostrils were stuffed, swollen, and obstructed with mucus, d the lining membrane of the mouth was tumid, and of a olet red colour. In the middle of the day there was a uid greyish-white evacuation, resembling pus in its odour, nsistence, and appearance, mixed with some clots of putri- d blood. Death occurred during the following night.

Post-mortem appearances: The mucous membrane of the es, nose, and mouth was red or violet, and covered by a ry abundant thick mucus. The lungs were of a dark lour, with some black patches, but still crepitant. The ft ventricle of the heart presented several brown stains, ssembling ecchymoses, which penetrated into its tissue. Its

internal surface was of the colour of lees of wine, offering a singular contrast to that of the right side, which contained a hard fibrinous concretion, two drachms and a half in weight, of a light yellow colour, and resembling grease in appearance. This was of the same consistence throughout, and everywhere free, with the exception of a portion of the size of a finger nail, which adhered to the inner surface of the ventricle. No appearance of the injected fluid could be recognised in this clot. It was continued, of the same colour and consistence, into the pulmonary artery, and into the vena cava, the vena azygos, the axillary, and even the right jugular vein.

The intestinal mucous membrane, especially of the rectum, the duodenum, and a small portion of the small intestines, was of a violet-red colour. It was inflamed in longitudinal stripes, and in patches, which gave a mottled appearance, even to the outer surface of the intestines before they were opened. This discolouration was not accompanied by any thickening of the tissues, nor by ulceration, and appeared rather the result of ecchymosis or hæmorrhage. The lining membrane of the rectum was principally affected, and its mucous glands were swollen and very prominent. This intestine contained matters resembling those evacuated before death. The other intestines contained a very thick greyish-white mucus. The mesenteric glands were enlarged. The gall-bladder contained black, thick, ropy bile, resembling melted tar."

Experiment. — "An ounce of putrid water, in which some beef had been macerated, was injected into the crural artery of a middling-sized dog. The artery having been tied, the pulse ceased below the tendo Achillis. A considerable degree of fever and restlessness followed the operation. This continued the whole day and the following night, without any vomiting or evacuations which so commonly followed similar operations upon the veins. The next day the limb was very painful, but not swollen. There was thirst with the ordinary secretion of fæces and urine. On the third day the animal was evidently better; the appetite

become almost natural, and he could walk more easily, ough the limb still appeared very painful. In the night e were some soft, almost liquid evacuations. The fourth the animal was evidently recovering, when an ounce and alf of very fetid and very concentrated fluid (derived the maceration of beef) was injected into the crural ry of the opposite limb. The animal immediately evinced , accompanied by very violent and remarkable palpita- of the heart. It walked lame, keeping the leg raised, soon became feverish and uneasy. The symptoms were ctly the same as after the first experiment. The leg became dually more and more painful, and extremely sensitive, not infiltrated with serum. During the night there was ch expression of pain, and the animal was in continued tion. Death occurred nineteen hours after the second ection. The limb had become swollen only within five or hours previous to death. Post-mortem appearances: The b presented a very large quantity of bloody fluid infil- ted in all the tissues. The superficial muscles were black, l presented more or less the appearances of gangrene. e deep muscles were entirely disorganized, and converted o a putrid pulp, resembling masses of the red lees of wine, tremely fetid, and disengaging a quantity of gas. The b first injected was still swollen, and presented, in the erior of the adductor muscles, two or three cavities filled th a putrid bloody serum. In the chest the lungs were althy, as were also the right cavities of the heart, but the t cavities presented several reddish-black spots, scattered er their external surface. In the left auricle was a firm, llowish-white coagulum, adhering to an inflamed spot on inner surface. The intestinal canal was filled with a ownish-red fluid, resembling altered blood, which in the omach and duodenum was of the colour of soot. The ucous membrane of these organs, as well as of the jejunum d rectum, were gorged with blood of the colour of the lees red wine, but without any inflammatory thickening of their ats."

Another experiment performed by Gaspard sufficiently

illustrates the fact that the blood is really poisoned by the introduction of putrid matters. He extracted some blood from the jugular vein of a dog, which had died from the effects of a putrid injection. Although this fluid was defibrinated and filtered, and was without any sign of putridity, its introduction into the jugular vein of a healthy vigorous dog gave rise to symptoms of blood-poisoning; the animal was attacked with vomiting and purging, but eventually recovered.

An important and very suggestive monograph, bearing upon the subjects discussed in this work, has recently been published by Dr. G. Polli, of Milan.

Under the head of morbific fermentations of the blood, he describes the changes produced by the introduction of putrescible substances into the circulation. From his experiments upon animals he has arrived at the following :—

1. That the injection of a certain quantity of pus into the circulation produces pyæmia, and such diseases as are characterised by multiple abcesses.

2. That the injection of putrid matter produces septicæmia, or those diseases recognised by the name of putrid infections, and characterised by a typhoid gastro-enteritis.

3. That the injection of matter obtained from contagious diseases—glanders, for instance—will reproduce the same affections.

Dr. Polli gives many experiments illustrating the effects of the injection of putrescent materials into the veins of animals (dogs). He relates particularly the effects of the injection of corrupted human pus, in quantities varying from two to four grammes: It appears that the animal recovers after injection of the smaller quantity, but generally dies between the fifth and seventh days after the operation for injection of the larger (four grammes). The symptoms correspond with those which have been narrated. At the post-mortem examination, the gastro-enteric mucous membrane was found in a state of inflammation, of dark red colour, and dotted with puriform exudation, and the lungs presented numerous ecchymotic spots and blood-clots.

The injection of from one to three grammes of putrid blood into the veins of a dog, was followed by symptoms similar to the above, but the disorder was of a much more serious character. As before, a dog would recover after the injection of the smaller quantity, but death generally took place after injection of three grammes. A similarly ecchymosed, bloody, and dark-red spotting, and congestion of the mucous-enteric tract was present, particularly about the vicinity of the stomach, duodenum, and rectum.

The injection of the discharge from the nares of a glandered horse into the veins of a dog, even where the small quantity of half a gramme was used, gave rise to some of the phenomena observed in the above experiments, with numerous unhealthy abscesses in the skin, areolar tissue, and between the muscles. After death, the clots in the lungs were both more numerous and better marked than in the cases were pus was injected. These clots were ofttimes softened in their centres and converted into purulent-looking cavities.

From these experiments it appears that the action of decomposition commenced in one portion of the blood, may be propagated to any part, or to the whole system, and unless the action were checked, this would be the usual result. The blood is in a peculiar manner open to the influence of portions of liquefied fibrin or decomposing blood, after every lesion either from accident or disease. The evolution of ammonia is one of the first products of incipient decomposition. This also is said to be one of the essential conditions of coagulation of the blood. The same influence, therefore, that tends to set up a diseased action in the blood, would appear at the same time to have a tendency to limit the disease by producing coagulation of that fluid. It is true that the coagula thus formed may, in their turn, undergo disintegration or decomposition, and portions of the clot may be carried to, and arrested in other vessels, or the products of its decomposition may be the means of infecting other parts. But, in other instances, the coagula remain firm, and prevent the extension of disease to the remainder of the blood, or along the blood-vessels.

The union of separated parts by a thin layer of blood, indicates what Hunter called the "intention" as much when such a union is temporary only as when it is permanent; and so, the object of the coagulation of the blood in the veins, in cases where the process of decomposition is commenced, appears evident, although the remedial effect is not always attained.

When, through the introduction of a septic agent, the stagnant blood begins to decompose, the whole of the constituents of the blood, are then together involved in the changes which take place. The experiments above related show, that the same impediments will not under such circumstances, be offered to the passage of morbid matter into the circulation, as when the blood firmly coagulates in the veins. An interval, however, even in the most strongly marked cases of natural disease, usually elapses between the development of the infecting cause, and the manifestation of constitutional symptoms. This is especially the case where diseased secretions enter the circulation through the nutritious vessels of bone.

The cancellous structure of bone may be compared to the cellular tissue of soft parts. When inflamed, its interstices become filled up by the effused products, and an abscess may be as accurately circumscribed in the hard as in the soft structures of the body. In a healthy constitution, the adhesive inflammation will, in this way, always precede the suppurative; but where the inflammation is not circumscribed by adhesion, the secretions may permeate from cell to cell in non-adhering parts. In soft structures, a remedy is at hand for allowing the escape of matter, by a free division of the parts, but in bone, where the same process takes place, the hard unyielding sides offer an effectual obstruction to the escape of any effused fluid. An unhealthy inflammation is propagated along the endosteal membrane; the cells of the bone may then become infiltrated with inflammatory products, the sinuses and small veins become closed with coagula, and, if these coagula break up, there is nothing to prevent the diseased secretions and pieces of decomposing fibrin from

ading their way into the general circulation. The morbid atter is detained for a certain time, during which the pro- ss of decomposition is established. The first infected por- ons of blood, together with the morbid matters which they ntain, then pass on to infect the blood in adjacent vessels. he dissolved and putrifying fibrin from these, proceed rther towards the centre of the circulation; in its course it ill loosely coagulate fresh portions of blood, and then deter- ine their decomposition. Every additional quantity of ood that is infected will add to the amount of putrid id in the vessels, and thus the disease will propagate itself, uite independent of the original source whence the morbid atter was derived. Each portion of blood which is attacked ses its vitality, passes into a state of decomposition, and ecomes itself the means of infecting other portions. The ntaminated blood may then be found in the vessels in every tage of decomposition, or it may have passed out of the essels in which these changes have taken place, having first tained them of a deep livid colour. Long tracks of purple eins will occasionally be found, some being blocked up with iscid blood in various stages of putrescence, and some aving discharged their contents, and being comparatively mpty.

The frequency with which symptoms of pyæmia follow njuries to, or operations upon, bone is well known. The rganisation of bone, and the comparative slowness with which remedial actions are carried on in it, render it peculiarly iable to interruptions in the process of repair, especially when, as not unfrequently happens, the vitality of some portions of bone with their peri and endosteal membranes has been threatened. The offensive smell of the bone, as well as he appearance of its cancellous structure infiltrated with unhealthy lymph and puriform matter, will frequently show, n such cases, that the processes above-named have not ollowed their natural course.

It becomes a question well worthy of solution, whether uch symptoms are as common after amputations through a oint, as through the shaft of bone. Some recent observations

by the French military surgeons, Dr. Valette, M. Jules Roux, and Baron Larrey, are well calculated to draw attention to the matter.

M. Jules Roux read a memoir before the Imperial Academy of Medicine at Paris, in 1860, which gave rise to very interesting and protracted discussions, in which Baron Larrey took a principal part. After adverting to the great fatality attending amputations of the thigh for gun-shot wounds, during the Crimean and Italian campaigns, and the excessive mortality attending secondary amputation generally after such injuries, he proceeded to describe—under the name of osteo-myelitis—an extremely common affection following gun-shot wounds of bone. He states that this osteo-myelitis involves the whole length of the bone, and points out how any amputation in continuity will not only fail to remove the whole of the mischief, but will aggravate its severity, by the additional stimulus of the saw. He recommends, therefore, that disarticulation should invariably be adopted instead of amputation in continuity in secondary amputations for gun-shot wounds. Of twenty-one such disarticulations recorded by him (including four femurs) not one was fatal.

These observations obviously possess very great practical interest. M. Roux's conclusions are, however, of too sweeping a character.

The mortality attending amputations on the battle field may be accounted for by other causes:—Putrid infection of the blood and pyæmia, in all probability, occupy a very prominent place, and deaths from these have, no doubt, been debited to the account of his diffused osteo-myelitis. Professor Longmore, in a paper on this subject read before the Royal Medico-Chirurgical Society, February 20th, 1865, has shown that in several cases, where the morbid state of the tissues was manifestly due to the continued osteo-myelitic action after amputation for gun-shot fracture, the diseased action did not traverse the whole extent of the bone, the necrosis was limited, and failed to reach the apophyses, and the sequestra were encased by copious shells of new bone as in ordinary cases of necrosis. The author has himself met

tth cases of diffuse inflammation of bone, allied to erysi-
las or acute cellulitis of soft parts; and has published a
loured plate representing the disease extending throughout
e whole of the tibia in the last volume of the Pathological
ansactions. He can, therefore, quite conceive that it is of
ore common occurrence than is generally believed, particu-
rly after crushing injuries to large surfaces of bone; in
me cases wherein there has been some shock to the part,
yond and out of all proportion to the amount of appre-
ble injury; and in others, where the action of the diseased
cretions from the original injury has induced a septic in-
mmation of the neighbouring parts.

Among the fatal cases occurring during the late stages
gun-shot injury to bone examined by Dr. Marston at
alta, he noted the following appearances in three, wherein
ath was preceded by symptoms resembling pyæmia.

I. Rifle-shot injury of left tibia, close to the knee-joint;
e ball lodged. After rigors and smart pyrexia, abscesses
peared in the calf and popliteal region with œdema of the
mb. A typhoid state supervened; a yellow hue of the skin
as present: the patient vomited a good deal, and suffered
om diarrhœa and pulmonary symptoms. An autopsy re-
aled a ball lodged in the posterior aspect of the head of
bia. This bone was partly denuded of periosteum, its ex-
rior was in a state of superficial necrosis, and its interior
uded a purulent fluid when sawn across. The femoral and
ternal iliac veins of the same side were plugged with coagula
soft consistence, and of yellowish-brown aspect in their
terior. There were numerous small abscesses and indura-
ons in the lungs. The heart contained loose and dark
ots. The gastro-intestinal mucous membrane was con-
ested in patches, and covered with a very tenacious
ucus.

II. In the person of a soldier, dying with symptoms of
w fever and dysentery, with a sloughy state of the stump
left thigh, which had been amputated after the battle of
lma, there was found:—Pus beneath the periosteum, two
three longitudinally-splintered fragments of the femur,

one of which was detached and necrosed; and a sanio-purulent discharge exuded from the medullary canal. The large intestine was much inflamed and presented some large ulcers (dysenteric). The spleen was indurated in some places, much softened in others. The lungs had an ecchymosed, mottled aspect externally, with patches of pneumonic consolidation internally. The right heart contained firm coagula, which extended into the pulmonary artery.

III. In this case a rifle-ball had entered one buttock, traversed the perineum, impinged upon the opposite ischium (which it had fractured), and was deflected downwards, at right angles, to the popliteal region of the limb. A large abscess appeared in the buttock, and inflammation of the perineal tissues set in, with œdema of the left leg. The patient suffered from rigors, yellow aspect, vomiting and typhoid symptoms, in which state he died. The track of the ball was then traced. The spine of one ischium was splintered and surrounded by pus, the course of the ball down the thigh was inflamed and sloughy, and the ball was found loose in the popliteal region. Some of the pelvic veins were filled with coagula, and a loose clot was present in the left common iliac. The intestines were inflamed and softened. The lungs were diseased, one pleural sac contained fluid, and the kidneys were enlarged and inflamed in their cortical parts.

When the fluid fibrin introduced into the vessels has attained a very great degree of putridity, the tendency in the blood to coagulate will not be sufficient to resist its circulation through the general system.

The following experiment, illustrative of this point, was performed for the author by Mr. Mayer, veterinary surgeon. A young and perfectly healthy ass was secured and the right jugular vein exposed. An ounce of fluid, derived from the spontaneous decomposition of portions of fibrin, and in a very advanced state of putrefaction, was mixed with an equal quantity of water, and injected into the exposed vein. The vessel did not become "corded," and the circulation was not apparently impeded. In a few moments the animal gave

ree or four groans, expressive of much distress. The vital wers appeared at the same time to be suddenly prostrated, e animal was unable to rise, and soon fell into a state of ncope.

The faintness lasted for a few minutes; on getting up, e animal reeled, and staggered about for some time, and en recovered sufficiently to walk to his stall. Some uction now commenced, the breathing was disturbed, short, d quick, the pulse 120 in the minute, small and wiry. hese symptoms continued for about an hour-and-a-half, hen the animal became very restless and uneasy, evincing ternal pain by groaning and looking at his side. All food d water were refused, and death followed four hours after e operation.

On a post-mortem inspection sixteen hours after death, the gular vein, into which the putrid fluid had been injected, as found in its natural condition, partially distended with iid blood. It was pervious through its entire length, and ntained no coagula. The lungs were studded with irregu-rly circumscribed, soft, black patches. When cut into, ese discharged a black fluid, having the appearance of a ixture of blood and ink, and of a strong putrid smell. The art had liquid blood in both its cavities. The cœcum, colon, d a portion of the small intestines, were deeply congested d of a dark livid colour. There was an effusion of many nts of serum of the peritoneal cavity; this, as well as the ood throughout the body, had a putrid and very unpleasant nell. In this case the putrid injection either prevented the agulation of the blood in the body, both before and after eath, or had the effect (in the event of any coagula having en formed) of determining their speedy reconversion into fluid state. These effects are very different from those served after the injection of simple, unirritating substances, from those which follow the translation of pieces of fibrin blood-clot. These latter may plug the vessels of internal gans and become encapsulated by the thickening walls of the essels and the formation of an envelope of connective tissue, they may lead to anæmic softening, and localised suppu-

rations of the surrounding parts. But the decompositions set up by putrid fluids lead to inflammatory irritations of a rapid and destructive character: wide-spread infiltrations, inflammatory softenings, or limited gangrene, without the production of any embolic abscesses.

The general result of putrid fluids in the system, whether introduced directly into the circulation, or injected with a serous cavity is, to produce a remarkable affection, characterised by a peculiar congestion of the mucous membrane of the stomach and intestines. The vitiated material or animal poison is determined to the muco-enteric tract, much in the same way that a mineral poison is when inserted through a wound. The evacuations that accompany this condition are evidently an effort of nature to relieve the system from the vitiated fluids which have entered the circulation, and it is not a little remarkable that the mucous membrane, and none of the other coats of the intestines, should be affected in these cases. The appearances produced may be distinguished from the results of common inflammation, in that no thickening or shrinking of the tissues is produced, but they are swollen, congested, and blood-stained, either in petechial spots, in larger patches, or over a continuous surface. The discharge from the intestines in such cases consists chiefly of mucus, but this may sometimes be accompanied by a kind of passive hæmorrhage, and occasionally the secretion may assume a puriform character, without any abrasion of the mucous lining of the canal.

It may now readily be understood that the appearances and symptoms, which a few years ago were so often observed and described as forming a separate disease, under the name of *gastro-enteritis*, may frequently have been only secondary results produced by an unhealthy condition of the blood.

When the actions produced by the introduction of putrid fluids into the body are fully developed, all the indications of putrefaction may take place, even in the living body. Not only the fluids, but the so-called solids pass rapidly into decomposition, and the former would appear, in addition to being extremely liable to decompose themselves, to have the

perty of infecting other parts, and even other healthy ies. Thus we read, that during the plague of Marseilles, bile taken from those who had died of the disease, uni- ly produced death when injected into the veins of s.

After a putrid element has been introduced into the system blood is evidently altered in composition. It becomes k, viscid, and in a great measure deprived of its coagu- ng power. After death it is found fluid, of a very dark ur, and not unfrequently mixed with gas.

The long continued congestion of the mucous membrane, f other parts, has a tendency to terminate in the soften- of the tissues involved. This is the case whether the gestion is of healthy or diseased blood, but the tendency much more marked, and occurs much more rapidly, in the er case than in the former. The congestion of compara- ly healthy blood in the legs of old people, affords a mmon instance of consequent softening and breaking down the tissues. A molecular necrosis occurs unattended with great amount of inflammation.

In the treatment of affections arising from the presence of eptic poison in the system, it is important to remember t the alimentary secretions afford a natural method of ef. The determination of this class of poisons is evidently the mucous membrane of the intestines, and every facility uld be given for its elimination in that way.

In cases where the blood is more or less decomposed in living vessels, it sometimes, as has been shown, does not gulate at all, or any coagulum that may have formed comes rapidly dissolved. In the latter case the colouring tter of the blood will stain any part with which it may in contact, and leave an appearance on the lining mem- ne of the blood-vessels which has often been mistaken for ammation.

The *post-mortem* appearances in the more solid structures the body, in those who die in consequence of the introduc- n of vitiated fluids into the blood, often cannot be distin- ished from similar changes produced by other causes, yet

there are some effects which are peculiar, and may be directly associated with the reception of foreign matter into the circulation. The most characteristic circumstance, attending the extension of disease to different organs of the body through the medium of the blood, is that several parts of these organs, or even different organs, will be simultaneously attacked. The disease will appear at once, in various spots which will become rapidly disorganised, while the surrounding textures will remain unaltered, either in structure or colour. The appearances observed upon dissection will vary according to the part attacked, and the stage of development in which the disease is found. *The lungs* are the organs in which the successive changes may best be observed. The morbid processes affecting these organs are, perhaps, the most important and interesting, not only on account of their frequency and gravity, but because we can trace in them the type and pattern of those diseased conditions elsewhere seated. When portions of a disintegrating or decomposing blood-clot, or when puriform fluid has entered the circulation, the first appearance produced in the structure of the lungs, is that of one or more congested or dilated veins of very small diameter. If these be laid open, minute clots will be commonly found in their interior. This will be followed by a well defined spot, of much darker colour than the surrounding texture. Several of these spots will probably appear at the same time, and each one of them will soon become surrounded by a spherical patch of purple congestion. Effusion of lymph will now take place, commencing in the centre of each affected portion, and gradually extending towards its circumference. If the disease continue, each spot will suppurate, and the different parts will become softened and broken down, in the same order in which they were previously solidified.

The morbid changes in the lungs will conform to one or other of the following descriptions :—

In the slightest degree of the affection, as we view the surface of the organ through the pleura, particularly about the edges of the lobes, it is found to be variously mottled and

d-stained. Numerous spots of congestion, blotches, or uric looking dottings are discovered, forming separate as it were, of disease. These appear dark and well-ned at the centre, with a congested-looking periphery, h passes into the healthy textures by a gradual diminu- of the depth of colour. On cutting into these parts, the ntity of air is found to be diminished: a sero-sanguinolent exudes, and we may perhaps discover the blood coagu- l in one or more twigs of the pulmonary vessels.

In another and more advanced stage, these distinct res of diseased action have become the seats of effused ucts, so that different lobules of the organ are hepatised, no longer crepitate on pressure. There will generally softening or abscess in the central part of these lobules, re the action has first commenced, and the effused pro- ss are remotely placed for vascular supply. In this last ty the organ becomes the seat of multiple abscesses, like l vomicæ, with or without surrounding induration.

The serous covering may or may not be implicated. The ace over a diseased spot of lung may be covered with shly effused, soft lymph, which may conceal the lobular ase beneath. The marks of pleuritis are sometimes much extensive and general, consisting of diffluent lymph and purulent effusion. This inflammation is occasionally ted by the close proximity of pulmonary abscesses, or by rupture and communication with the pleural sac.

The initial step in these morbid changes has to be sought in the altered condition of the blood contained in the els, and not in the existence of a phlebitis. It is mani- y impossible, in every instance, to trace the presence of gula in vessels so minute as those of the lungs, yet it can one with sufficient frequency to justify the conclusion they are very often present at the onset. It is not until healthy nutrition of the part has been affected, and in- matory action induced, that the coats of the vessels par- ate in the disease. A coagulation of the blood may otless be the effect of inflammation, and not its ante- nt, since we generally find the blood coagulated in the

vessels of a pneumonic lung. But when the lung is no more affected than in the first variety, fortunately, the condition of the blood in the vessels can be more easily traced than in the subsequent stages, and coagula or emboli are generally present.

Turning to *the heart*, which is, however, far more rarely affected, we discover that the morbid processes are essentially the same. In pyæmial carditis, small secondary abscesses may sometimes be found affecting the cardiac structure immediately beneath its investing membrane. The surface of the organ also presents numerous ecchymotic or purpuric looking spots and blotches. Although the lymph may be general over the pericardium, as in the pleura, yet the cardiac muscle will generally be found diseased in isolated spots, with intervening portions of healthy structure. If the lymph be scraped off the pericardium, these spots will appear as small elevated opacities, which, when cut into, are found to be minute cavities with softened edges, and filled with a puriform fluid, or a pultaceous material.

The liver frequently becomes the seat of secondary inflammation. In the early stage, brownish-red spots may be observed scattered through its substance. These, as they extend, assume a bluish or slate-colour, and the structure of the liver thus affected is found to have lost its consistence, and to be very easily broken down by pressure. Every part affected here, as in the lungs, proceeds rapidly to softening and suppuration; and the usual appearance presented after death is that of several small circumscribed abscesses, around which the structure of the liver has been condensed only to a very small extent. It sometimes happens that the larger veins in the liver become affected. These vessels being held open by the firm structure of the part, are not so readily obliterated as in other situations; and it happens that the fibrin of the blood being more or less perfectly separated from its other constituents, is found in detached masses mixed with fresh portions of blood, which have not undergone the same change: a very peculiar mottled appearance, resembling granite, is thus occasionally produced.

Affections of the *spleen*, produced by the introduction of foreign matters into the blood, are probably not so readily recognised as similar affections in the lungs and liver. For, although the spleen is often found to be diseased in those who die from infection of the blood, yet it is comparatively seldom that secondary abscesses have been found in it.*

When the general mass of the blood has undergone a septic change, the pathological changes induced in the spleen are, sometimes, very marked.

Not only is the organ enlarged, but it is very irregular in point of consistence. Numerous conical, rounded, or oblong masses of induration are present in it; white, yellowish white, or chocolate in colour. These masses correspond to veins obstructed with fibrin and blood-clot, bounded by an irregular zone of vascular tissue.

The remaining part of the gland tissue may be so friable and softened, that it is very easily ruptured, and the diffluent contents exude through the rents like a thick treacle, leaving the indurated masses behind.

In the person of a previously strong and healthy man, who died very rapidly after being admitted into hospital with symptoms of delirium tremens, intestinal disease, and low fever, the spleen was found of a dark slaty hue exteriorly; the trabeculæ and interior of the gland were completely disorganised, and filled with a dark brownish mud-pulp, which drained off so completely as to leave the gland a loose bag of one-third of its original size, and containing, here and there, irregular indurations of altered fibrin and blood-clot. The heart had dark fluid blood in its left, and loose dark clots in its right cavity. The lungs were full of small abscesses and indurations (lobular pneumonia). The intestinal mucous membrane was much congested, mottled with large ecchymotic looking spots, and softened in places. In this case, no injuries or external wounds (save a few bruises) could be discovered.

* In Virchow's Cellular Pathology, translated by Dr. Chance, there is an illustration of detached pieces of clot impacted in the capillaries of this organ.

Deposits of lymph are sometimes met with in the *kidneys*. These are of small extent and of a light colour. The patches of congestion, so characteristic of this disease in other organs, are not here observed. This may depend upon the peculiar disposition of the capillary system of the kidney. The blood has to pass through the malpighian tufts, and may be altered in character before it reaches the proper venous system of the organ.

In cases where purulent infection of the blood has been purposely produced, portions of the kidney will not unfrequently be found inflamed and firmer than natural; but if the origin of the disease were not known, these appearances could not always be distinguished from those produced by inflammation of the kidney from other causes. In a case where a fibrinous concretion had formed in the left side of the heart, and had afterwards become disintegrated, the kidneys were found, when examined by the author, to contain numerous masses of white deposit in various stages of softening.

The skin is liable to be affected in three different forms. The first of these occurs very rarely, and consists of small deposits of matter in the structure, or upon the surface of the skin, resembling in many respects the pustules of small pox. The second form is also of rare occurrence, and consists of small congested spots on the surface of the skin. These are generally of a dark purple hue, but sometimes they assume a bright red colour. The third form presents itself much more frequently than either of the others, although it has not hitherto much attracted the attention of pathologists in connection with purulent or other infection of the blood. It commences very suddenly, and sometimes without any particular attention being directed to the part. A large circular patch of congestion, livid or purple in the centre, but becoming of a lighter colour towards the circumference, will form usually upon some part of the lower extremities. The skin of the calf of the leg is, perhaps, more frequently attacked than that of any other part. In the centre of the congested portion, mortification very rapidly takes place, and is indicated

the part assuming a black or dull leaden colour. In some es, it would be difficult to say where the mortification ses and the congestion begins, but in other instances, re is a distinct line of demarcation formed; a zone of ght red congestion will then occasionally surround the rtified part.

Some modifications of this third form of affection of the n may be met with occasionally in the course of the disease. tches, assuming a livid or dusky-red appearance (which dually fades into the colour of the surrounding skin), will sent themselves in different parts, and terminate in thick foliation of the cuticle, or in small sloughs of the skin. In me instances the superficial portions only of the skin are troyed, and the parts beneath appear comparatively unected; small circumscribed portions of the outer layer of skin will exfoliate, and the subjacent parts will heal without suppuration, by a process similar to that of scabbing.

In the cellular membrane, serum, lymph, and pus, may be posited, mixed with each other in various proportions. e surrounding vascularity in these cases is usually small, d the lymph effused not properly organised; there is, consequently, no natural boundary to the disorganising process, d the fluid secreted becomes infiltrated in the surrounding rts.

When the *muscular structure* is affected, suppuration takes ace with great rapidity; portions of muscles may be found ite soft, and sometimes pultaceous, in circumscribed patches, ound which the fibre is perfectly healthy. Pus is occaonally deposited on the exterior of muscles, and it will be en smeared over the surface, and rather infiltrated in the llular tissue, than contained in a cyst. In the interior of uscles there is the same absence of the natural limit to the flammation; but owing to the more compact structure of e part, the deposits of matter generally remain circumribed.

The *serous membranes* are peculiarly liable to be attacked y secondary inflammation, and, when affected, suppurate ith the greatest readiness. They generally exhibit but a

slight degree of vascularity, and sometimes scarcely appear more injected than in their natural condition. In the peritoneal cavity, large quantities of unorganised lymph are frequently poured out, mixed with turbid serum or pus. The synovial membranes of joints, when affected, often appear to run directly into suppuration, and become distended with pus in a very short space of time. The pleura on the other hand will seldom suppurate at first, but lymph will be deposited upon its surface, and its cavity will contain turbid serum occasionally mixed with blood.

SYMPTOMS.—Sometimes, after an injury to a vein has been followed by the formation of coagula, symptoms of exhaustion, almost amounting to collapse, set in with all suddenness. The patient struggles and gasps for breath, while his features become remarkably anxious and pallid, without any appearance of venous discoloration. The pulse is small and intermitting; the skin cold, and covered with a clammy perspiration, and the muscular strength gone. The heart's action is a loud, ringing, irregular "wobble."* These are symptoms of venous embolism; they denote that some coagula have reached the right side of the heart and even passed into its large vessels. This cardiac form of apnæa, as Dr. Richardson has so well remarked, is due to the non-transmission of blood to the air, and not to any impediment to the ingress of air to the blood. In Mr. Freer's case, recorded by Mr. Hodgson, these occurrences followed four hours after the saphena major vein had been tied for varices; and, in another case, described by Dr. Druitt (Medical Times and Gazette, July 19, 1862), similar symptoms followed the translation of a thrombus, from a vein in the thigh to the right side of the heart. Several other cases have been recorded at different times.

The commencement of constitutional disease, after direct infection of the blood, is marked by the sudden change in the

* Dr. Marston has some notes of a case in which a coagulum of unusual size, length, and firmness, was found in the right side of the heart, and pulmonary artery. The patient's symptons were those we have described. In his struggles for breath he threw his head back, and opened his mouth so widely, that the fauces and epiglottis could be seen.

manner and appearance of the patient. A severe rigor is usually the most prominent symptom, and is followed by much febrile excitement, or by extreme depression. A very peculiar heat of skin will sometimes be present, while at other times the surface will be covered by a profuse clammy perspiration. The fever is irregularly intermittent or remittent in type, in the cases characterised by numerous blood clots and metastatic abscesses. Evening exacerbations are also commonly present.* In cases of septicæmia, where a general infection of the blood exists without any necessary connection with blood-clotting, embolism, or multiple abscesses, the range of the pulse and temperature is very much higher, and the fever more continuous in type.

Great depression frequently accompanies even the first stages of this disease, indicated by a want of tone in the pulse, by an extremely listless manner, and sometimes by a tendency to syncope. The countenance becomes anxious, the tongue dry and brown in the centre, and red at the edges, or, in other instances, it presents a coating of a pasty, yellowish-white colour; a dusky yellow hue frequently pervades the skin, and sometimes the conjunctivæ of the eyes. The pulse varies much in frequency in different cases, and at different times in the same case; generally, it is very rapid, especially when accompanied with much heat of skin. Sometimes there is severe pain, which may be referred exactly to the spot, that subsequent examination shows to have been the seat of secondary inflammation; at other times it is not confined to any particular situation, but consists of general ill-defined feelings of short duration, and recurring at irregular intervals. The peculiarity of such sensations is best expressed by the terms applied to them by the patients themselves "catching pains all over," "soreness of the stomach," and "thrilling in the blood."

* The febrile phenomena follow very much the development and evolution of the secondary deposits; a distinct rigor, or a well-marked febrile exacerbation being excited and associated with each centre of development. According to Dr. S. Ringer, there are ranges of temperature which are peculiar to cases of pyæmia, in that, when the fever is intermittent during the day, the temperature between the hours of elevation is normal.

Vomiting may occur, either as a symptom of constitutional disturbance, or as indicative of inflammation of an abdominal organ. In the latter case it is extremely obstinate, and the fluid ejected is generally of a green colour. Diarrhœa is a symptom of frequent occurrence. Its appearance will not unfrequently be accompanied by relief of the other symptoms. When it occurs it is generally profuse, and little under the control of medicine. The intellect is seldom affected during the first stages of the complaint, but subsequently, in severe cases, restlessness, delirium, and coma, seldom fail to succeed each other. Death is commonly due to exhaustion in the cases of pyæmial fever attended with extensive suppuration; but in other instances, it may be a direct result of the action of a poisoned blood.

These symptoms are all peculiar, both in regard to the rapidity with which they make their appearance, and also the sudden manner in which they occasionally disappear. When this infection of the blood arises in surgical practice, the accession of these constitutional phenomena is often manifested from two to six days after surgical operations or injuries. When one of the large veins has been originally affected, the interval which elapses is comparatively short. In cases occurring after childbirth, it is usually longer, extending to the end of the second week. After surgical operations or accidents involving some portion of bone, the access of the disease may be marked by a rigor during the third or fourth week. The local phenomena which precede and accompany the constitutional malady are sometimes very indicative of a septic change. A wound, for example, ceases to appear healthy; the surrounding tissues become inflamed, the healthy secretions of pus and lymph cease—the part dries up, and this is succeeded by an ichorous discharge. Sometimes the areolar tissue becomes boggy and œdematous, or even emphysematous, from the development of gases arising out of a septic decomposition of the fluids. At this stage the decomposition, originating in a local action, may infect the general mass of the blood and rapidly kill the patient, without the occurrence of any blood clotting; or coagula may

m in the vessels, disintegrate, and decompose, and become
nveyed to other parts. In the last instance, the phenomena
thrombosis and embolism become superadded to the
ginal septicæmia.

TREATMENT.—In the preceding pages we have endeavoured
indicate the true pathology of phlebitis, and we have seen
tt many and essentially different processes have been in-
ded within this term. Phenomena which *may* follow a
ebitis, properly so called, may equally ensue where there
s been no such inflammatory affection. Those morbid
aditions of the blood in which there is a tendency to the
oduction of lesions of many and distant parts, with mul-
le centres of inflammation, commonly take their origin
m a coagulation of the blood at some definite point, or from
e introduction of some septic or decomposing agent into
e circulation.*

* There are, however, other maladies—coming under the observation of the
sician more frequently than that of the surgeon—which have so many points
ffinity and alliance with the above that we must, in the meantime, include
m under the same category.

These last however seem to be separated from phlebitis, thrombosis, pyæmia,
, by the characteristic that they are the concomitants, or the sequelæ of some
existing disease.

What is the exact connection of the pyogenic fever, so ably described by
Jenner, with pyæmia, septicæmia, &c., has not been accurately determined.
ere is not, in the former, the thrombosis, multiple and metastatic abscesses,
softenings of portions of different viscera, which play so important a part in
latter. Cases, corresponding to Tessier's description of acute purulent
thesis, have occurred within the experience of most physicians and surgeons,
l sometimes these have so much resembled, in their clinical history and
rbid anatomy, those of pyæmia, that it may yet be considered an unsettled
nt, whether this disease may not occasionally be of spontaneous origin, and
able of arising irrespective of the absorption of any specific material from a
und or injury.

The poison of typhus, for instance, has been known to induce a formidable
m of pyæmia; but it is not quite certain, whether it does so directly or by
ding to some local disease, such as necrosis, as the intermediate step. Cases
acute necrosis of bone, followed by osteo-myelitis and pyæmia, often simulate
y closely in their symptoms those of a typhoid fever.*

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* *Vide* Ericlisen's "System of Surgery," 3rd Edition, page 653; Dr. Murchi-
n in Medical Times and Gazette, March 19, 1864; and Dr. Aitken's Science
d Practice of Medicine, Vol. 2.

When we examine into the phenomena which follow th injection of a purulent or decomposing organic substance int a vein, we perceive that these are capable of being arrange into two different series :—1. Those mechanical change which arise from the coagulation of the blood at the part the breaking up of such coagulum, and the transference o portions thereof to distant parts, producing, what is terme by Virchow thrombosis and embolism. 2. Those genera alterations in the characters of the blood-fluid, which, what ever may be their exact nature, are highly suggestive of som molecular disturbances and morbid alterations of its consti tuents, such as unfit it for the nutrition of the tissues; i common parlance, the blood is poisoned. It will be obviou that these need not be conjoined or concomitant effects. Th first may be alone observed; but in the majority of instances perhaps, where the second has an existence, it is precede and accompanied by the former condition. In injecting an substance into the blood capable of causing its coagulation we have that substance included in such coagulum, and, if i be not discharged by a local process, portions of it may b transferred to other parts; and this is more likely to occur i the poison be one capable of generating its like out of th materials with which it is in contact.

The treatment naturally, then, divides itself into loca and constitutional, both as regards the primary lesion and th subsequent affections. Whatever tends to favour the healthy healing of a wounded vein may be regarded as affording security against any subsequent disease; and the chie point in the local treatment is to prevent any accidenta circumstances from interfering with the natural process o repair. When the powers of the constitution are enfeebled even the natural motions of a part may interfere with re covery, and rest sometimes becomes an important object i the treatment. How necessary this is after childbirth, whe the divided veins are being closed, every one who ha attended such cases practically knows. Again, after bleedin the arm will inflame in a much greater proportion of case

en the patient is obliged to follow his usual occupation, when, from accidental circumstances, the arms are kept in tion. It has occurred to the author to see the symptoms purulent deposits set in on the day following prolonged empts to bring fractured portions of bone into position. all such cases any external violence, or even the motion of body, may loosen the coagula formed either between the unded edges, or in the cavities of veins.

If the description which has been given of the morbid enomena in veins be the correct one, the distinction be- een the process by which fibrin or fibrinous coagula are posited from the blood and that by which lymph is secreted m a living membrane, is of primary importance, not only regard to the pathology of this class of diseases, but also th regard to their surgical treatment. No surgical inter- ence could arrest a morbid process which extends by con- uity of action in the lining membrane of a vein; but such terference is both indicated and warranted if the occasional d severer symptoms of phlebitis proceeds through its con- nts, generally in a more or less coagulated state. Indeed ch attempts have not been entirely wanting.

Hunter remarks that when inflammation takes place be- nd the orifice of a vein so as to alarm the surgeon, he ould immediately make a compress upon the vein at the flamed part, to make the two sides adhere together; or if ppuration has taken place, then the compress should be put pon that part of the vein just above the suppuration.* Now, s lymph is not effused in the early stages of phlebitis as a ecretion from the lining membrane of the veins, the adhe- on produced by Mr. Hunter's method of treatment would be y coagulum of blood only. This would not, under ordinary ircumstances, become organised. It would adhere only to he sides of the vessel, and it would be constantly liable to ecome displaced. Such a bond of union, although it might

* Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, p. 29.

prevent, for a time, the morbid contents of a vein from entering the general circulation, could scarcely be looked upon as a permanent union of the sides of the vessel.

In cases where the affected vein is seated superficially, a much more certain and effectual way of closing its canal, and of barring the entrance of its contents from the general circulation, may be used. This method, which, when properly performed, I believe to be free from danger, was adopted in three out of four of the following cases. The fourth case is given as an illustration of Mr. Hunter's method of treatment. It will, I think, be admitted that although Mr. Hunter's method might perhaps have been successfully adopted in the first case, it could not have been well used with any reasonable chance of success in the second and third cases.

Case I.—William Linsell, æt. 44, was admitted into St. George's Hospital on the 14th of September, 1864. A month previously he had cut the fore finger of the left hand. The part festered, in consequence as he believed of the cut having been poisoned. On the 12th of September the inflammation was extending up the arm, and on the following day he had severe rigors. Upon his admission there was some general redness over the lower and outer side of the fore arm. An irregular, unhealthy, and honeycombed wound, surrounded by thickened white skin, existed on the index finger. The course of some absorbent vessels could be traced on the outside of the arm by delicate red lines in the skin. On the inside a darker and deeper blush extended in the course of the basilic vein to the middle of the fore arm. Beneath this the vein could be traced by the touch as a thickened cord. Two needles were now introduced beneath and across the vein, immediately above the point to which the inflammation had extended. A piece of thick plaster was applied in the course of the vessel over the skin, and retained tolerably firmly in its position by two elastic india-rubber bands, placed over the extremities of the needles. The vein was thus closed by acupressure at two points, about three quarters of an inch apart. Between these points the vein was divided by subcutaneous section.

(On the day after the operation the inflammation of the
m, and the thickening of the vein, extended as high as the
rt where the operation was performed, and there termi-
ced abruptly.

September 17th—third day after operation. The inflam-
tion had not extended beyond the divided portion of the
m. The needles were removed. Subsequently to this,
o abscesses formed in the fore arm; one directly in the
rse of the basilic vein, and from this a quantity of brown
tter was discharged, containing a large admixture of
ered blood. No further local or constitutional disturbance
llowed in this case, and the patient left the hospital quite
ll on the 30th of September.

CASE II.—William Kintleton, æt. 38, was admitted into St.
eorge's Hospital on the 23rd of September, 1863, for hemor-
age from the internal saphena, which had burst at the
wer part of the thigh. The parts around the opening of
e vein were much thickened, so that the course of the vein
uld not be clearly distinguished. On the 24th of September
attempt was made to obliterate the saphena vein above
e point at which it had given way. Two needles were
troduced across the vein, and it was supposed to be divided
tween the needles. From the amount of blood lost on
thdrawing the needles on the 28th, it became apparent that
e of the needles at least had transfixed the saphena vein.

On the 30th two distinct and severe rigors occurred. The
lse rose to 146, and inflammation was extending up the
igh in the course of the saphena vein. A portion of this
in, not involved in any surrounding thickening, and about
ur inches above the seat of the former operation, was now
llected, and a fresh needle was here passed fairly under the
essel. Pressure was made upon the vein by a figure of 8
gature passed over the ends of the needle.

On the following day the pulse had sunk to 100. The
cal inflammation had increased; but all the constitutional
mptoms had diminished in a marked degree.

October 2nd, pulse 92.

Within the next few days two abscesses formed in the

saphena vein—one below, and the other above the point of insertion of the last needle.

On the 8th, the last formed abscess above the needle was opened.

13th, pulse 100, soft, compressible; had slept well. His countenance free from anxiety.

17th. The needle was removed, 17 days after its application. This patient was kept under observation until 5th of November, when he was discharged well, having had no recurrence of his symptoms.

CASE III.—John Brood, æt. 67, was admitted into St. George's Hospital on the 8th of January, 1862, for the purpose of having a very large cluster of veins on the inner and lower part of the thigh obliterated. The internal saphena was very much enlarged from the knee to the groin. He had suffered from this complaint for about sixteen years, and had been eventually obliged to wear a lace stocking.

On the 9th of January, two needles were introduced across the vein, and it was divided subcutaneously between the needles. A sudden motion occurred during the introduction of the upper needle, and it was observed that some dark coloured blood escaped as the puncture was made. When the needles were removed on the 13th, a similar discharge of dark coloured blood was observed, and it was inferred that the needle, instead of passing under the vein, had perforated it. Some swelling and redness of the skin had appeared around the seat of the operation.

14th. There was a severe rigor, followed by profuse perspiration, which ran down his face. The pulse rose to 140.

A fresh needle was now inserted between the seat of the local mischief and the centre of the circulation. This was done about the middle of the thigh. Care was taken to pass the needle completely under the vein, and the vessel was compressed by a figure of 8 ligature, passed over its extremities.

15th. The pulse had sunk to 100, and the constitutional symptoms had subsided. The needle last inserted was allowed

remain three or four days, when it was removed. No abscess curred in this case, and the patient was sufficiently well to ave the hospital on the 26th of January, seventeen days ter his admission. This patient was seen for another affec-on on the 2nd of January, 1865. He then stated that he id never had anything the matter with the vein since he covered in 1862, and had never worn a bandage since that me. The vein at the seat of the operation, where it had een divided, remained obliterated; but that portion of the essel under which the last needle had been placed was com-letely pervious, and of the same size as the rest of the essel.

CASE IV.—Thomas Baker, a middle aged man, was bled the arm on the 28th of March, 1851. On the 22nd of the llowing month a red, vivid patch of inflammation appeared the inner part of the upper arm, and on the 25th, some ark coloured matter was discharged from the cicatrix of he wound made in bleeding, which previously appeared to e healed. The inflammation extended, and large vesicles rmed principally in the course of the basilic vein. A pad as carefully adjusted, so as to make pressure upon this vein mmediately above the inflamed part. During the next two ays, the inflammation extended downward in the course of he vessels toward the back of the arm. The skin became vid, and abscesses formed in different parts. The inflamma-on in this case never extended beyond the lower margin of he pad, which had been placed on the basilic vein.

In any future case, similar to those above related, the uthor would decidedly prefer the operation of subcutaneous ection to that of pressure by a compress, or to that of imply passing a needle under the vein for the purpose of bliterating its canal. By the operation of subcutaneous ection a permanent union is effected, because it takes place etween the opposed portions of cellular tissue on the out-ide ot the vessel. Such union is vascular, and therefore not able to be broken down. By this operation no suppuration eed be excited, and the needles used for the purpose of acu-ressure may be removed at the expiration of two, three, or

four days, when the union will be complete. Union cannot be ensured within the same period by the pressure of a needle placed under the vein. If the needle be removed within the first few days, the current of blood is liable to be re-established through the vein; if it be left, suppuration may be excited on the outside of the vessel; this may lead to the coagulation of the blood, both above and below the part where the vessel is compressed, and the coagula thus formed may undergo the very changes which produced the serious symptoms for which the operation was undertaken. In the third of the above recorded cases this appears in some measure actually to have happened, for although the current of blood through the vein was arrested, yet suppuration took place both above and below the needle last introduced. In the first case, on the contrary, when the vein was divided, no trace of inflammation extended beyond the divided part. In both these cases, the products of the diseased actions were expelled from the interior of the veins by the process of suppuration; but had the flow of blood through the vessels been allowed to continue, some of these same morbid products would have been carried in the course of the circulation, and would have produced their effects in other and distant organs.

As the process of reparation in veins has been variously described by authors, so the different theories propounded have led to different kinds of treatment. At the Veterinary College, even within the last few years, it was publicly taught that a coagulum in a vein was a foreign substance, and ought to be removed; and the jugular vein in horses which had been bled was sometimes slit up for several inches, in order to remove the coagula which formed in successive portions of its course.

That a coagulum in a vein may be an irritating substance has been fully proved, but the irritation then depends upon the accidental admixture of foreign matter.

To remove coagula in ordinary cases, is to remove the very means prepared by nature for the restoration and safety of the parts. Position, topical applications, bandages, and

nperature may all have their influence in producing healthy tions. As the wounds which precede purulent deposits are nerally characterised by feeble powers, those conditions hich most tend to invigorate the parts are principally indi-ted. The irritability of a wound frequently appears to be thing else than a series of attempts to bring about an tion, which it has not the power to accomplish; as soon as at is fulfilled which the necessity of the parts demands for eir healthy condition, irritation will cease. In such cases erything that will confer strength to carry out the intended tion will prevent inflammation. But no local applications e likely to accomplish this object, unless the powers of e constitution are supported at the same time. It is ident, observes M. Cruveilhier, that the treatment of phle-tis ought to be concentrated on the first period of the dis-se, viz., that of the coagulation of the blood. So soon as rtions of a disintegrating or decomposing clot, or the ptic products of a wound, have become mixed with the culating blood, medicine is generally of little avail. Un-rtunately, in a large number of cases, the contamination of e blood takes place through minute vessels of a wound lden from our sight; and the occurrence of severe consti-tional symptoms is the first signal of a malady to which, only o often, there is but one end. When there are indications of e extension of inflammation along a vein ,the mode of treat-ent, which used to be adopted in this country, was the ministration of calomel and opium; and in France, general eeding, but especially the application of large numbers of eches.

Such treatment was based upon a false view of the patho-gy of these disorders. The use of calomel and bleeding s now been generally abandoned, and a stimulating plan of eatment substituted for it.'

Although a careful comparative experience be still want-g, the numerical evidence which we have in some diseases, nds to indicate that plan of treatment which is most in cordance with the views now held and taught.

At a period when puerperal fever was rife, forty cases attacked with some form of the disease, says Dr. Ferguson, "were treated without any bleeding or leeching, or without any attempt to induce the constitutional effects of mercury, and of these only two died." So long as there are the local phenomena of venous obstruction from the presence of blood-clots, mercury is not only useless, but injurious; and when the constitutional symptoms would indicate a general infection of the blood, the case can certainly no longer be termed one of inflammation at all, but it comes within the category, and requires the treatment of a blood disease of typhoid type.

The cases in which purulent deposits usually form, indicate a debilitated state of constitution. They are of much more frequent occurrence in large towns than in the country, and in hospital, than in private practice. The depressing influences which give rise to erysipelas, and puerperal fever, will also predispose to the formation of these abscesses; and as scanty diet, loss of blood, debilitating surgical operations, and overcrowded rooms, have been found among the causes of the former, so may they be looked upon as favouring the production of the latter.

There are several very important points connected with the *etiology*, and causation of these diseases, which have not yet been at all satisfactorily worked out.

There appears, for example, to be some intimate etiological connection between such diseases as phlebitis, inflamed lymphatics, the different forms of erysipelas, pyæmia, and putrid infection. They all seem to depend, to a very great extent, upon the presence of specific morbid materials in the blood, which are either introduced from without, or generated within the animal economy. The diseases we have named frequently occur simultaneously, and their prevalence and spread — if not their generation — would often seem to depend upon peculiar conditions of the atmosphere, particularly the atmosphere of hospital wards. What is the exact determining cause or causes of these disorders is beyond our knowledge, for we have not yet ascertained what the changes in the secretions of a wound are, which

precede the general blood contamination. When this has taken place in whatever form it may develop itself, it would appear to be communicable.

It is not an essential character of such communication that the disease which follows should be exactly the same, for it has happened in the author's experience (in common with that of others), to have observed the appearance of cases of pyæmial disorder, after exposure to the erysipelatous poison. The two disorders are frequently combined in the same patient: a wound exhibiting the local characters of erysipelas, and the constitution exhibiting the symptoms of pyæmia.*

Professor Simpson, in some suggestive papers upon surgical fever, has advanced some very cogent evidence upon the spread and communicability of these disorders. The most important practical lesson to be learnt is, that this group of diseases is preventible to a great extent. Whatever ministers to a defective hygiene, to the presence of decomposing animal matter in the atmosphere—in one word to dirt—supplies the *external* conditions most favourable to their occurrence; and whatever ministers to the accumulation of those effete and waste products which produce an instable condition of the blood and tissues, supplies the most favourable *internal* conditions. It is too much to hope that we shall be enabled to prevent these accidents to surgery by the most rigorous application of the most sagacious rules: but no one can doubt that much may yet be done. When we take the lowest rate of the recorded mortalities in some English hospitals, and contrast them with the highest rate of the continental hospitals, we cannot avoid perceiving the existence of external causes which are within our control, and remediable.

It becomes an interesting subject for inquiry, whether the application of acupressure, instead of ligature, for the arrest of hæmorrhage, will at all lessen our mortality in surgical practice.

* The morbid appearances found in fatal cases of erysipelas are very similar to those discovered after pyæmia. There is the same tendency to multiple sources of congestion and blood-clotting.

An abundant supply of food, fresh air, a nutritious and stimulating diet, and the most scrupulous attention in preserving a cleanly state of all wounds are the main prophylactic measures.

The treatment of inflammation of the veins, in which purulent deposits frequently originate, is thus spoken of by Sir B. Brodie, after matured observation, "All the experience that I have had on this subject would lead me to believe that, like erysipelas, it has its origin in a low asthenic state of the system, and that those persons are especially liable to it who have been much lowered by hæmorrhage at the time of an operation, or by too scanty a diet afterwards. An operation is a shock upon the nervous system, making a great demand upon the vital powers. The effects of this shock are often much aggravated by loss of blood, and a very scanty diet actually makes the patient more liable to some kinds of inflammation. Our mode of practice ought to be rather to sustain his powers by allowing him wholesome nourishment, and not to add to the influence of the other depressing causes, the still worse one of starvation."

The general management of this disease after the formation of purulent deposits has commenced, is probably as little satisfactory as any that come under the notice of the surgeon. The whole course of the disease is characterised by what has been aptly designated "action without power." The excitement of the system will imitate all the acts of genuine inflammation, without any of its healthy results, and loss of energy will appear immediately after, or even arise in conjunction with, the first symptoms of increased action.

"What treatment," says Cruveilhier, "shall we oppose to purulent infection? To this question experience is as yet dumb, while the various remedies to which theory would seem to point have failed as signally in my hands as in those of others; yet, when the injection of putrid matters into the veins of living animals has been followed by abundant and very fœtid evacuations, they have frequently got well." Cruveilheir conceived "that diseases resulting from purulent

ction would not be stamped with the seal of incurability, that nature, seconded by art, would triumph in the ma-ty of cases if the pus, which is incessantly renewed, did incessantly renew the sources of infection." In accord-e with this remark, M. Gaspard found that animals which vered after the injection of a certain quantity of pus into ir veins, often died when the experiment was repeated. recovery was usually preceded by black, liquid, and ex-mely fœtid evacuations, which often seem to afford imme-te relief.

Dr. Polli, of Milan, has very recently published a mono-ph upon the diseases arising from purulent or putrid ab-ption and their treatment. Having shown by various tations and observations (many of which were original) t some maladies have for their cause a fermentation of constituents of the blood—sometimes determined by rescible materials, or by ferments introduced from with-, sometimes by spontaneous alterations of the materials of blood itself, originated by the particular influences to ich the organism was subject—he proceeds to take a rower and more precise position, and to identify the sup-ed causes with the given species of disease, by producing fficially those maladies, by the introduction into the blood certain morbific ferments.

The summary conclusion of his experiments is, that with injection into the circulation of the morbid materials indi-ed, we can artificially produce certain grave and well pro-nced maladies, which shall exactly possess the general racters of diseases due to morbid ferments.

From this synthetical study of disease, he asks whether, t be granted that the starting point of the morbid pheno-na be due to the action of a specific ferment in the blood, s possible to impede its effects, render it inactive, or ntralize it in the living organism ?

It is well known that the eminent French physiologist rnard, while he establishes the fact that such fermentations take place in the blood, holds that " the neutralization of ments is *impossible*, because, to do this, the properties of

the blood would be changed to such a degree that life would be no longer possible." *

Dr. Polli's efforts are directed to establish the doctrine that the neutralization of morbid ferments in the blood of living animals can be effected without altering it in a manner incompatible with life.

Many substances possessed of anti-fermentative or anti-catylitic properties are known, but these possess such poisonous or caustic qualities as to render them inapplicable. Dr. Polli shows that sulphurous acid, in combination with the bases of alkalis or alkaline earths, possesses these powers in a marked degree, and can be used to almost any extent. Herein, then, lies the gist of Dr. Polli's discovery, and it rests upon the results obtained from 70 experiments, of which he cites 16 of the more important, in an appendix to his memoir.

His observations go to show that,—by the addition of sulphites to the substances used for injection, we may prevent their injurious action, by injecting of them at the same time that we inject the morbific agent, we may neutralize its effects, by their administration beforehand (as prophylactics), we may render it innocuous; and by their use, when the morbid ferment is already present in the blood, we may anticipate similar results.

Dr. Polli's experiments seem to have been well designed and carefully performed, and they are ofttimes crucial in their nature. Some of the results are conflicting, as might be anticipated when we consider the great difficulties attending the subject; indeed, it is scarcely possible to keep the effects of a thrombosis and embolism separate from those of the blood poisoning, and in some of the cases described, the amount of the sulphites used was insufficient for attaining their full therapeutic action.

There seems to be great unanimity of opinion among the Italian physicians and surgeons, as to the therapeutic properties of these agents, both as local application to unhealthy

* Leçons sur les effets des substances toxiques et médicamenteuses, page 99.

ores, in which they arrest the fœtor, diminish the pain, and promote healthy action, as well as internal remedies.

The results obtained by the ordinary treatment of diseases of the type under consideration are so lamentable, that we cannot avoid hailing any aid with gladness which is put forward upon plausible reasoning, and attested by a fair amount of evidence. If the results obtained by Dr. Polli and others be verified by clinical experience, *then*, the merit of the discovery can scarcely be over-rated. *This, however, remains to be seen, and warned by every day's experience, the author would desire above all things, to avoid all eulogistic or exaggerated terms.**

For the benefit of those who may be desirous of trying the sulphites we may add a few words upon the mode of using them, and the amount which may be administered.

In one of his pamphlets, Dr. Polli has recorded the experiments made upon himself, and another individual, with the view of defining the doses tolerated by the system, and of indicating their physiological action.

In the period of four days each of them consumed 50 grammes of sulphite of magnesia without inconvenience. Dr. Polli states that so large a dose as 4 grammes could be taken with so little inconvenience that he has no doubt that it might have been augmented to 5 or 6 grammes, if required.

From chemical observations made upon the excretions, he found that the sulphites are absorbed as such, and pass out by the kidneys. While some of these salts pass out of the system unchanged, the remainder are excreted as sulphates, becoming oxidised at the expense of the oxygen in the blood and tissues. The observations indicate further that the salts are present in the urine at first as sulphites, then, these with sulphates, and finally, sulphates only can be detected.

Dr. Polli particularly adverts to the distinctions between the adult human being affected with a blood disease, and an

* The author entertains a decided impression that, although these remedies may prove useful in cases of putrid infection of the blood from the injection or absorption of decomposing agents, they will not be of much use in the ordinary forms of pyæmia.

animal the subject of experiment, in—the much larger size of the former, the unknown quantity of the morbid factor in his blood, and the augmentation which this undergoes, according to the duration of the diseased action, &c.

As different individuals, even when selected from the same breed and variety of animals, exhibit very different powers of what may be called vital resistance, or reaction to morbid poisons, so must it be with men.

In a severe case of purulent absorption, it will be necessary to saturate the system, as it were, with the remedy, by giving it in doses as large as can be tolerated. With this view, these salts may be introduced by the mouth, by enemata, and through any wounds that may be present.

In cases of a more chronic or less urgent nature, we may give 15 or more grains of the sulphite of soda or magnesia as a dose, 3 or 4 times daily. As a lotion, injection, or gargle, the sulphite of soda may be used, from the strength of 2 to 4 drachms to the 8 ounces, or a saturated solution may be employed.

If it be deemed necessary, there can be no harm in giving the sulphites as a medicated drink to be taken by the patient *ad libitum*.

It may be mentioned that Dr. Polli,—in an interview which he had with Liebig and Wöhler—was informed, that the sulphite of soda could be prepared at a cost not exceeding that of the alkali itself, so that these agents have the merit of being very inexpensive.

VARICOSE VEINS.

ILARGEMENT of the veins is commonly found in those parts tthe body which are most dependent, or in the lowest part any one system of veins. With regard to the general culation, varicose veins are most frequently seen in the ss; but they are also by no means unfrequently found in lower part of the spermatic plexus, and in the most dedent part of the portal circulation. Although essentially same disease, varicose veins have received distinctive mes when they occur in the two situations last mentioned; en the disease affects the spermatic veins it is called varicele, and when the veins of the rectum are affected a rson is said to suffer from hemorrhoidal tumours or piles. ese affections will each require a separate consideration. e plan of treatment in all the cases mentioned may be lliative only, or a radical cure may be attempted. The rious plans of giving artificial support to varicose veins of leg, and of treating the ulcers to which they give rise ve been dwelt upon by so many authors that it is unnecesy here to do more than allude to the subject. The radical e of the disease in the lower extremities consists in obliating the enlarged veins, so as to allow the circulation ough the part to be carried on by the remaining vessels, ich maintain their original size. For this purpose various ns have at different times been adopted. But before deibing the very simple operation which the author has opted, and successfully practised in a very large number of ses for the cure of varicose veins, it may be well to say a v words upon the anatomical distribution and structure of ese vessels.

The subcutaneous veins of the limbs consist of two sets: the one supplementary to the deeper vessels, the other distributed in and belonging to the integuments. These two systems of veins will be easily recognised upon dissecting an œdematous lower limb. They are distinguished by certain anatomical and physiological peculiarities. The deeper set pursue a straight course towards the centre of the circulation, and are less numerous, larger, and possess stronger coats than the superficial ones. They are intimately connected with the aponeurotic investments, by which they are strengthened and bound down to the limb. The tegumental veins—which are easily traced in a body after *post mortem* decomposition has caused the detachment of the epidermis—consist of very numerous veins of small size, which form a finely-meshed and anastomosing network immediately beneath the cutis. These all eventually transmit their blood into the deeper vessels. They possess very thin coats, and receive little or no support from their connection with surrounding tissues. These minute plexuses of tegumentary veins appear to be subsidiary to other purposes than one of simple circulation. They probably exercise an influence upon the functions of the skin. It seems probable also, that in cases of impeded circulation, such as arise from many cardiac or pulmonary diseases, the congestion of the small veins of the skin, and of those mucous membranes which are exposed to the air, may be at once the measure of the degree of impediment to the circulation, and a subsidiary means for oxidation of the blood.

Structurally, veins are very much like arteries, differing from them chiefly in their flaccidity, in the thinness and less pronounced characters of their different coats, and in the presence of valves. The larger veins possess three coats, viz., an internal or epithelial, a middle muscular, and an external fibrous coat. The first consists of a covering of tesselated epithelium, supported by a layer of very fine connective tissue, which forms the so-called basement membrane. The second or middle coat is muscular, consisting of two layers of fibre cells, longitudinally disposed next the internal coat, and

cularly arranged externally. The outer coat is tough, and mposed of the ordinary white and yellow elastic fibre. e elasticity of veins depends upon the yellow fibre constituent, and varies according to its amount.

The valves of veins, by obstructing all retrograde currents, preserve the system of capillaries from the impulse d congestion that would otherwise ensue. These valves e of extremely delicate structure, being formed by a reduplication of the lining membrane, with a small amount of nnective tissue. They are semi-ovoid or lunated in shape, merally placed in pairs, and, during the flaccid state of the ssels, their borders are nearly in contact, becoming separated as the vessel is distended with blood. It is noteworthy at the tunics of the vein are thinner in the immediate ighbourhood of the valves, and readily yield to the fluid essure, hence the bulging into pouch-like projections at ese parts.

The deeper supplementary system of veins seems to be mplementary or compensatory to the circulation through e deep vessels, allowing the passage of blood through their annels when its return through the venæ comites is obructed by muscular contraction.

In the process by which dilatation of a vein is accomlished there are two different agents or forces present, the ne being constant and physiological, viz., the impulse which derived from the vis a tergo; the other physical, in virtue f that hydrostatic pressure, which is a property of the blood common with all other fluids. If the current of blood be bstructed in some of the vessels of a limb, the vis a tergo must tend to cause dilatation of other vessels. When the enous coats are weaker at one part than another, less supported by surrounding textures, or when there has been long ontinued exercise of a part of the body in a dependent posiion, the hydrostatic pressure will cause dilatation of these essels. The practical fact, then, to be remembered is, that he vis a tergo is a force which must constantly act against bstructions in all positions, while the hydrostatic pressure, ollowing the law that a column of fluid exerts a force pro-

portionate to its perpendicular height, must cease to operate when the body is horizontal.*

Veins are very liable to become varicose, particularly those of the lower limb and left spermatic cord. In a varicose limb the deeper system of supplementary veins are generally implicated from an early stage; but it is in the superficial system that the dilatation and varicosity become most apparent. A vein can only maintain its original space in the tissues under the operation of a distending force by becoming dilated and distorted, hence the curious tortuosities and reduplications which are so commonly witnessed. These will be most apparent where the veins are weakest and least supported by their investments. Varicose veins are commonly the source of much present discomfort, and they may become the source of much future danger. Besides the sense of weight, fatigue and weariness, and the fugitive pains and cramps, which are the usual concomitants of varicose veins, they may cause different degrees of œdema, various diseases and discolorations of the skin, ulcerations, &c. The diseased vessels, moreover, are liable to spontaneous or accidental rupture and consequent hemorrhage, to attacks of inflammation, and to coagulation of their contents.

The treatment of these affections has been hitherto mainly palliative, for, although a radical cure has been very frequently attempted and attended with success, yet it has been found that operative interference with varicose veins was often followed by a dangerous train of symptoms. The cause of this has only to be duly appreciated to be in many cases effectually guarded against. What is the reason that a ligature may be applied with perfect impunity to a divided artery on the extremity of a stump, and that surgeons have at all times had some misgiving with regard to performing the same operation on a vein? The reason is, that phlebitis has been not unfrequently known to follow a ligature upon a vein, but no similar affection is produced by

* *Vide* Varicose Veins and Varicose Ulcers, by J. W. Nunn, Esq., Surgeon to Middlesex Hospital, 1852, to which very practical little Essay the reader may refer.

ing an artery; and the reason of this, again, is obvious
m facts dwelt upon at length in the first part of this work,
mely, that should the product of any unhealthy action be
rmed in an artery, the circulation of the blood has a ten-
ncy to carry it *from* the centre of the circulation, but when
e same action takes place in a vein the morbid product is
ely to be conveyed *towards* the centre of the circulation,
d thus not only to contaminate the blood, but to inflame
e channels through which it passes. In the case supposed,
artery would sooner or later discharge its contents on the
rface of the stump, but the vein would carry them into the
neral circulation.

In like manner, after an injury to, or operation upon, a
ricose vein, the products of its inflammation, or the ad-
ixture of any vitiated matters within the vessel, will tend
pass to other parts.

The author has long felt that, in the radical cure of vari-
se veins, the danger from this cause may be with great
rtainty prevented, and his experience during the last twelve
ars has convinced him of the safety and impunity with
hich many operations upon the veins may be performed.

The means which have been employed for the radical
re of varicose veins have included, 1, injection of some
aterial into them to determine coagulation of the blood;
division of the vessels by direct and subcutaneous section;
excision of a portion of the trunk of the affected vein;
the application of caustics to the integument over a vein,
as to induce an inflammation which shall spread by con-
guity to the coats of the underlying vein, and produce a
calised coagulation of the blood and ultimate obliteration of
s cavity; 5, the compression of a vein by twisted suture,
ith or without its transfixion, and various modifications of
is plan.

It appears to the author that all these methods are open
objection. Some of them do not attain their end. A
dical cure is often not effected, and they all may be
angerous. If a temporary ligature is applied so as to
duce a clot, such coagulum may break up and be conveyed

elsewhere, and induce dangerous symptoms; or if it remain localised, it very commonly breaks up and liquefies in time, and then the varix returns. Those procedures which involve the wounding or injury of the coats of a vein are still worse. When a vein is divided wholly or in part, or transfixed by a needle, inflammatory re-action ensues in the coats, and coagulation of the contained blood is produced. The coagulum becomes applied to the divided coats, and adheres to the lymph, which is effused for their repair. The materials engendered during the inflammatory process can readily become mingled with the blood-clot, and it then only depends upon the stability and firmness of the latter, whether these materials shall be localised or pass into the circulation. The author's plan, it appears to him, effectually guards against these accidents, while it effects a radical cure. By subcutaneous section of the vein we prevent the access of air, while we effectually obliterate the vessel by means of the lymph, which binds it to the neighbouring connective tissue. By acupressure of the vein above and below the site of division, we effectually prevent the dangers arising from the formation of a thrombus. In regard to the first we may quote Sir B. Brodie's observation, that the difference between dividing a varicose vein by subcutaneous incision and dividing it together with the skin covering it, "corresponds to that which exists between a simple and compound fracture."

Operation for Varicose Veins.

This is now always done in one sitting. The plan formerly advocated of allowing the blood to coagulate in the vein before it was divided, being clearly superfluous.

The operation is performed in the following manner:— The vein is taken up between the finger and thumb, which are made, as far as may be, to meet behind it. A needle is then passed behind the vein, and made to pass out as near the vein on the opposite side as possible. The vessel is then compressed by an india-rubber band, or a ligature passed

wer the end of the needle. This point of the operation is ppeated in another part of the vein, about an inch distant, s represented by the woodcut at the commencement of this ork. A portion of the vessel is thus isolated from the rest f the circulation. It may then be divided or removed ithout fear of any constitutional effects. Generally a simple ib-cutaneous division is all that is necessary. There is then o suppuration, no ulceration, and no open wound. The eedles used for the purpose of acupressure are removed on he third or fourth day: the upper one generally a day before he lower one. All the parts usually become healed about he seventh or eighth day, and the divided veins are massed gether in a knot, and permanently obliterated.

The needles used are generally armed with an elastic and before being placed under the vein, *i.e.*, they are passed hrough one end of an elastic band, and the other end of the and is passed over the sharp end of the needle, after it has een passed under the vein.

A very slight degree of tension of the bands is sufficient o close the vessels. If firmer pressure be required, as in the se of a number of small veins, the best plan is to apply the dia-rubber bands as usual, and to place over them a common gure of "8" ligature. Some swelling will probably occur on he second day, when the ligature may be removed without n any way interfering with the security of the compression. The elasticity of the bands will allow for a certain amount of welling without being inconveniently tight. If, however, a and becomes very tight, the constant pressure prevents the lood passing through the capillaries, and a streak of white lough may be produced in the skin. This will in no way inter- ere with the success of the operation, but it may take some ays to heal, and thus appear to retard the patient's recovery.

This operation has been performed by the author, and, with ome modifications, by various other surgeons a great number f times. So far as he knows, no serious symptoms have wer supervened, where due care has been taken that the ides of the vein should be brought together without being njured by the needles.

It is sometimes difficult to be sure that the needles introduced pass fairly under the vein, but this object may, in the great majority of cases, be certainly obtained by a little manœuvre. The vein is first pressed out of its bed with the finger, and the needle is then introduced, so that its point may fall into the bed of the displaced vein. The needle being then left at rest, the vein is allowed to regain its natural position, and in so doing it rolls over the point of the needle. The vein is then pressed with the finger in the opposite direction towards the head of the needle, and its point may be brought out without danger of injuring the vessel.

When a needle is passed in this way fairly behind a vein, and left there for two or three days only, it is almost impossible that it should excite any mischief in the interior of the vessel, while the pressure it exerts effectually prevents either hemorrhage or absorption.

In operating upon large veins, it is a point of primary importance that the needles should always pass fairly behind them; for if they transfix the vessels, an interval may be left between the needle and the side of the vein farthest removed from the surface. Independently of the chance of exciting inflammation by puncturing the coats of the vessel, the channel may then not be completely closed, and a passage to the general circulation may be left for any morbid product that may be present.

The case is, however, different with regard to small veins: when a needle pierces into one of these, its small cavity must necessarily be very nearly, if not quite, obliterated. The same care, therefore, is not necessary in operating upon veins of a small size. Clusters of varicose veins in the legs may, for instance, be pierced by a needle, and tied with impunity. If a "8" ligature is placed round the ends of the needle, the small veins which may happen to be punctured are subsequently as completely closed as if the needle had been made to pass under them.

The existence of varicose veins is considered as a physical disqualification for our public services, and it is also a very

equent cause of invaliding. Many of the author's cases ve occurred among these classes.

In several instances, sailors have been sent to him by r. Clarke from the Royal Naval rendezvous, Tower-hill, who d been rejected as unfit for duty, and who, after having is operation performed, were received within a few days or eeks into the navy.

It would be tedious to relate at length even a small part the cases in which this operation has now been performed, ace they all follow very much the same course, and are ttended with the same success.

The following, from the pen of a former demonstrator of atomy, upon whom the operation was performed, was pub-lhed by him in the "Lancet" for July 29, 1865, and may be ken as a fair specimen of the operation and its results.

This gentleman, after having completed his medical ndies wished to join the army, but was rejected at the Horse uards for varicose enlargement of the external saphenous d tributary veins of the left leg. He says:—

"July 6th, 1864.—Mr. Lee inserted two pins under the in at the upper part of the calf, the pins being about three-arters of an inch apart; and the vein was pressed against ese pins by means of india-rubber ligatures. About four hes lower down, the vein was again secured by two pins, the same distance from one another as before, and simi-rly ligatured. The vein was next divided between each ir of pins by a sub-cutaneous incision, the only blood lost ing that contained between the pins of each pair. Small ds were placed over the incisions, and the leg carefully ndaged. I declined having chloroform administered, as I shed to watch the operation, and the pain was of short ration. Ordered to remain in bed. No restriction as to et.

"7th.—Had about four hours' sleep during the night after e operation. Experienced slight pain and twitchings in e course of the divided vein and accompanying nerves.

"8th.— The lower pin of each pair was removed. Very ght twitchings, and no pain worth mentioning to-day.

"10th.—The upper pin of each pair was removed.

"13th.—Walked a little about the room with the aid of a stick.

"14th.—Called on Mr. Lee at his house in a cab, being rather lame, but able to walk ten or twelve yards 'at a stretch,' without a stick or other support.

"The vein was still slightly painful on touch, but evidently obliterated. The bandaging was continued for a few days. The lameness disappeared about a week after the operation, and soon after I passed the physical examination at the Horse Guards.

"June 27th, 1865.—The vein is now perfectly obliterated, and the enlarged tributaries reduced to their normal size.

"As the veins have just been subjected to two or three months hard cavalry drill, mounted and dismounted, I think the case is a good example of successful obliteration."

I have now operated in the way described in a large number of cases at St. George's and at King's College Hospitals, and in private practice. From the 29th of August, 1861, to the 11th of March, 1863, I find in one case-book detailed notes of nineteen cases of varicose veins, and of eight cases of varicocele, operated upon in St. George's Hospital alone. The following is an abstract of these nineteen cases, in the order in which they occurred. All the cases operated upon within the period are included, except those which require particular mention, and which are noticed in another part of this treatise.

M. C., æt. 23, had suffered from varicose veins for twelve months.

Sept. 15. The internal saphenous vein of the left leg was operated upon in the usual manner. The needles were withdrawn on the 10th, and the patient was discharged cured on the 18th.

W. D. was operated upon on the 15th of August for varicose veins, accompanied by an ulcer of the leg. The internal saphenous vein was divided subcutaneously on the 15th of August, and he was made out-patient on the 28th of the same month.

J. P., a soldier who had returned from General Havelock's army on account of varicose veins was operated upon on the 3rd of August. The saphenous vein was divided about four inches above the left knee, and a cluster of veins on the same side was operated upon at the same time below the knee.

This patient was discharged, cured, on the 25th of September.

T. L., æt. 35, not of very temperate habits. Operated on October 24th, 1861.

October 29th, the needles removed.

November 13th, discharged cured.

A. T., æt. 26. The internal saphenous vein was operated upon four inches above the knee on the 14th of October, 1863.

October 19th, the needles were withdrawn.

October 25th, cured.

William H., æt. 29. Subject to varicose veins for five or six years. The posterior saphenous vein operated upon on the 3rd of October, 1861. Discharged cured October 19th.

James R., æt. 56. Duration of disease five years. The internal saphenous vein operated upon six inches above the knee, and four inches below it, on the 28th of August, 1861.

This patient was suffering from piles, and was kept in the hospital until the 16th of October.

N. R., æt. 62, admitted into St. George's Hospital for a varicose ulcer of the leg, of 19 years' standing.

The internal saphenous vein was operated upon four inches above the knee on the 31st of October, 1861. The needles were removed on the 4th and on the 6th of November. The ulcer near the ankle had now diminished to one-half its original size. Discharged cured November 23rd.

J. G., æt. 45, admitted with varicose ulcer, depending evidently upon a varicose condition of the veins of 12 years' standing. The internal saphenous vein below the knee was operated upon on the 5th of September, 1861.

September 9th, the needles were removed.

October 2nd, discharged cured.

Mary R., æt. 30, had suffered from varicose veins for 13 years. The internal saphenous vein was operated upon below the knee on the 5th of December, 1861.

December 9th, the needles were removed.

December 28th, discharged cured.

Ann P., æt. 46, subject to varicose veins for 10 years.

November 14th, operation below the knee.

November 19th, the needles withdrawn.

December 23rd, discharged cured.

William Y., æt. 42, varicose ulcers. The internal saphenous vein was operated upon below the knee on the 2nd of January, 1862. India-rubber bands, instead of the "8" ligature, were used in this case for the first time.

January 7th, needles removed.

January 9th, the ulcers had healed.

January 11th, discharged cured.

Ann F., æt. 32, varicose ulcer on leg, with eruption on skin, commencing in small boils.

The internal saphenous vein operated upon May 8th, 1862. Some ulceration followed along the track of the upper needle. Left the hospital June 5th. The vein quite obliterated, but still slight irritation along the track of the upper needle.

Adelaide F., æt. 52, varicose ulcer, accompanied by varicose veins of ten years' duration. Operation on the vein three inches below the knee on February 6th, 1862.

February 10th, the needles removed.

Discharged cured February 26th.

A. W., æt. 60, varicose veins for 10 years. Ulceration near the inner ankle.

Internal saphenous vein operated upon below the knee March 6th, 1862.

March 11th, needles removed.

March 22nd, made out-patient.

W. B., æt. 22, operation for varicose veins of the leg, December 18th.

December 22nd, the needles removed.

December 26th, was sufficiently well to get up.

January 1st, 1863, had an attack of erysipelas of the face, which kept him in the hospital until the 14th, when he was discharged cured.

M. P., æt. 27, operation January 29th, 1863. Discharged cured February 11th.

E. D., æt. 34, varicose veins, accompanied by dark patches in skin of the leg.

Operation May 3rd, 1865.

Discharged cured June 3rd.

E. W., æt. 30, varicose ulcer of the left leg of six years' duration.

Operation April 9th, 1863.

April 13th, the needles removed.

April 21st, discharged cured.

The operation for varicose veins, when performed in the manner above described, has been attended with such uniform success, and the cases have run such a similar course, that it appears unnecessary to relate any further instances. But the question at once arises as to whether the cures effected in this way are permanent. Now in hospital practice the great majority of patients are lost sight of, unless they again become ill, and it is extremely difficult to give anything approaching to an accurate statistical statement of the results of operations after the lapse of years; a considerable number of cases that have been operated upon for varicose veins have, however, at a later period fallen again under my observation. In several instances I have found the vein, after several years, to have remained perfectly obliterated, and the inconvenience from which the patient had suffered to have been entirely removed. In other cases I have found the current of blood to have been re-established through a collateral channel. The vein operated upon has remained impervious, but a collateral branch has become enlarged, and opened into the originally dilated vein above the obliterated point; when this has occurred there has generally appeared to be a constriction at the point where the newly dilated vein has opened itself, and this has appeared to act as a kind of valve at the part. In several cases where this has happened

the patients have been enabled to continue their usual occupations without any inconvenience, and without the aid of artificial support. This enlargement of the collateral veins does not, however, always take place. Among the cases in which the obliteration remained perfect without any increase of the neighbouring vessels, I may mention particularly two; one of these was a medical man, a friend of my own, who, whenever he came to London, called to show me his leg. The other was a gentleman residing at Kensington, who, before the operation, could never move out without a lace stocking, and who, afterwards, habitually walked into town and back without any inconvenience, and without any mechanical support. Both these cases were operated upon several years ago.

In a few instances, after the lapse of time, the veins have become apparently very much in the same condition as they were before the operation, but even in these cases the patients have been relieved from the inconvenience existing at the time, and have enjoyed a period, more or less prolonged, of comparative comfort. In one case I performed the operation a second time in the same situation.

VARICOCELE.

THE term varicocele might with propriety be applied to a swelling caused by dilated veins in any part of the body; but common usage has restricted the name to an enlargement and dilatation of the veins of the spermatic cord.

The causes of varicocele are the same as those which produce enlargement of the veins in other parts. The particular local conditions which have been supposed to favour the occurrence of varicocele are very numerous. Thus the presence of an inguinal hernia, cysts and tumours in the cord, swellings of the lumbar glands, and hydrocele, have all been noted as tending to produce this disease. The accumulation of fœcal matter in the sigmoid flexure of the colon has been supposed by many eminent physiologists to be a not unfrequent cause of varicocele, and this has been adduced as a reason why the affection is found more often on the left than on the right side of the body.

Warmth has undoubtedly the effect of relaxing the venous circulation generally; and it certainly relaxes the scrotum in a very peculiar manner. But the cause which tends most directly to produce this disease is the prolonged congestion of the spermatic veins. M. J. L. Petit compares the passage of the spermatic veins over the pubis to the passage of a tube over a pulley, and conceives that the blood returning against its specific gravity, with this great mechanical disadvantage, is one great reason of the frequent occurrence of varicocele. After all these circumstances have been enumerated, there remains to be considered some inherent predispositions in the vessels themselves. Thus it is not uncommon to find many members of the same family showing the same tendency to this affection, although their habits of life may be entirely different.

Symptoms of Varicocele.—The pain experienced is of the

most variable kind: with a very slight enlargement of the veins the pain is sometimes considerable; while, on the other hand, with veins enlarged to many times their natural size, no pain is in some instances experienced. Generally, however, a dull aching sensation is felt at intervals, and especially after prolonged exertion. This is often confined to the part itself, but is sometimes experienced in the loins, in the inguinal region, and in front of the thighs. This pain is frequently accompanied by a sense of languor, by mental depression, and by hypochondriasis. But by far the most important symptom connected with this disease is wasting of the testicle.

As varicose veins in the legs, after they have existed some time, produce imperfect nutrition of the parts whence they are derived, so a dilated condition of the spermatic veins appears to have a tendency to induce imperfect nutrition of the testicle. This is followed by a wasting of the organ, and loss of natural power. The testis becomes at first soft, then diminished in size, and in some cases almost disappears.

Treatment of Varicocele.—The palliative treatment of varicocele consists in removing any general or local causes which may have tended to produce congestion of the spermatic veins, the application of astringent lotions, cold ablution, and the mechanical support of the parts by different forms of suspensory bandages.

The radical cure can only be effected by the obliteration of some of the enlarged veins.

It was not long after the first trial of acupressure, combined with sub-cutaneous section, for the cure of varicose veins in the lower extremities, twelve years ago, that an opportunity presented itself for treating the varicose veins of the spermatic cord in the same manner.

The author's experience of this operation has now become extensive. He has long been in the habit of performing it, both in hospital and in private practice, with such an amount of success in the way of radical cure, and such an entire absence of any dangerous effects, that he feels there need be no apprehension about its adoption.

The operation for the radical cure of Varicocele is briefly as ollows:—The patient usually takes a little chloroform, suffi- ient to render him for a minute or two regardless of pain, ut not sufficient to render him insensible. The scrotum, on he side of the varicocele, is then taken between the fingers nd thumb, and the vessels are allowed to glide one by one ut of the hand. Presently the vas deferens will escape, nd may always be known by its peculiar hardness. As soon s this is separated from the other vessels, two needles are assed beneath the veins about an inch apart. These are ade to pass between the vas deferens and the veins to be perated upon. Pressure is then made by means of elastic nds, passed over the extremities of the needles, and the eins are divided subcutaneously in the interval between hem. A very thin knife is introduced horizontally, with s edge directed upward or downward. This passes, like he needles, between the vas deferens and the affected essels. This part of the operation may be performed while he affected veins are retained between the finger and thumb. The edge of the knife is then turned forward, and the cluster f veins divided towards the skin. In doing this, it is con- enient to place the fleshy part of the thumb of the right and over the veins, in order to prevent their yielding before he knife. When the knife is introduced, care should be taken hat it is not passed below more veins than are included in he ligatures.

A little blood sometimes flows out of the wound made by he knife, but this in general amounts to a very insignificant uantity. Some slight hemorrhage into the cellular tissue rill also occasionally follow, and may give a little pain by istending the parts around the ligature, but it in no way nterferes with the ultimate success.

The elastic bands and needles may be removed on the hird or fourth day after the operation. The divided vessels will t that time be closed by lymph effused from the surrounding ellular tissue. In three or four more days this lymph will ave become firm, and the veins permanently obliterated.

It will sometimes happen that the hemorrhage is not com-

pletely arrested by the acupressure. This depends upon a vessel having been divided which has not been compressed. The bleeding is generally venous, and may then be stopped by pressure, but should it continue a fresh needle may be introduced *below* the incision, sufficiently deep to include the divided vessel, without interfering with the vas deferens. In three instances it has occurred to me to witness some arterial hemorrhage, and this in all the instances was immediately and effectually commanded by inserting a fresh needle beneath the bleeding vessel, and applying acupressure *above* the incision. After the india-rubber bands are stretched over the ends of the needles, a "8" ligature may be also applied over the bands. Some swelling will probably occur on the day after the operation when this ligature may be removed, and the elasticity of the india-rubber will then allow for a certain amount of swelling, and will exercise quite sufficient pressure to keep the vessels closed.

The results of this mode of operating have proved most satisfactory. In almost all the cases the veins operated upon have remained permanently obliterated. In some few they have become again enlarged after a time. In none have any symptoms of constitutional disturbance, such as would be produced by the absorption of diseased secretions, presented themselves.

It has been most gratifying to observe in some cases of commencing atrophy of the testis, that after the operation the proper nutrition of the part has been restored, and the organ has regained its natural size and firmness.

The following are instances, among many, in which the veins were divided immediately after the introduction of the needles:—

J. A., æt. 22, single, was admitted into King's College Hospital, December 3rd, 1858. He stated that about the age of 14 he began to experience inconvenience on the left side of the scrotum, and a sense of great weakness in the left testicle. More recently he has experienced pain in the same situations, and for two months past has in consequence been a patient at St. Thomas's Hospital. Upon examination the

spermatic veins on the left side were much enlarged, and tender to the touch. The swelling completely disappeared when he was in the recumbent position.

On the 15th, two needles were introduced three-quarters of an inch apart beneath the enlarged veins, care being taken not to include the vas deferens. A very thin sharp knife was then introduced underneath the veins and between the needles, and the whole cluster of veins was divided towards the surface: very little hemorrhage followed.

December 18th.—Considerable swelling of the scrotum had taken place. The needles were removed on the fourth day.

20th.—Feels much better; pulse perfectly quiet; swelling in a great degree subsided.

24th.—Feels quite well; pulse 60; some thickening around the divided spermatic vessels.

31st.—Some thickening remains in the line of the incision. The swelling above and below this has entirely subsided. Feels quite well, and entirely free from pain. To leave the Hospital to-morrow morning.

1859, January 13th.—Came to report himself, feeling free from any inconvenience.

17th.—Again presented himself with a letter of thanks for his cure. The veins appeared quite consolidated in the line of incision.

An officer left his regiment in India and came to this country under a medical certificate, for the purpose of being cured of a varicocele. The operation was done as in the preceding case. The needles were removed upon the fourth day. There was no constitutional disturbance whatever. The scrotum was discoloured, in consequence of some blood which had become extravasated. This gentleman got up on the sixth day, and left town on the twelfth day after the operation. The author has reason to believe that his recovery was quite satisfactory.

A gentleman had suffered for years with pain and a sense of weight after exercise, in consequence of a cluster of varicose veins connected with the left spermatic cord. He

came to town for the purpose of being relieved, and the operation was performed in the usual manner. During the following night he experienced pain and was restless. Upon examination, it appeared that some effusion of blood had taken place between the ligatures, and had distended the skin, so that these had become very tight. The pain subsided during the day. There was no constitutional disturbance. On the fourth day the needles were removed, and on the seventh day the patient was down stairs. His recovery has been permanent.

C. B., æt. 20, was admitted into St. George's Hospital on the 10th of April, 1862, having suffered from varicocele for six months. The operation as above described was performed on the 17th, with the india-rubber bands.

April 21. Experienced very little pain; some hiccough. Did not sleep well; appetite good.

18th. The needles were removed.

24th. No pain; pulse 68; slept well.

26th. Quite free from pain, except when he walked.

May 3. There was still a slight discharge of pus from the track of the needles.

14th. Discharged cured.

F. A. G. was admitted into St. George's Hospital on the 18th of November, 1862, having suffered from hernia and varicocele of the left side for the last two years.

Nov. 20th. The operation for varicocele was performed without interfering with the hernia.

21st. Passed an indifferent night; pulse 80.

24th. The needles were removed.

26th. Was free from pain; appetite good.

Dec. 5th. Convalescent.

S. F., æt. 20, admitted into St. George's Hospital on the 17th of December, 1862, having suffered from varicocele for twelve months.

Dec. 18th. Operation performed.

22nd. The needles were removed.

24th. Got up of his own accord.

26th. Discharged cured.

R. C., æt. 23, was operated upon in St. George's Hospital the 5th of February, 1863. He had suffered from varicocele for two years and a half. The left testis was now almost wasted away.

Feb. 9th. The needles were removed.

14th. Discharged cured.

Dec. 31st. The patient again presented himself at the hospital. The left testis had much increased in size, and was now as large as the right. There had been no recurrence of enlargement of the veins, nor any inconvenience on that side since he left the Hospital. On the 31st of December, 1865, the patient, writing upon another subject, incidentally remarks, "you literally *made* me a *testicle*."

In performing the operation for varicocele, it is important that the bands should not be drawn too tight over the ends of the needles. The parts involved in the operation swell sometimes very rapidly, and the skin immediately under the ligatures or the bands may very soon slough. The success of the operation is not interfered with by this, but the recovery of the patient is protracted. It will sometimes happen that the portion of skin between the needles will slough together with the subjacent cellular tissue, and sometimes an abscess will form on the loose cellular tissue of the scrotum. These local accidents have never, as far as my observation has gone, been attended with any great degree of constitutional disturbance, and the cicatrix left has appeared to afford an additional security against a recurrence of the varicocele. In a few instances where the part has become very much relaxed, I have, at the time of the operation, removed all the skin, the cellular tissue, and veins which were included between the needles. This proceeding has been attended with very little hemorrhage at the time, and the cicatrix produced has afforded a firm support to the part afterwards.

The late Mr. Briggs occasionally removed a considerable portion of the skin of the scrotum in cases of pendulous testis, and the cicatrix left maintained the testicle in something like its natural position. This operation succeeded

well enough when the case was not attended with enlargement of the veins; but when it was, the removal of the skin could have little or no effect upon the varicocele. At the time to which I refer, no one thought of cutting deeper than the skin, as no means were then in use which would effectually control hemorrhage from the spermatic veins in case they were wounded. Mr. Briggs' operation, then, was well adapted for a case of pendulous testicle where the veins were not enlarged, but not for a case accompanied by varicocele. A case presented itself some years ago in which the testis hung so low, that when the patient lay upon his back it would hang over on the outer side of the left thigh. There was, in this instance, a well marked varicocele. Knowing that I had the means by acupressure of controlling the dilated veins, it appeared practicable to combine Mr. Briggs' operation with that for obliteration of the veins. Accordingly, the needles were introduced as far apart as possible, and, after the veins were secured by the "8" ligature passed over the ends of the needles, the intermediate portion of skin, together with subjacent tissues, containing the enlarged veins, was removed, leaving a very considerable gap. No hemorrhage occurred. The needles were then drawn towards each other, and by this means the edges of the wound were brought together and maintained in position.

This was the first case in which this operation was performed. The wound readily healed, and the testis was subsequently retained very nearly in its natural position.

ORIGIN AND TREATMENT

OF

SOME DISEASES OF THE RECTUM.

THE simplest disorder, to which the general structure of organs is exposed, consists in vascular congestion. The rectum is especially prone to it, owing to the dependent position of the part, and to the more or less acrid and heating nature of its contents and secretion, as constant causes; while it is obvious that no general congestion can occur in the abdominal circulation, either through increased flow of blood to the stomach and bowels, or through obstruction of the portal system from any of the various circumstances that continually produce these results, without filling and distending the hæmorrhoidal vessels. In the female sex, the close connection of the rectum with the uterus renders it again liable to periodical congestion by contiguous sympathy; during pregnancy, the return of blood from the part is directly impeded by the pressure of the gravid uterus.

Accordingly, no organ exhibits such a variety of morbid phenomena, attributable directly to congestion, as the rectum. These may be referred to three heads. The first consists in vascular fulness alone, attended by sensations of heat, tingling, weight, aching; at first local, afterwards extending around the hips, and down the thighs. Of these sensations, the most troublesome from its severity and permanency, is that of tingling. Where it is most acute, the texture of the skin becomes capable of sudden injection, and acquires the habitude of almost erectile tissue.

The second order of congestive phenomena comprises the production of growths, through a modified hypertrophy, dependent on the heat and afflux of blood. These growths

present the form of single or clustered tumours, the interior of which consists of hypertrophied cellular tissue, involving in certain situations, folds of varicose hæmorrhoidal veins. These tumours, called piles, are met with externally around the anus, are liable to form within the outer fibres of the sphincter, but are most common within the intestine. Their habitudes vary in different situations, but in all they are liable to continual variations in their state. Originally the result of congestive action, when that subsides, they are often free from sensation, and pass unnoticed by the patient; but they are ready at any moment to become angry, to increase in size, and to participate in the uneasiness attending the first kind, or simple congestion.

The third set of congestive disorders of the rectum, comprises the varieties of hæmorrhoidal bleeding. There are four great features predicable of congestive hemorrhage: it may be vicarious, it may be periodical, it may tend to the relief of general or local plethora, it may be simply debilitating.

1. Hæmorrhoidal bleeding is seldom vicarious. It is almost a normal phenomenon indeed in certain persons, and instead of having to divert it back to another channel, it is sometimes an object to bring the disorder back to this part; as for instance, when pulmonary hemorrhage has already occurred, or when there are threatenings of apoplexy after the suppression of hæmorrhoidal bleeding.

2. Consistently with the position in which the preceding remarks place hæmorrhoidal congestive bleeding, it is occasionally periodical. But this is a phenomenon confined to the male sex. It is not so frequent in England as abroad. In Russia it is of common occurrence. Such a strange function it is obvious rather requires regulation than suppression; or the latter can only be thought of in connection with an entire change of habits in the patient.

3. As a vent to general or local plethora, hemorrhage from the rectum is of some moment, and it is not to be hastily suppressed by art, till it is clear that no other organ will become embarrassed by its arrest. In four cases out of five, however,

It is an overloaded abdominal circulation, which is availing itself of this vent, and in that case, by combining a change of diet with the use of mild aperient medicines, the employment of means for directly suppressing the bleeding is allowable. In countries where the habits of the people involve less exercise than those of the English, and at the same time food is taken in abundance, this form of constitutional relief may be of great avail, whatever local ailment or general disease the patient may labour under.

4. Hemorrhage to excess is, commonly, primarily the result of congestive plethora, which has afterwards been kept up by relaxation of the vessels, and in some cases by an attenuated state of the blood; directly lowering, it is especially apt to affect the nervous system, and may connect itself with a variety of anomalous and unexpected pains in remote parts of the body, such as spasmodic disorders, or hysteria.

It is obvious, from the simple enumeration of the phenomena and consequences of congestion, to how great an extent disorders of the rectum must be amenable to simple general treatment, consisting, namely, in regulated diet, exercise, ablution of the part with tepid or cold water, joined with continual attention to the due action of the bowels. Were these points regularly attended to, more than one-third of the whole number of hæmorrhoidal attacks would never occur; as it is certainly found in practice that as large a proportion, as has been stated, admits of being thus cured. But business and pleasure stand in the way of good resolutions, and in the doubtfulness of the event, men too often take their chance.

The phenomena of inflammation, which develop themselves in these parts, are of a minute character pathologically, but in practice they are often extremely troublesome; for inflammation seldom manifests itself except in the form of indolent phlegmon of the cellular tissue, and for the most part occurs in persons whose vigour and stamina are in some degree undermined. As a class, London tailors are especially liable to this form of hæmorrhoidal affections.

Every now and then this form of disease puts on an acute and graver character, and small or extensive phlegmons, in the immediate proximity of, and connecting themselves with, the rectum, occasion alarm from the attendant irritative fever or some casual complication.

In general, the phlegmon becomes an abscess before it is troublesome to the patient, and then only annoys him because it is slow to heal, and forms a sinus, with a disposition to extend and to multiply itself, burrowing in the lax cellular tissue around the rectum.

These cases present many varieties: fistula, with one opening, which may be either external or into the rectum; fistula, with an external and intestinal opening; the two conjoined; fistula of the rectum combined with urinary fistula.

The treatment of these cases is almost wholly local and mechanical. But regard must be had to the general state of the patient, who, as it has been mentioned, is generally in the reverse condition to that which occasions congestive disorder. The latter commonly has to do with plethora and strength, the other with temporary weakness or an undermined constitution. To reduce and cool the system is the common indication in the one case, to correct and invigorate in the other.

Malignant growths are a too common occurrence in the rectum. Incurable, they yet admit of great palliation—their diagnosis is important, but the rules easy.

After the broad physiological divisions of congestion, inflammation, morbid growths, the remaining features of hæmorrhoidal disease, have a narrower and more purely mechanical character.

The sphincter ani is liable to irritability, spasmodic action, rigid permanent contraction; to become irritable from soreness and ulceration of the membrane covering it; to be hypertrophically enlarged, and to oppose too much resistance to the parts above; to lose its expansile freedom, the anus then becoming a narrow rigid aperture. On the other hand, the sphincter is liable to be paralysed wholly or incompletely. The intestine itself is liable to displacement, either

its mucous membrane alone being thrust out in large hypertrophic folds, or the entire intestine being inverted, like the finger of a glove.

The intestine, like the other mucous canals, is liable to stricture.

The intestinal stricture is sometimes purely spasmodic, in other cases it has the character of a permanently indurated ring.

Finally, the rectum is liable to obstruction from the inordinate accumulation of fæces, to disturbance or lesion from foreign bodies, to laceration in labour, or it may have been originally incomplete and imperforate, or open by a wrong vent.

Of Inflammation of the Rectum.

The phenomena of inflammation which manifest themselves in connection with the rectum are referable to the two heads of erysipelas or phlegmon. Each presents remarkable subdivisions.

Erysipelas in this locality, as elsewhere, most frequently proceeds from an outward cause acting on a bad condition of body. The ordinary form of the attack is cutaneous. There is but trifling swelling of the cellular tissue. The skin is thick and heated, the redness ending at a defined irregular line, which rapidly extends itself. It is most frequently caused by piles which have become angry by imprudence on the part of the patient, or have been injudiciously disturbed by the surgeon. There is nothing special in the features of erysipelas occurring here; nothing special in its treatment.

Perfect quiet, the recumbent position, a diet of broth, the bowels relieved by a saline laxative, tepid fomentation, tepid bread and water poultices frequently changed. If there should be much heat, some swelling, brawny hardness of the swollen perinæum, a strong phlogistic disposition about the part, a longitudinal incision parallel to the raphe, an inch to an inch and a half in length, is required. Where there are heat and tension combined in erysipelas, incisions—sufficient, but

not too extensive—are eminently beneficial. The part is sensible of speedy relief, and looks cooler and freer from tension.

In phlegmon it is the exact reverse; prematurely cutting into a mass of phlegmonous inflammation is invariably injurious. It is not easy to account for this remarkable difference. Diffused, spreading cellular inflammation around the rectum appears always to proceed from some local cause, but it has to be treated irrespectively of it, as if it were a primary disease.

The rectum within the sphincter is liable to be pierced by ulceration. Not much is known of the mechanism of this event. It is commonly unsuspected, till a result appears, and the commonest one is an internal fistula communicating with the bowel alone. But sometimes this appears to form the source of diffused spreading cellular inflammation of the part; perhaps the immediately exciting cause may be some escape of fæcal matter into the cellular tissue, and acting like a violent irritant. Then there is a great and rapid swelling of the perinæum of the part of the nates immediately adjoining of the scrotum, penis, and pubes. The lax cellular texture is distended and tense with serous effusion. The skin is tight, red, and shining. In twenty-four hours partial sloughing of the integuments commences in the scrotum and penis. Joined to this is considerable constitutional disturbance. The tongue furred, the pulse frequent, loss of appetite, vomiting, perhaps shivering, followed by symptomatic inflammatory fever. The state of things is like that which ensues upon rupture of the urethra. That this has taken place is the first impression on seeing the parts; but we learn that the patient has had no stricture previously, and before and now makes water without difficulty. Of course the complication may present itself of moderately severe stricture of the urethra, not enough to produce rupture or ulceration behind it, with diffused cellular inflammation occurring altogether from another cause. To the possibility of all such combinations in serious cases the surgeon must always keep his attention awake. However, for the first and immediate treatment of the case, there is no

necessity for making up one's mind as to its exact cause. There is but one practice to follow whencesoever the affection may have originated to prevent troublesome destruction of the integuments by sloughing. In the perinæum, in the swollen scrotum, in the distended cellular tissue of the penis, incisions must be made that will give free issue to the distending fluid, and relief to the tense and inflamed vessels. The incision in the perinæum will inform him pretty certainly of the source of the acrid injection of the cellular tissue. Either a urinous or fæcal smell will attach to the fluid that comes out, and show what has been the source of the irritation.

Phlegmonous inflammation about the anus and rectum is again either superficial or deep seated, and in either case may present varieties of an acute or subacute character.

Acute deep-seated phlegmon of the perinæum menaces indifferently the urethra or the rectum, or it may implicate both. If it arise from positive irritation in the urethra, it is most likely to open a passage by ulceration into that canal; if the urethra be sound, the rectum stands in greatest danger of this subsequent lesion.

The attack is marked by indisposition, thirst, feverishness, irritability, uneasiness in the perinæum, which is sore when pressed; little external swelling, no inflammation of the integuments. There is more tenderness on pressure than belongs to inflammation of the prostrate gland; nor is there the vesical irritation, nor the peculiar sensations in and after making water, which attend inflamed prostrate. But the patient is more uneasy daily; there may be wandering at night, restlessness, with very frequent pulse, and very considerable constitutional disturbance. Quiet, the recumbent posture, fomentations, liquid diet are resorted to; leeches applied, may temporarily alleviate the deep-seated wearing uneasiness. A lancet, plunged prematurely into the nidus of phlegmon, only makes matters worse; but the instant suppuration has begun, this step cannot too soon be taken; if half a teaspoonful of matter only escapes, the patient is conscious of extreme relief. What has given its irritable character has

been the compression of the deep-seated phlegmon by the perinæal fascia; yet, as was said before, it would not have done to have pierced this before suppuration had commenced, but as soon as that process is in action, there is something, which in the order of Nature requires a vent; and then the integuments do not resent being thrust through by the lancet.

The difficulty is to know the right time for this operation, which, rightly done, entirely relieves the patient, who is progressively better every half-hour afterwards. There are some general signs:—if a rigor has taken place, if the character of the pain has altered, and become occasionally lancinating, every now and then a single throb shooting through the part, instead of the uninterrupted dull aching; and finally, if the surgeon, by tight pressure and counter-pressure with two fingers, can detect, though obscurely, a sort of deep-seated elasticity, then he is to risk plunging a bistoury, or a lancet up to the shoulder, towards the supposed suppuration. The examination through the rectum by the finger will help to decide as to the nature and condition of the case, and the depth and direction for the introduction of the lancet. A small piece of lint dipped in oil should be left in the opening of the skin, and poultices continued to encourage the reduction of the inflammation, which in favourable cases speedily disappears; but the patient is to be kept perfectly quiet and cool in body, to secure his primary recovery, and to prevent after consequences.

Deep-seated, indolent phlegmon about the rectum is generally not identified till extensive suppuration has taken place, and the rectum lies in a bag of pus. Not but there have been general symptoms, but these have not been traced to the local cause, which has been attended with quite incommensurate local symptoms. The patient is feverish or ill with headache, perhaps delirium, or his general indisposition may be slight, in time something unusual is mentioned as felt about the perinæum, and the surgeon called in discovers sensible fluctuation around the whole circumference of the sphincter. The case is clear. The abscess must be opened by a puncture with a tolerably broad lancet on both sides of

the sphincter, a vast quantity of offensive matter finds vent, and the patient is better directly.

The point is to get the abscess to close rapidly. This is done by letting the matter have free vent, which is to be obtained by the place and direction of the two or three lancet incisions, not by any great incision. A free incision in such case will take weeks to heal in the flabby state of the parts. Rest is to be observed, but the patient wants sustenance and nourishment.

Hæmorrhoidal Tumours.

THE first treatise that the author published on hæmorrhoidal tumours was in 1848. The plan of treatment then advocated has stood the test of time and a wider and more matured experience, and its intrinsic value has been appreciated by a large class of the profession, both here and on the continent.

The idea of treating piles with nitric acid originated with Mr. Houston, and from the success obtained by him in the treatment of the vascular tumours of the rectum, the author was induced to try this remedy in other kinds of piles. A practical experience of 18 years brings the daily conviction that no other plan ensures an equal amount of safety and ultimate recovery to the patient. Besides Mr. Houston, the author has to acknowledge much valuable information derived from the lectures delivered by Sir B. Brodie, and from the late Herbert Mayo, with whom the author had the advantage of an intercourse of several years duration.

ON THE SURGICAL TREATMENT OF HÆMORRHOIDAL TUMOURS.—In the year 1843, Dr. Houston published an article in the *Dublin Journal of Medical Science*, advocating the use of strong nitric acid in two kinds of hæmorrhoidal affections.

The first of these, is described as a sort of aneurism by anastomosis of the small vessels of the mucous membrane and submucous cellular tissue; the second, as of a chronic inflammatory nature, and best illustrated by comparing it to

the red, villous, tender, hæmorrhagic surface exhibited by the mucous membrane of the eyelids in old cases of chronic conjunctivitis.

The direct application of the nitric acid to these vascular tumours, Dr. Houston was led to believe, combined in itself all the advantages possessed by excision or ligature, without any of their disadvantages. "The diseased surface," he says, "may be removed with little pain, and without danger; and in the cicatrisation which follows, a radical cure is effected. Nor do the good effects stop here: not only is a reparation of the worst part of the affection directly accomplished by this means, but in consequence of the bracing up of the general mucous membrane which follows the removal of the relaxed and diseased part of its surface, other varices which are present are supported and reduced in bulk. These secondary good results may be regarded as not the least important which take place."

Besides the two classes of affections above-mentioned, Dr. Houston mentions that he had reason to believe that the use of the strong nitric acid might be beneficially employed for the removal of dilations of the larger veins of the bowel, sometimes connected with these vascular tumours.

Soon after the appearance of Dr. Houston's valuable paper, acting upon the hint thus afforded, the author was induced to try the effect of the local application of the strong nitric acid to other kinds of hæmorrhoidal tumours; and in 1848 he published some cases and observations, showing the applicability of this mode of treatment to various kinds of hæmorrhoidal affections, and especially to such as were connected with a relaxed condition of the mucous membrane of the rectum.

From the experience which he then had he was led to make the following observations. The benefit derived from this plan of treatment must not be expected till the small ulcers made by the caustic begin to heal. The loose folds of mucous membrane are then drawn upon, and the whole of the mucous lining is rendered more tense. Each small cicatrix, moreover, serves as a permanent point of attachment for

relaxed membrane, and consequently the inner coat which alone descends in such cases) is retained permanently contact with the other coverings of the bowel.

The degree of pain experienced in this operation depends a great measure upon the way in which the nitric acid is plied. The sensibility of the thin skin around the anus is ry great; and if the acid be allowed to come in contact tth it, the degree of pain is very considerable. If care be ken, on the other hand, to confine the application of the id to the comparatively insensible mucous membrane, exemely little pain is caused. Nitric acid should never, therere, be employed in cases of external hæmorrhoids, both cause of its painful action on the skin, and because it is tt the remedy required, that being excision by the knife or ssors.

In the application of nitric acid to hæmorrhoidal tumours, e degree of irritation experienced in some measure depends on the extent of surface involved in the operation. When, erefore, a considerable amount of the mucous membrane sscends with the tumours, it is desirable to select certain rtions, to which the application of the acid should be nfined. The action of the acid may be limited, either by plying a small quantity at a time, or by shielding the surunding surface with a paste made of chalk and water.

The best mode of effecting this object is, however, to pply the nitric acid through a small speculum with an erture in its side. Through this aperture the mucous embrane or pile will protrude, and may be effectually stroyed. As soon as this is accomplished, the surface ould be smeared with the paste made of chalk and water, d the speculum withdrawn. So little inconvenience does is give, that the patient is generally not aware that the id has been applied.

Every portion of mucous membrane to which the acid ttends should be as completely deprived of vitality as posble, since the degree of pain experienced will necessarily pend upon the remaining sensibility of the parts.

Unless these conditions are observed, the application of

nitric acid, or of any other caustic, to the mucous membrane of the rectum, may prove as serious an operation as that for which it is intended as a substitute.

The acid used in such cases should be the strongest that can be procured. That which is usually kept by chemists under the name of the strong nitric acid does not effectually destroy the surface to which it is applied; and when used, it therefore produces more pain than the strongest acid, and cannot moreover be so certainly relied upon to accomplish the intended purpose.

A not uncommon and convenient way of applying nitric acid, when the tumours can be protruded, is to encircle their base with an instrument which will at the same time hold them in their situation, and make sufficient pressure to prevent hemorrhage in case they should be disposed to bleed. If the parts cannot be protruded, the same object may be gained by a speculum inserted within the bowel. If necessary, any portions of the hæmorrhoidal tumours, or of the mucous membrane, may be removed with a pair of curved scissors, and the cut surfaces immediately wiped dry, and touched with the acid. If the application of the acid be made before any bleeding has taken place, the blood in the divided vessels will become coagulated, and the vessels permanently sealed.

Care must be taken in performing this operation, when any portions of mucous membrane have to be excised, that the pressure completely commands the hemorrhage; for if any blood escape from the part it will become mixed with the acid, and thus prevent it from effectually acting upon the surface to which it is applied. The instrument devised by the author in 1848 for restraining the hemorrhage under these circumstances, and for holding the prolapsed tumour in position, consists of two parallel curved plates of steel, with their internal edge slightly indented. These are connected together at their extremities, and by means of a screw or spring may be made to exert the exact degree of pressure required.*

* The instrument described by M. Jobert, in the "Gazette des Hôpitaux" of the 1st October, 1853, is a modification of the above, a description of which was published in 1848.

'There is a large class of cases which generally pass under
e common name of piles, which have not an inflammatory
gin, and are not connected with any particular enlargement
the hæmorrhoidal veins. In the instances alluded to, the
convenience arises from portions of the relaxed mucous
mbrane becoming inverted and griped by the muscular
ces situated at the lower part of the rectum.

'The insensibility of the mucous membrane in this com-
int frequently causes the symptoms to be referred to the
ghbouring parts, and therefore the disease may exist with-
; being recognised. A patient will complain of a dull pain
er the sacrum, or a heavy aching pain in the perinæum,
ich neither he nor his surgeon can satisfactorily account
.. In the course of time, some other symptom presents
lf, which draws attention to the rectum. The usual
ernal remedies for piles may now be administered, but
se are found to produce no ultimate benefit, since the
ease depends upon a mechanical cause.

A gentleman had for a long time experienced pain on the
side of his heel, and for this he had tried in vain different
ds of remedies. He suffered also from piles, which were
ectually cured by the application of the strong nitric acid.
e pain in the foot now entirely subsided, and did not
urn. This gentleman was a medical man, and had no
ubt that the pain in the heel had all along depended on the
es.

A lady has for a period of three years suffered from most
tressing pain around the lower part of the back and down
outside of left thigh. The pain would come on often
night, and last for hours. She was never sure that she
uld have a day's ease. She had suffered from piles, and
on making an examination in November, 1865, I found in
dition an internal fissure. The local disease was cured,
d the pain which had tormented her so long was entirely
ieved.

In cases where the mucous membrane of the rectum has
quired an habitual disposition to "bag," it frequently
ppens that no medicine applied either generally or locally

will afford relief. The loose folds of membrane, which may or may not be connected with hæmorrhoidal tumours, will descend again and again, and sometimes keep up irritation in the part for years.

Permanent relief in such cases can only be afforded by such means as tend permanently to brace the mucous membrane of the bowel. The simplest, as well as the most efficacious method of accomplishing this, is to remove one or two longitudinal folds of mucous membrane in the same way as above recommended for the removal of hæmorrhoidal tumours. It is not necessary to remove the precise portion of membrane which has been protruded. The destruction of any portion after the wound has healed will have the effect of bracing the remainder. In this, as in the operation for hæmorrhoidal tumours, it is the process of cicatrisation which cures the disease.

These observations, published in 1848, have been fully confirmed by increased experience.

The use of local caustics in hæmorrhoidal affections, great as it is, has been exaggerated unfortunately, so that the application of strong nitric acid has now become very general, and there appears at present some danger that this very useful remedy should be brought into discredit by its indiscriminate application. It is essential, therefore, that we possess a clear knowledge of the class of cases in which this agent is alone required, as well as of those in which it will not prove effectual.

A distinction may be drawn between the different kinds hæmorrhoidal tumours founded in their different anatomical characters. Thus, there is the red, highly vascular, spongy tumour, composed of small arteries and arterial capillaries: the larger, bluish swelling, mainly composed of dilated veins. Sometimes these two forms are combined in the same swelling, which is at one part chiefly arterial, at another venous. Indeed, as the structural characteristics are themselves continually undergoing changes, such a distinction is of comparatively little practical value. We may roughly contrast the leading features of these two varieties. The first is most

equent in young persons. It is more sensitive, and more sposed to bleed. The second is more common in middle-ed persons. It is liable to spontaneous coagulation of the ood within the vessels, or rupture of their coats, effusion of ood into the cellular tissue and below the mucous mem-ane; to attacks of inflammation, which may be acute, or to chronic inflammatory action and the effusion of lymph, hich induces hypertrophy and condensation of all the uctures.

The nitric acid, as Dr. Houston's remarks indicated, is eminently adapted for destroying the bright fungous-king growth, which is readily extruded, and so often seen young people.

'The cases which are met with in practice are perhaps re simply and conveniently divided, for the purpose of atment, into those which bleed, or are composed of a soft cular substance; and those which do not bleed, or are med of firmer tissue.

1. For the first of the two classes of cases, the application the nitric acid is an excellent remedy, and in the great jority of instances no other means of surgical treatment required. The nitric acid, when applied, penetrates the stance of the tumour, and produces its effects as described Dr. Houston, either by causing a superficial slough, or by iterating the vessels of the part. It possesses the great vantage of giving little or no pain if properly applied, of requiring the confinement of the patient, and of being ffectly safe.

'The following cases, from the author's note-book, afford strations of this mode of treatment.

(Case I.—T. F., aged 42, residing in Belgrave Terrace, ne under treatment on the 25th of July, 1847. He stated t he had been affected with piles ten years, and had, ing that period, suffered much pain in the part; so severe, t it occasionally kept him in bed for a month or two ether. Ever since the first appearance of the piles, he . been subject to repeated attacks of hemorrhage. Two rs before the author saw him he had had the piles tied.

This afforded him temporary benefit, and he remained tolerably well for six or eight months. He had also tried, both before and after the operation, various sorts of remedies, consisting chiefly of ointments and lotions, but none of these gave him permanent relief.

In July, 1847, he was suffering so much pain that he was unable to sleep at night. He experienced a constant sense of weakness about the pubis; a frequent desire to pass urine, and, occasionally, a degree of irritation such as to unfit him for any exertion.

At the time that the piles were tied, he was under the care of a well-known surgeon, who had devoted his attention almost exclusively to this branch of surgery. He experienced so much pain from the operation, that he expressed himself most unwilling again to subject himself to any similar treatment.

Upon examination, a cluster of internal piles could be detected, and might be seen protruding through the external orifice. As he continued to lose much blood, and a considerable portion of mucous membrane occasionally protruded, the strong nitric acid was applied on August 2nd to one of the most vascular and protruding tumours; and as this produced no inconvenience, a more free application of the acid was made a few days afterwards, so as to destroy a considerable portion of the protruded mucous membrane. After the operation, upon each occasion, the parts were replaced in their natural position. The continued loss of blood had at this time produced a visible alteration in this patient's health: he had become very pale, and languid, of a sallow hue, and constantly complained of depression and weakness. He was now directed to go into the country, and he was ordered some quinine and sulphuric acid. Not to enter into tedious details, I may add that on April 1st, 1850, he had continued free from hemorrhage, and remained well, with the exception of a slight occasional bearing-down pain. He said that he now felt quite another man, and could attend without interruption to his business, which formerly he could never do for long together. In the summer of the year 1854, he had some slight

urn of hemorrhage, but not sufficient to require any further gical treatment.

(CASE II.—S. D., aged 31, came under the author's notice November, 1850; about four months previously, she first perienced irritation and pain in the situation of the rectum er walking or riding. This was accompanied by a very comfortable sensation of bearing down. About a month er the first appearance of these symptoms she first had morrhage from the bowel. The blood passed was fluid, ll came only with the motions. The quantities discharged dually increased, and soon appeared whenever she passed motions or water. She would occasionally, at these es, lose as much as a quarter of a pint at a time. From s; cause she had become extremely weak and exsanguine.

(On introducing the speculum into the rectum, a tumour sented itself on the right side. Immediately above this s a transverse ulcerated fissure, from which the blood was n to spurt across the speculum in a single continued am. This fissure was so situated that any descent of the morrhoidal tumour would necessarily draw upon and sepae its edges. The tumour and the fissure above it were ched with the strong nitric acid on the 14th of November.

November 22nd.—She had had slight hemorrhage the ond day after the operation, but since that day she had not ceived any. She was now feeling stronger, and had imved in her general appearance.

December 17th.—She had had no hemorrhage since the t; report, and had regained her usual health. The bowels re now quite regular, and the motions passed without pain inconvenience.

'This and the following case seem to afford satisfactory dence that in severe hæmorrhoidal affections the bleeding y occasionally come from a single vessel, although, doubts, in the great majority of instances the blood is poured from the general surface of the tumour. In either case disease is effectually remedied by the application of the ong nitric acid.

CASE III.—H. S., aged 42, was sent to the writer by

Dr. Guy as an out-patient at King's College Hospital, on August 26th, 1852. He then stated that he had been troubled with hæmorrhoidal tumours for twelve months, and that for eight or ten months he had lost a large quantity of blood. In consequence of this continued hemorrhage, he had become completely blanched and very much out of health. Upon examination with the speculum, a vessel was seen pouring out blood *per saltum*. The strong nitric acid was applied to the part whence the bleeding proceeded, but the continued flow of blood swept the acid away as fast as it was applied, so that the operation could not be satisfactorily performed.

August 30th.—He experienced a good deal of uneasiness after the application of the acid. This probably depended upon some of the acid having become mixed with the blood, and having in consequence become diffused over the mucous surface.

The bleeding had not stopped, but the blood passed was greatly diminished in quantity. The lower part of the bowel still felt sore, and it was therefore determined not at that time to repeat the application of the nitric acid.

This was, however, done upon the 9th of September.

13th. The bleeding had now ceased.

Oct. 1st. He had had no bleeding since the last report. There was now no tendency to prolapsus, nor any other local inconvenience.

1853. April 18th. He remained quite well.

This patient has completely regained his health and strength, and he has not, so far as the author knows, suffered any return of his local inconvenience up to the present time.

During the last eighteen years the author has applied the strong nitric acid to a variety of hæmorrhoidal tumours; and, as a very general rule, he has found that it has completely and permanently prevented the recurrence of hemorrhage; and that, where this symptom has been the only, or the principal one, which caused distress to the patient, no other remedy has been requisite to cure the disease. He has also very generally found that where other inconveniences besides

morrhage have been present, and the mucous membrane not become changed in character, and hardened (as is metimes the case, either from constant exposure, or from eated attacks of inflammation), the application of the ong nitric acid has been alone sufficient to remove the plaint.

When nitric acid is applied to a portion of mucous membrane which has undergone no material change in structure, permeates the tissues to a certain depth, in the same way other fluids do when applied to an internal surface of the dy. This subject may be well illustrated by the following amples.* If half an ounce of acidulated water is introced into the pericardium of a dog killed twelve hours fore, and warm water is injected in a continued stream rough the coronary arteries, so as to flow into the right ricle of the heart, in four or five minutes the water gives equivocal evidence of containing acid.

If a drop of ink is placed upon the peritoneum of a living g, it sinks into it and forms a large circular stain, which at tt is confined in depth to the serous membrane.

In an animal that had been killed by the wound of a ranese poisoned arrow, the parts around the wound became a brownish-yellow colour for the depth of several lines, l. took the bitter flavour belonging to the poison.

In opening the abdomen of an animal some time after tth, the parts adjoining the gall-bladder will be found to deeply tinged with bile. In all such instances, an imbibin takes place of the fluid, which infiltrates the tissues of part. Nitric acid, when applied to a mucous surface, acts a similar manner ; it permeates the membrane at the part ched, and partly by its direct action on the living tissue, l partly by coagulating the blood in the veins, it comtely destroys its vitality. The action is under ordinary umstances confined to the mucous membrane and the ssels which supply it. The acid does not penetrate deeper m this ; and, consequently, its effects being thus limited in

* Mayo's Physiology, p. 81.

depth, may be regulated with the greatest nicety, according to the extent of surface to which it is applied.

This operation, properly performed, the author believes to be perfectly safe; for, although cases have been recorded in which very unpleasant symptoms have arisen after the application of the nitric acid, yet, never having witnessed any such, except in cases where the acid had been injudiciously employed, he is led to conclude that such symptoms may be attributed to the rules concerning the use of this remedy, already laid down, not having been observed.

II. The cases in which the use of the nitric acid alone has not proved successful, are those in which the mucous membrane has become thickened, and the subjacent parts infiltrated with lymph, as the result of repeated attacks of inflammation; and those in which the mucous membrane from long exposure has become hardened and altered in structure. The first of these orders of cases is met with usually in the comparatively young and plethoric; the second, in patients of a languid temperament, or advanced in life. The acid, when applied in such instances, does not fairly permeate the structure of the mucous membrane; it usually removes a superficial layer only, which is soon replaced, and the diseased parts are left in much the same condition as before. These observations are illustrated by the following cases:—

Case IV.—A lady, of full plethoric habit, and of a florid complexion, who had had several children, wished something to be done for some piles, which had caused her some inconvenience for a considerable time. The tumours were found to consist of firm, solid, oval masses, of a bright red colour, covered by the smooth mucous membrane near the margin of the anus. The tumours were touched with the strongest nitric acid in the usual way. At the expiration of a fortnight, they were found to be in very much the same condition as before the acid had been applied.

Case V.—A clergyman, between 70 and 80 years of age, but in good general health, complained of the constant inconvenience attending a partial prolapsus of the mucous mem-

rane of the bowel, and a constant discharge of a brownish uid, which discoloured his linen. This affection had lasted r several years.

Upon examination, the mucous membrane was found ightly livid, perfectly smooth upon the surface, and possessg very little sensibility. It was touched in the usual way ith the strongest acid. The operation gave no particular ain. A week after, this patient again applied, and it was vident upon examination that the parts were in much the me condition as before the operation. The acid was again pplied as before, and the patient allowed to return home to the country. A few weeks after, the author heard from is gentleman that his inconvenience had not been relieved, nd it became a question what more effectual remedy could e had recourse to.

Case VI.—A medical man, advanced in life, consulted the riter on the 27th October, 1851, in consequence of the inconenience he had long experienced from a protrusion of the ucous membrane of the bowel, accompanied by a constant ischarge. The complaint had existed for many years. pon examination, a smooth pouch of mucous membrane as found projecting on each side. The membrane was uite smooth, little vascular, and possessed little sensibility. t was touched with the strong nitric acid in the usual anner. This gentleman, who came from Wales, the author ad an opportunity of seeing some months afterwards. He en stated that although relieved, he was not cured, and ought that "something more might be done." The caustic as applied a second time, but still, as was subsequently arnt, with but partial success.

In such instances, the mucous membrane, by repeated ttacks of inflammation, as in the fourth case, or by long xposure, as in the fifth and sixth cases, becomes altered in tructure. It has no longer its villous character, and presents perfectly smooth surface. It gradually loses its natural ensibility, becomes possessed of comparatively little vascurity, and occasionally is found covered with cuticle. The pplication of nitric acid under these circumstances does no

harm; but for the reasons above mentioned, it does not act sufficiently upon the parts to produce a cicatrix. Its use is consequently apt to lead to disappointment, and to bring a most useful remedy into disrepute.

Whenever there is reason to believe that the application of the nitric acid alone will not act sufficiently upon the mucous membrane, the plan which the author has now for some time adopted is as follows:—The affected parts are first made to protrude, and then embraced by a broad forceps, made upon the plan of the instrument described by him in 1848.

With this instrument the prolapsed part is seized, and such a portion of it as may be deemed expedient is cut off on the side of the "clamp" next to the operator with a curved knife made for the purpose. The cut surface is then touched with the strong nitric acid, or with the actual cautery. The parts are returned into their natural position, and the operation is completed. This plan is equally adapted for the removal of hæmorrhoidal tumours, and the excision of portions of relaxed mucous membrane, where no hæmorrhoidal tumours apparently exist. The forceps retain their hold of the base of the prolapsed part after the requisite portion is removed. The cut surface is thus prevented from either bleeding or retracting, and it is held in a convenient position for the application of the cautery or caustic. This application is as essential a part of the operation as securing any bleeding vessels is after an operation in any other part of the body.*

When the parts cannot be sufficiently protruded to be conveniently seized by the forceps, the author has then performed the operation very satisfactorily in the following way:—A rectum speculum has a slide upon one side which may be removed; this is made to fit accurately into grooves on each side, so that by being withdrawn to a greater or less

* The following is the description of the author's instrument published in the "London Medical Gazette" for 1848:—"The instrument which is best adapted for restraining the hemorrhage under these circumstances consists of two parallel curved plates of steel, with their internal edges slightly indented, so as to fit each other when they are brought together; these two plates are connected at each end by a small cross bar, to which a screw is adapted so as to produce the exact degree of pressure required."

ent, a corresponding aperture is left in the side of the trument. When the speculum is introduced, the slide is ttially withdrawn, and the instrument moved about until tumour, or the portion of mucous membrane required to removed, projects into it. The slide is then closed, and tumour is firmly held between it and the rest of the trument; the projecting portion may then be cut off within speculum by a long narrow knife, and the cut surface ched as before with the actual cautery, or with the nitric ll. Or in case it should be deemed advisable to remove a gitudinal portion of the mucous membrane, the operation y be varied as follows:—The speculum, instead of being dle single, is made double; that is, there is one speculum hin another, so arranged that the outer one will revolve on the inner. Each part has an oval aperture at its side; en these apertures correspond, a tumour, or portion of xed mucous membrane, will readily project into the specu-n. When the part to be removed has thus passed through corresponding apertures, the different portions of the trument are made to revolve upon each other, and thus the erture is diminished, until the condemned part is embraced ween its opposite sides. Being thus firmly held, the ope-ion is completed as above described.

All the instruments above mentioned, are made by Matthews, of Portugal Street; and although they are y simple now that they are finished, yet a considerable ount of time and patience have been required in order to them adapted to their intended purpose.

CASE VII.—R. H., aged 39, of sedentary habits and swarthy mplexion, applied to the author in the summer of 1852. stated that he had suffered from piles for ten years. ring the whole of that time, he had passed blood when he nt to the water-closet, and for the last four months he had ffered much pain after each evacuation. A considerable rtion of the mucous membrane projected whenever he ained, and this was always followed by an uneasy sensa-n, which lasted for some hours. As the bleeding in this e, although considerable, did not form the principal feature his complaint, and as it was probable that, even if this

were arrested, the protrusion of the mucous membrane and consequent inconvenience would continue, it was resolved to remove a portion of the prolapsed membrane. For this purpose, the patient was placed under the influence of the monochloruretted chloride of ethyle, by Dr. Snow, on the 24th of June. A portion of the protruding mucous membrane was removed in the manner above described, and the cut surface was touched with the strong nitric acid.

July 7th. For the last four days, the pain had entirely ceased. He said that he now felt "quite a new man." He had no inconvenience or protrusion after a motion.

July 21st. He felt quite well; had had no return of pain or bleeding, or other inconvenience.

This patient sent a friend of his to me in the early part of the autumn of 1853; and he had not then experienced any return of his complaint.

Case VIII.—E. S., aged 50, a widow, had been subject to piles, accompanied by occasional slight discharge, for twenty years. During this time, she had been habitually somewhat costive, but her general health had been good, with the exception of a feeling of weakness, caused by repeated loss of blood during the last two or three years. This patient had come under my care in the summer of 1852. The hæmorrhoidal tumours were then touched with the nitric acid; but no details of the case were then preserved.

She again applied to the author on the 5th of December, 1853. She then stated that she had derived temporary relief from her previous treatment, but that her symptoms had subsequently returned.

Upon examination, a thick fold of hypertrophied mucous membrane, covered with cuticle from long exposure, surrounded the margin of the anus. Altogether, this formed a mass the size of a pigeon's egg. Upon separating its different portions, the membrane internally was seen to be quite smooth, little vascular, and covered by a thickish mucopurulent secretion. A portion of the hypertrophied mucous membrane on each side was seized with a clamp, and removed with a sharp knife, bent laterally. The cut surfaces were

then touched with the actual cautery. No narcotic was used in this instance.

Dec. 7th. She was suffering no pain, and appeared quite comfortable. There was no fever. Her circumstances required her to walk a short distance from her home, which she did without inconvenience.

Dec. 12th. There was a little local pain, accompanied by slight discharge, and some bearing down after a motion. No fever.

Dec. 28th. She had a little smarting, but had suffered no other pain since the last report.

The wounds were now all but healed, and the portions of hypertrophied mucous membrane not removed were daily diminishing in size.

Feb. 1st. She had felt no inconvenience since the last report. There were some small remains of the flaps of hypertrophied mucous membrane, which had been left on each side of the rectum, but these had assumed a healthy appearance. The discharge had ceased, and she felt herself quite well. In this instance, the period of recovery was unusually long, owing probably to the great thickening and alteration which had taken place in the structure of the protruded membrane.

Case IX.—J. W. came a second time under the author's care at King's College on the 30th of January, 1854. Six years previously, he found that he habitually lost a considerable quantity of blood when at stool, and for three or four years he had suffered from occasional prolapsus of the bowel. Soon after this symptom had appeared, he applied at the hospital; but there were then general considerations which induced me to recommend him not to have anything done to the piles. After this, he went to America, and returned in very good general health. The bleeding had now entirely subsided, but the inconvenience attending the prolapsus still continued.

Upon examination, an oval, red, solid tumour, irregular upon its surface, and about the size of a large strawberry, was seen projecting from between some thickened and

hypertrophied folds of mucous membrane. The parts presented little sensibility to the touch, and were not disposed to bleed. Whenever the tumour descended, it caused a dull heavy pain, occasionally, as he expressed it, of a "dragging" character.

On the 1st of February, the oval tumour was seized with a clamp, and removed. The cut surface was immediately touched with the actual cautery. Portions of the hypertrophied mucous membrane on each side were treated in the same way. Upon removing the clamp, the hemorrhage had entirely ceased. *The patient being deaf, and having his face averted during the operation, was not aware that the actual cautery had been applied.* He complained of the pain caused by the removal of the tumours, but was not conscious of anything else. He walked home, and was desired to keep still during the remainder of the day.

Feb. 3rd. He said he was a great deal better. He experienced slight shooting pain now and then in the part, and felt a little sore when he walked. There was no fever; he felt quite well in himself; and his appetite was "first-rate." Some folds of the thickened mucous membrane around the anus, which were not removed, had assumed a healthy appearance.

Feb. 6th. He came regularly to the hospital as an out-patient, without inconvenience.

Feb. 8th. He had suffered some pain on account of the action of purgative medicine. There was now no discharge from the bowel, and no prolapse upon going to the water-closet. The folds of thickened mucous membrane which were left had become generally reduced in size, and the whole surface was assuming its natural healthy appearance. The wounds left, in consequence of the removal of the lower folds of thickened mucous membrane, were much smaller, but not yet healed.

Feb. 10th. In his own words, the patient felt "very well indeed;" he "walked more than twenty miles" on the previous day, to "Hounslow and back." There was no pain, but slight itching. Upon examination, the little wounds were not quite healed, but looking quite healthy.

This mode of operating, the author has now put in practice a considerable number of times in the treatment of hæmorrhoidal and other kinds of tumours. It possesses the great advantage of allowing the surgeon at once to remove any part that he may wish, and of enabling him at the same time completely to control the hemorrhage. It also furnishes him with the means with certainty of preventing the occurrence of bleeding after the operation. The difficulty of accomplishing this, as is well known, has prevented surgeons from employing excision of late years for the cure of hæmorrhoids. M. Dupuytren, who advocated excision in these cases, on account of the pain and inconvenience attending the usual mode of operation, nevertheless confesses that hemorrhage to a serious extent occurred in two-fifths of the cases upon which he operated, and in which no means had been taken to prevent subsequent bleeding. By the means now recommended, the great and only objection to the excision of hæmorrhoidal tumours is removed. In the cases upon which the author has operated, he has found occasionally that some hemorrhage has continued after the cut surface had been touched with the nitric acid; but in no case has there been the least inconvenience from this source where the actual cautery had been employed.

The pain of the actual cautery is in a great measure prevented by the natural insensibility of the mucous membrane to pain, and the numbness produced in the part which is held by the clamp. Chloroform may be used if the patient be nervous, or the pain may further be very much relieved by freezing the tumours, or the portions of mucous membrane, before they are removed. This may conveniently be done by applying to them for a minute or two a ball of iron, which has previously been left in a mixture of pounded ice and salt.*

It is only when operations involve the skin, such as the excision of external piles or redundant growths of the external integument, that there need be any apprehensions about the pain.

* This is a modification of the plan proposed by Dr. James Arnott.

The advantages of this operation, as compared with others employed for the cure of hæmorrhoidal tumours, the author conceives to be :—

1. That, where the application of the strong nitric acid alone is not sufficient, it is less painful than any other means equally efficacious.

2. That it is safer than the common operation now in general use.

3. *That it requires less confinement, and the patient is sooner convalescent, than after an operation with the ligature in the ordinary way.*

Each of these points requires a brief consideration.

1. The pain caused by the application of the ligature to a hæmorrhoidal tumour may be divided into that which is felt during the operation, and that which is subsequently experienced. That produced during the operation is caused in a great measure by the forcible dragging upon the part during the time the ligature is being tightened. It is very difficult during the operation for the surgeon to get his hand on the same plane as the protruded bowel. The necessary consequence is, that the ligatured portion of mucous membrane is drawn out to a level with the hands. The inconvenience produced by this "dragging" upon the intestine is altogether obviated by the operation now under consideration. The hæmorrhoid may be removed, if necessary, without even being protruded through the external opening. The pain and irritation caused by leaving the ligature upon the part to be removed is also dispensed with.

2. Although the ordinary operation for hæmorrhoidal tumours is reckoned safe, yet instances every now and then occur in which very severe and even fatal effects follow. Sir B. Brodie mentions having, in his own very large experience, had three fatal cases. The writer has himself had the opportunity of dissecting the parts after a fatal result in three other instances, where the operation had been performed by the most able and cautious surgeons of the day: In two of these instances, secondary deposits had occurred in internal organs, and in the third there were symptoms of

lood poisoning during life, and an open vein of some size as found after death, leading directly from the wound aused by the operation. When the base of a hæmorrhoidal umour is transfixed with a needle, any large vein which it ay happen to contain is necessarily liable to be wounded; nd if, after this is done, each half of the tumour is included n a separate ligature, it is extremely likely that the sides of uch a vessel would be held open. This circumstance, in the ubsequent stages of the complaint, would, as far as it goes, irectly favour the absorption into the circulation of the nflammatory products of the part. If, on the other hand, he whole of a hæmorrhoidal tumour is included in a ligature, here is a possibility that it may not be completely strangu-ted. The outer parts of the tumour may slough, while a anguid and partial circulation is continued in a conical ortion in its centre. The blood which there circulates hrough the tissues on the verge of mortification, but which ave not entirely lost their vitality, may become infected by he products of decomposition with which it comes in con-act, and may thus, being again received into the circulation, ecome the source of general disorder in the system. This oint is well illustrated by cases in which a ligature has been pplied to portions of the tongue. It has been found that, as lceration occurred in those parts directly subjected to pres-ure, the ligature has gradually become loosened. The cir-ulation has then again in some measure been restored in the entre of the ligatured part, and this has been followed by ymptoms of general constitutional disturbance.

After the application of a ligature to a large tumour in ny part of the body, such a partial restoration of circulation ay take place. There is no distinct and immediate line of emarcation drawn between the living parts and the dead; nd it may be left to accidental causes to determine how uch of the tumour will recover its vitality, and how much f it will perish.

That a general contamination of the blood, from some ause or other, occurred in the three cases which the author ad an opportunity of examining, he cannot doubt; and he

believes that this source of danger would be entirely prevented by performing the operation in the manner which has now been described. The application of the actual cautery, while it prevents any blood flowing from the divided vessels, also prevents any vitiated fluids passing through them into the general circulation.

3. After the application of a ligature to a portion of mucous membrane, a process of ulceration is induced, and continues until the ligature separates. During this period no process of repair can be commenced. At the time the ligature falls off, the surgeon will often be surprised, if he happens to see the part, at the size of the wound which is left. By the process of ulceration it is rendered much larger than it would have been by the simple removal of the hæmorrhoidal tumour.

After excision of the tumour, and the application of the actual cautery, no cause of irritation remains. The operation is complete, and the process of repair at once commences. The wounds, when seen on the following days, always appear smaller than the portions of mucous membrane which have been removed. The object of the application of the cautery, it is to be remembered, is not to destroy any depth of structure, which would be in itself a somewhat prolonged and painful operation, but simply to seal the divided vessels, which, in this operation, afford the only cause for anxiety. The superficial slough, which is made for this purpose, is very soon thrown off; and a clear definite line is at once drawn between the parts destroyed or removed, and those which it is intended to leave; and there is nothing to prevent the process of cicatrisation from commencing immediately. Within a week almost every patient will be able to take exercise and resume his occupations.

It is not necessary in the operation now described to include all the diseased or protruded membrane. The removal of some portions exerts its beneficial influence on that which is left. The same observations apply in this respect to the removal of a portion of mucous membrane by excision, as to its destruction by the application of the strong nitric

acid. In both cases the permanent benefit is produced during the process of cicatrisation.

It will be readily seen from the foregoing remarks, that in the author's practice the employment of the ligature holds a much more restricted position than it does in the practice of many of the ablest surgical writers. It may be asked, therefore, does he altogether ignore this method of treatment? Certainly not. Cases frequently occur in practice for which the ligature is by far the most suitable, and therefore the best remedy.

When the swelling of the rectum resembles an erectile tumour, in being composed of varicose veins, dilated and anastomising arteries; when it involves a considerable extent of surface, is broad based, sessile, and particularly if the affection be attended with severe attacks of hemorrhage, the ligature may be the only method of cure. Again, when the hæmorrhoids have been of long standing and exposed to long continued irritation, and the coats of the veins become much thickened and altered where they are irregularly dilated and varicose, so that the tumour, on section, shows a cystic structure in its interior, bounded on all sides by an indurated and hypertrophied fibro-cellular growth; or where the gut is very lax, and a considerable amount of prolapsus becomes superadded to the local tumour,—ligature is the proper remedy.

In the present chapter the author has purposely confined his observations to the surgical treatment of hæmorrhoidal tumours.

Polypi of the Rectum and Excrescences about the Anus.

It remains to notice a few affections of the rectum, which are sometimes mistaken for piles.

We occasionally find little bag-like processes of mucous membrane within the rectum, resembling polypi, but still not exactly identical with them. When these little growths remain above the sphincter they may give rise to no symptoms, and only be discovered by accident. There are other

excrescences from the mucous membrane which possess a structure partaking of the character of uterine polypi. These are generally single, but in rare instances in clusters of three or four.

Polypus of the rectum is occasionally, though rarely, met with in the adult. It is most frequent in children, and in them much more vascular also, and hemorrhage from the bowel is a prominent symptom.

In all cases where polypus of the rectum is suspected, it is a good plan to examine the patient soon after an action of the bowel. By this means we may discover a growth which, at other times, has receded some distance into the gut.

The polypus of the adult bowel is a fibro-cellular structure possessed of trifling vascularity only. It is generally seated about an inch from the anus, and it may vary in length from half an inch upwards, according to the length of its pedicle.

When these growths descend during the action of the intestine, the sphincter muscle closes firmly upon them, and occasions the patient very acute pain. If the swelling continues to protrude at other times, it becomes irritated and inflamed, and ulceration may take place with a great aggravation in the patient's symptoms. A sense of swelling present in the bowel, a mucous discharge, and probably a little blood, are the symptoms. In these cases immediate relief, without the slightest danger, is caused by their extirpation. If the pedicle of the polypus extends somewhat higher up, we may hook it down with the finger, and ligature it at this part before snipping it away.

The polypus of children has a similar structure to the last, and differs from it mainly in point of vascularity. When the child is at stool prolapse of a small tumour of bright red colour takes place, and hemorrhage ensues, often large in amount. A slight bleeding may also continue long afterwards. These occurrences in a child lead to a suspicion of polypus, and the rectum should be carefully explored. It is generally found within an inch of the anus; but sometimes it has an attachment higher up. The plan of treatment is very simple and successful. Seize the growth, draw it downwards, and by a

ocess of twisting with forceps you may detach it; or a liga-
re may be tightly applied to its stalk, and the polypus be
owed to remain in the bowel until it sloughs off.

CASE.—Thos. F., æt. 10, was admitted into St. George's
ospital, on the 25th of October, 1865, supposed to be suffer-
g from a prolapsus of the rectum, accompanied by occa-
nal loss of blood. The symptoms had existed for two
ars, and were so troublesome, that he was about to be dis-
ssed from a school at which he was being educated. On
e 4th of November the patient was directed to sit over
me warm water, and to protrude the bowel, when a polypus
ojected, the size and appearance of a large cherry, with a
ry small pedicle. A ligature was placed on the pedicle, and
e polypus removed on its distal size with a pair of scissors.
ter this the patient experienced no inconvenience.

CASE.—Six years ago a gentleman consulted me for what
believed to be a prolapsus of the bowel. He had suffered
m his symptoms for twenty years, and never had a motion
thout the part becoming protruded. Upon examination
e protruded part was found to consist of a very firm poly-
s, the size and shape of a large chesnut. This patient had
me to a determination not to submit to any operation by
gature, and I therefore determined to cut off the tumour,
d to apply the actual cautery to the cut surface. The
dicle of the polypus which was a quarter of an inch in
ameter, having been secured with a clamp, the polypus
elf was removed with a knife made for such operations,
d bent upon the flat. The cut surface was seared with the
tual cautery; one vessel was still inclined to bleed, and
is was tied. The clamp was then taken off and the parts
turned within the sphincter.

No inconvenience followed this operation, and a complete
re was effected. The polypus being of unusual size, is pre-
rved as a preparation in the museum of King's College.

External piles, when their cavities have become obliterated,
d flaps of skin have been formed, which gradually wear
way, are apt to take upon them an excrescential form; but
ey are easily and obviously distinguished from malignant

growth. Where cleanliness is neglected, they very often take on a diseased action, but are of no ultimately important consequence.

Extirpation by scissors or the knife is the remedy, only taking care that the sphincter muscle be not included in the extirpated tissue by a too liberal use of these instruments.

Fistula Ani.

Fistula ani is one of the most common, and occasionally one of the most troublesome cases in surgery. It seems a simple business ; in practice it is often found one of the most difficult to manage. This arises from its being essentially a complicated phenomenon. In the following way we may get at its elements separately.

Gatherings occasionally form in the groin and the axilla. They are superficial phlegmonous abscesses. They break, or are opened. The redness and swelling diminish, but a thin discharge continues with some hardness, running in one or other direction from the small wound left. If a probe is introduced, it passes into a straight or bent canal two, three, four, or even five inches in length. If a gathering occur in the middle of the buttock, the back, or the chest, it is opened, and no such residual sinus under ordinary circumstances is left. What has made the difference ? In the latter case, in addition to the absence of the irritation which a diseased gland is perhaps creating, two salutary conditions have been present, which were wanting in the former instances; one rest, the second a moderate pressure.

In the groin and axilla, the areolar tissue is very lax, and there is motion at each movement of the hip joint, or of the shoulder. There is little pressure in the axilla at any time, and in the groin none, when the hip joints are not fully straightened. So the residual cavity of the abscess has its sides, in these situations, moved on each other, and no bracing support is maintained upon it.

But there is another evil. Those in whom these sinuses

form from the above described causes, are persons either of a scrofulous habit, or of temporarily impaired or broken down constitution, in whom the work of reparation proceeds weakly. The actions in such frames are at once irritable and indolent. This manifests itself thus :—The sinus in the groin runs some way under the skin; a probe is introduced its whole length; an opening is made at the further end, which is kept open by a shred of lint; pressure is made by bandage in the middle of the sinus, with a free vent at either end. The patient is kept perfectly still. If he have some resources left in his health, with this treatment the sinus probably closes. If he be scrofulous, or extenuated by previous illness, the measure fails, the sinus remains.

What resource has the surgeon? He sends his patient to the sea-side, recommends the likeliest course to strengthen and invigorate him, and if he succeeds in giving him flesh and health, the sinus heals at once. Sometimes, however, the cause is local as well as constitutional. A suppurating, impregnating, or tuberculous gland exists in connection with the sinus, and the irritation or discharge from this gland prevents its healing.

Now, what are called fistulæ are such sinuses, residues of abscess near the rectum, where the cellular tissue is lax, and without pressure and support, and it has specially this character in persons of debilitated or attenuated frames, in whom abscess near the rectum is most frequent. Among the different classes of artizans, none are paler, thinner, less healthy-looking than working tailors; they are in confined air, have no exercise, and are often persons of dissipated habits. It is just in this class, and those who resemble them most in sedentary pursuits, that fistula is most rife.

It has formerly puzzled the surgeon that abscesses so formed do not heal like abscesses in other portions of the cellular membrane. At first it was supposed that healing was prevented by the action of the sphincter and levator ani muscles only. A great authority was led by a more mature experience to conclude that this view was incorrect. Such sinuses would unquestionably obstruct the healing of any

abscess, yet they would not fully account for the fact that abscesses near the rectum rarely heal spontaneously, nor can the action of these muscles explain their formation.

When a small abscess forms in the lax tissue about the gut, whether it has originated in some lesion of the mucous membrane or not, there can be no doubt that it commonly, although not invariably, makes an entrance into the intestine at one point.

Here another element comes into play. Let us suppose that the cavity and walls of the abscess in the loose cellular tissue represent an incipient sinus. The acrid humours and gases of the intestine find their way in, unwholesomely stimulating the sinus, leading it to burrow further and extend itself, so that it is often found making its way along the side of the rectum, sometimes further up into the pelvis, beyond its point of communication into the gut. The mechanism is this:—A propulsive force acting upon the intestinal contents has to overcome the ordinary contraction of the sphincter. Part of that force becomes expended upon the lower end of the bowel, which "bags" therefore, above this muscle, and a little gas, mucus, or fæces enters into the sinus, and escapes by the external opening, if the fistula be complete. Moreover, every action in the sphincter and levator ani muscles causes movement of the walls of the sinus, and prevents that condition of "local rest" so essential to the healing process.

The mechanical varieties of the complaint are of less consequence, as objects of study and treatment, than the patient's general health and habit of body. It is to be premised, that in all these cases the view taken by the surgeon must be the view of a physician. He must see that the constitution is right, or he must set it right, before he risks defeat in the employment of local means. If the patient's constitution is irrecoverably gone, disease established in the lungs, the liver or kidneys irreparably damaged, or the like, no notice had better be taken of his fistula. It is an additional grievance, no doubt, to the patient to have the continual feeling of something not right,—the discharge of

moisture, and discomfort attending fistula; but it is better that he bear this, applying palliative means alone, than be subjected to the repeated surgical efforts for his cure, which his constitutional state renders entirely abortive.

The patient must be in a certain measure of bodily condition, or it is not worth while to put him to the pain even, of an elaborate surgical examination; for to do that effectually—and else it is worth nothing—a very accurate local examination and exploration is necessary. The disease may be—

1. A single blind fistula, running along the perinæum, or exterior, to the os coccygis, or, as is most frequently the case, passing inwards parallel to the rectum.

2. The fistula ascending in the coats of the rectum, may perforate the rectum almost immediately above the sphincter, which is generally the case, or one, two, or even three inches higher. And the point of perforation may be the extreme inward point of the fistula, or the latter may extend as a blind sinus, further inward.

3. The sinus from one orifice may branch into several. There may be more than one point of communication with the rectum. There may be several external openings. The whole of the perinæum may be hard, knotty, undulating, with openings like a rabbit-warren.

4. The case may be complicated with urinary fistula, polypus of the rectum, or piles.

5. It may be a concomitant of stricture of the bowel.

6. The sinus may have no external opening, but communicate only with the cavity of the intestine.

7. In some rare cases, the fistula may be complicated with some exfoliation of bone.

The purely surgical part of the treatment of fistula ani is reducible to a few rules.

Simple fistula running inwards upon the rectum requires the same operation, whether it be blind, or have an opening already into the gut. In searching for the internal opening the blunder is constantly made of doing this too high.

In the majority of cases, this opening is just beyond the internal sphincter—from three to six lines above the anus.

After a division of the sinus from this opening downwards, that part of the fistula beyond it will generally heal of itself.

A strong, slightly curved, probe-pointed bistoury, cutting however before the blunt end, is to be introduced along the fistula, the exploring probe being previously withdrawn; at the same time the fore-finger of the left hand is passed into the rectum, and receives the end of the bistoury, which has been either introduced through a pre-existing communication or has cut through the intestine at the blind end of the fistula. It is not a bad thing to have a thin silver ring thimble, without a top, as a shield for the fore-finger. If the fistula extends not more than an inch, a silver director, or the exploring probe may be passed up it, through the internal opening and bent by the finger in the rectum downwards, so as to project through the anus and then cut out, or the end of the bistoury itself may be brought out at the anus, and then by a strong traction of the instrument the intervening parts divided.

A fine layer of the thinnest lint, that has been dipped in oil, is then to be laid by the probe within the wound, and the patient is to keep his room some days. It is for the patient's comfort that the bowels should be in a soluble state, and relieved daily. For the first two or three days the bit of lint should be replaced, so as to prevent the lips of the wound closing; but it is not to be driven forcibly and roughly home to the bottom of the wound. The parts are to be kept clean by occasional washing with tepid water, and should be disturbed as little as possible, and the patient's whole system should be kept cool and quiet. Such are the indications favourable to a wholesome restorative process, and union of the wound from the bottom by granulation. If the healing process proceeds tardily, an occasional and slight touch of nitrate of silver will expedite matters. It is surprising how easy it is by inattention to these seeming trifles for a surgeon to decimate his success and ensure a large percentage of unfavourable results among his patients, even in a case so simple.

In the preceding operation it is all important, if there be a natural opening to the fistula, to include it in the section,

If the fistula extend higher, it is rarely necessary to divide this second part to effect a cure.

The above operation is very generally attended with complete success, if the fistula be not more than an inch to an inch and a half or two inches in length. But when it arrives at or exceeds this depth, it will not invariably heal by this limited operation. Division of the gut beyond that extent then becomes an expedient of questionable propriety. The deep wound does not do as well as the incision in the slighter operation. It is difficult to make it heal from the bottom; the intestine is liable to unite first in the middle, and defeat the whole intention. The fistula may remain, and the operation may be attended with very troublesome hemorrhage.

It is always possible, even in ordinary cases, to encounter such hemorrhage, when it has happened that instead of many small twigs, a larger arterial branch has come down near the anus. It should be a rule, on brisk arterial hemorrhage ensuing in such an operation, at once to secure the vessel with a ligature.

This is easily done when the wound is just made; as the vessel is first bleeding, it is then easily found. It is not so easily found on a recurrence of hemorrhage some hours or days afterwards. To seek for the vessel then, is a new operation to the patient, and a second most troublesome and discreditable one to the surgeon. It was not his fault that the vessel was divided, but it was his fault that it was not secured.

But if the fistula extend too far for the knife to be used with certainty and security, what other means can be adopted? The following resource may be tried. A flexible metal wire may be pressed through the fistula, and brought out and twisted at the anus; and by turning it daily more and more, the upper part of the intervening substance may be gradually ulcerated through; and it is found that as the wire slowly cuts itself out, the upper part of the original fistula has been considerably reduced; the rest may be divided in the way already described.

Simple sinuses opening upon the perinæum, and leading

beneath the skin, or not running deeply, are far from the easiest to cure—opening the other end, injecting with lime-water or the black wash, may be useful. If they exist, however, near the sphincter, a division of the muscle is necessary to attain the local rest required for their healing.

But can nothing be done without an operation? A few slight and recent cases may be brought to heal spontaneously, and in all considerable comfort may be obtained.

The first and great thing is frequent, large, and perfect ablutions in tepid water, first with a little soap mixed, then simple bathing with water alone, and at last the water nearly cold. This simple measure is not less salutary than refreshing. It is, indeed, in many cases absolutely necessary, in order to remove the foul and acrid secretion, which is liable to collect about these parts.

The next thing is the use of the confectio piperis comp:—half a drachm at night for a fortnight, which excites some warmth and action in the part.

Occasionally the rectum bougie, introduced from three to four inches, and remaining in the part from half an hour to an hour, gives a sensation of ease and increased tone, and is certainly beneficial.

To these means may be added the injection of a pint of cold water every evening. Everything that promotes the cleanliness of the parts is useful.

So far for the simpler forms of fistula. The proceedings are not always so plain in the more complicated cases.

When the external orifice of the fistula is removed to a considerable distance from the verge of the anus—as far as the buttock, for instance—is it necessary to divide the whole length of this tract? I do not speak of those cases in which the external opening is not beyond an inch or an inch and a half of the anus. Here the sinus may be divided in its entirety. A more extensive division is a serious matter. Besides the additional pain and loss of blood, it takes some time for the wound to granulate and heal, and loss of time is a cause of loss of temper and money to the patient. In such cases the following plan may be adopted:—Introduce a director

through the whole length of the fistula, cut down to the groove in it, from half an inch to an inch from the anus, then remove the director and re-introduce it through the wound into the gut, and complete the operation in the ordinary way. The sinus beyond will then generally heal spontaneously.

In the cases where many sinuses exist, a condition which has been compared to a rabbit-warren, it requires the exercise of a good deal of care and discrimination to find out the exact condition of the parts. Sometimes there is one primary fistula communicating with the bowel—the original and main sinus, into which the secondary sinuses enter; sometimes these sinuses pursue separate courses, communicating with the bowel by separate openings. Finally, a fistula may exist on each side, and communicate with the gut by opposite openings, or a fistulous tract may describe a semi-circle—like a horse-shoe—around the anus, with an opening into the bowel at each extremity.

Now, in the first of these cases, we must try to find out the original sinus, divide it, and the secondary ones will then heal. When the case is complicated by the number of fistulæ, it is better to make two operations. It is easier to secure all the required results of a limited operation, than where too much is done at once, not to mention the danger attendant on all operations, which is increased by their magnitude and complication.

As a rule, no operations are attended with less danger than these upon the rectum. And for this reason probably, that they directly relieve and remove a prior source of irritation greater than that which they directly excite. Where fistula ani is complicated with urinary fistula, it is better to cure the latter before meddling with the former. A patient will sometimes consult a surgeon, stating that he has often passed matter with his motions, and has occasionally perhaps noticed a little swelling in the anal region. Upon examination, he is found to be labouring under incomplete fistula—a sinus communicating with the bowel, but without any external orifice. In these cases a tumour close to the bowel is occasioned by the gradual collection of matter; this empties

itself into the gut, and the swelling subsides, only to reappear in a few days. We can sometimes press a little matter from the swelling into the bowel. The remedy is clear: make an opening into the part, insert a director and divide the fistula from the internal opening downwards, cutting the fibres of the sphincter.

It is now quite certain that in a few cases of fistula there is no internal opening at all, and, when it exists, it may not be detected by repeated examination. The patient becomes dissatisfied with delay, and we must then make an artificial opening into the bowel above the sphincter and divide the septum, including the muscle in doing so.

It is certainly true, as Mr. Tufnell and Mr. Hy. Smith have pointed out, that stricture of the rectum sometimes co-exists with fistula. The detection and treatment of the stricture then forms an essential element in the case. The connection between these diseases may be, perhaps, only a casual one, for it is not quite clear how a stricture of the rectum, when situated beyond the internal opening of the sinus, could cause or influence the formation of fistula. The case is not at all parallel to that of perinæal fistulæ, consequent upon stricture of the urethra. In the latter, the sinuses communicate with the urethra beyond the strictured part, and form subsidiary channels for the escape of purulent matters and urine; but it is often not so in the former, although sometimes it is.

However, the practical fact to be borne in mind is, the occasional occurrence of the two diseases in the same subject, and that, then, both will require appropriate treatment.

It sometimes happens, though fortunately very rarely indeed, that the section of the sphincter muscle in the operation for fistula is followed by a loss of contractile power in it. Generally, too, this is temporary only, the muscle regaining its power after cicatrization; but this does not always happen, and then the occurrence becomes a source of extreme discomfort and grievous distress to the patient.

Stricture of the Rectum.

This complaint is a source of considerable emolument to quacks, whose proceedings in it are very simple. Having elicited from the patient that he has some uneasiness in that region, or cause of complaint, the quack introduces a bougie into the gut, and forces it till it strikes against, or is fixed upon the os sacrum. "There," says the quack, "is the stricture, and the pain I have put you to arises from the morbid sensibility it occasions." And, thereupon, the patient, whose mind is fully satisfied of the reality of his affliction, undergoes one course, or a recurrent spring course, or a continual life-long introduction of rectum bougies, according to the length and elasticity of his or her credulity.

The patient, at the same time, is often the better, barring the pain, under the quack's hands. His mind is relieved, he is careful in diet, he takes medicine occasionally, and the introduction of the bougie is useful if he has chronic piles, or indolent and irritable mucous membrane. The last is the common condition, suggesting the idea of stricture to patient or quack. The patient's bowels act very irregularly; sometimes he goes to the water-closet three or four times a day, and passes only at each time some scanty, narrow, scrap-like evacuation. He thinks that all his forcing could get only so much through the stricture, when there was in fact nothing more in the intestine. Every now and then, in the irritable intestine, a single driblet, or fractional instalment of a motion, is transmitted to the terminus of the gut. There is an insufficient bulk of fæces, and there is irritable action of the bowels. The latter, the patient has aggravated or brought on by attending to this function and the feelings going with it, and by trying continually if he can now get a better relief. This leads in time to the establishment of a constant sense of uneasiness in the sigmoid flexure of the colon, to an increased secretion of mucus, which is discharged either with the scanty evacuation or alone. This combination of symptoms is not uncommon in those who have re-

sided in tropical or warm climates, and have suffered from hepatic derangements and irregular bowels. The patient is willing enough to believe that he has stricture. It clears up his doubts about himself, and he is happy that there is nothing worse behind. And surgeons of repute have been occasionally led to view this state of things as actually often attended with positive spasmodic stricture, or as constituting *spasmodic stricture of the rectum.* And, indeed, so far this opinion is defensible, that the fibres of the rectum act with preternatural force in such cases, and present some obstacle even to the introduction of a bougie; easily overcome, indeed —but certainly *there.* But then this spasm is not of one ring of fibres, but general, and does not correspond with our notions of spasmodic stricture elsewhere. It is only general irritability of the canal.

The use of the bougie is not to be recommended in such cases. What is indicated, is restoring the secretions, improving the digestion from the stomach and liver downwards, by diet, fresh air, exercise—if need be, aperient medicine, or the junction of tonics with aperients, by the use of injections, at first tepid, afterwards cold. Still there is no great objection to passing a bougie once or twice to satisfy the patient that there is no stricture, and the surgeon that there is no local cause of irritation of any kind, and if the use of the instrument is followed by relief and comfort, there is no reason why the patient should not himself use it every day, or every other day, in the morning before rising for half-an-hour, or at any other time. Nevertheless, stricture of the rectum is not a fiction. This form of local disease sometimes manifests itself; but it is of rare occurrence.

Where a mechanical narrowing of the rectum exists, it is unfortunately often due to cancer; but we have now to do with genuine stricture.

The question is not yet settled as to the mode of origin of stricture in any of the mucous passages. It remains possible that the narrowing may commence in a sort of cramp of the muscular or other irritable fibre surrounding the mucous canal.

The writer believes that stricture of the rectum may originate in two ways. 1st, and most frequently, by a chronic inflammatory action; 2ndly, as the sequela of ulceration. The ulcers arising during typhoid fever and dysentery very rarely indeed lead to a contraction of the gut on their cicatrisation, because the gland structures are chiefly affected. Softening and ulceration ensue, followed by a discharge of the glands and effused products, leaving an ulcer behind, which has reached the sub-mucous tissue only. A kind of new membrane is then formed. This lines the floor of the ulcer, and its edge becomes dove-tailed, as it were, between the mucous and sub-mucous coats. When, however, the muscular fibre forms the base of an ulcer, contraction may take place, or, whilst ulceration is taking place at one part, a large amount of lymph may be thrown out into the tissues around it; this, as it becomes organised, undergoes condensation. Narrowing and contraction of the bowel, therefore ensue as the ulcer heals.

In some cases, the stricture of the rectum is due to a syphilitic taint. The writer, in common with most hospital surgeons, has met with such cases. When condylomatous growths exist about the anus, we may suspect this. Not that such growths are by any means necessarily syphilitic, for warty excrescences may be produced by the discharge of mucus from the bowel, and by the moisture and heat of the parts. Still, it is well to be alive to syphilis as a cause, and to ratify or correct our opinion here by a few judicious questions.

Let the origin be what it may, certain it is that established stricture is greatly indebted to chronic inflammatory action for its physical character and growth. In every case, in the urethra and vagina, in the œsophagus, as well as the rectum, the narrow ring of established stricture displays a permanent thickening and rigidity, the evident result of infiltration of the tissues adjoining the thin mucous surface with coagulated lymph. The sub-mucous coat of the canal is the seat of the original thickening and induration, which, from length of

time and increased irritation, may, extend further. The true mucous coat, the thin, fine, inner lining, remains but little changed.

In the rectum, the common seat of stricture is from two to four inches from the orifice. In almost every case the narrowing is near enough to the surface to admit of being felt by the finger, or seen with the speculum. The first is the most satisfactory method. The surgeon measures with his finger the degree of contraction, and the length to which it extends. His touch satisfies him that it is not cancer. It is a firm, smooth ring, with an unbroken surface—with neither the harsh surface of the one kind of cancer, nor the irregular, projecting, fungus-like masses belonging to the other. The stricture is such a smooth ring as might be produced by tying a piece of tape around the healthy intestine, leaving an aperture of half-an-inch diameter. However, the stricture is not always circular, sometimes the smooth induration is greater and more permanent in one of its aspects than on the other, and when it extends around the circumference of the bowel in an irregular and unequal manner, the passage may be no longer direct but tortuous.

The condition of the gut above the strictured part will vary, of course, with the degree of the obstruction, and its duration. In general terms it is one of hypertrophy with dilatation. A gradual increase in the calibre of the bowel takes place, and, with it, hypertrophy of the muscular coat, with or without inflammatory changes in the lining membrane and sub-mucous tissue.

Sometimes small abscesses form at this dilated part, leaving ulcerated openings in connection with sinuses, which may terminate about the perinæum or buttock. The origin and cause of such fistulæ may be then compared with those urinary fistulæ which communicate with the urethra behind a stricture. Frequently, however, when abscesses and fistulæ accompany and complicate stricture of the rectum, they communicate with the bowel below the seat of stricture. The occasional combination of these two affections is worth carry-

gg in mind, on account of the practical bearing it has upon ee treatment of what may apparently be a simple fistula in co.*

Now this affection is not a very unfrequent one (*among usual cases*), and it is perfectly identifiable. The nature of ee complaint can be in almost every instance determined by cal examination; no doubt stricture may exist higher up in ee intestine—about the sigmoid flexure, for example—and may cancer, or the surface may be ulcerated. But these sses are fortunately very rare—fortunately for the surgeon, well as for the patient—as nothing is so painful to the rgeon as to prescribe and act vaguely and in the dark as to ee real nature of the disorder or cause of the symptoms. rricture of the rectum is a disease of middle life: rare in uth and old age. The symptoms are the following:—he patient brings a history of more or less habitual constittion, with an increasing difficulty of defecation; the fæces ssed either in a half liquid state, or in short flattened fragents; a sense of insufficient relief when the bowels have tted, and a disposition to repeat the attempt several times the day. When the stricture, through time, neglect, and ritation has become very narrow, the sympathies of the part e, as it were, called out, and there is a sense of weight and ghtness at the sacrum, uneasiness behind the left groin, d pain and weariness of the thighs; mucus is occasionally ssed alone, or with the fæces, but blood rarely. The ucous membrane of the part often becomes irritated or coriated, and then a burning sensation succeeds each stool, d often lasts for some time. The symptoms become rriously aggravated, when it happens that any quantity of lid fæces is lodged above the stricture. There is then

* Sir Benjamin Brodie puts all this very clearly. "Where abscesses have med in the neighbourhood of the gut, it is of no service to lay them open. I ve told you, on many occasions, that if abscesses are connected with diseased icture, they are not likely to heal; and you only make the patient worse by ing them open, there being, of course, a much greater extent of raw surface er the operation than before. If these abscesses are to be healed at all, it can ly be after the stricture has been fully dilated," p. 586, Vol. 3, of the works of e late Sir Benjamim Brodie, Bart., edited by my friend Mr. Charles Hawkins.

obstruction, with all its consequences, of which in connection with the rectum, I shall have to speak separately, and shall take occasion then to advert to this particular complication.

The treatment of stricture of the rectum is simple, easy, and, on the whole, successful. It consists in the use of the bougie to dilate the contraction. The best for this purpose are of indian rubber. They should be slightly conical. The secret of the treatment of stricture is *the greatest possible gentleness*—never to give pain or irritate the part. Thus, the bougie is not to be left in too long, nor to be introduced too often. It may be left in the stricture for half an hour every third day, in almost every case. In many the instrument may be passed every other day; with some every day. A larger and longer instrument is continually to be substituted for the last size; or the conical instrument insinuated always a little farther and farther. But the greatest nicety and judgment are required. Under gentle and not too frequently repeated pressure of the instrument, the stricture yields, the adventitious lymph is absorbed, the aperture becomes really larger, the induration less, and the intestine is sensibly tranquillised and calmed. If the surgeon attempts to go too fast, and to force the stricture rapidly, the effects are just reversed: the stricture becomes firmer, narrower, more irritable, and for a time the use of the bougie must be abandoned. If very great force is used, the bowel may be torn through; but even without this event, from mere forcible stretching, overdone, peritoneal inflammation may be excited, which may cost the patient his life.

Every now and then—but such a case is unfrequent—the stricture penetrated by the finger is extremely sharp and hard, and it will not yield to the bougie, or seems to require an infinite time for success. In such a case the surgeon may divide the stricture *forwards* a quarter of an inch, and introduce a bougie for ten minutes every day, to preserve the enlargement which he has gained. Deep incisions are to be deprecated, as involving danger from hemorrhage; but there is no objection to "notching" the stricture superficially in three or four places, if the single incision be found inadequate

rr insufficient. When the stricture is low down, no harm iight arise from rupturing it by forcible dilatation, in the ame way that is done in stricture of the urethra; but the rriter is strongly opposed to the use of various instruments ff great power for the treatment of stricture, particularly rhere it is higher up in the bowel. A well-known writer on iiseases of the rectum mentions a case wherein death ensued rom peritonitis produced by the rupture of the gut under the orce used—hydraulic pressure.

So far for the mechanical treatment of these affections, ut the medical must not be lost sight of. By means of sup-positories of soap and opium, injections of tepid water, small oses of castor oil, or cod liver oil where the patient's health nd nutrition are affected, we may the meanwhile alleviate he symptoms while we are removing their cause.

Under the title of "An unusual form of Stricture of the Rectum," Sir Benjamin Brodie has described a contraction of he gut which ought, he conceives, to be distinguished from rdinary stricture.

Most surgeons in extensive practice have been able to orroborate the accuracy of his description. It occurs chiefly n women who have borne children, and, in the majority of ases, it has shown itself some time after a difficult labour. The affection is insidious, and commences with pain in the ectum and back, a discharge of mucus from the anus, and ome difficulty in passing evacuations. These symptoms in-rease in severity until the pain is constant, becoming extreme fter every evacuation. The discharge, also increasing in mount, becomes bloody. If the case continues to progress, bscesses form in the areolar tissue, about the gut. These hew no disposition to heal, and as one forms and bursts bout the perinæum, anus, nates, or other parts, it is suc-eeded by another and another; hectic fever is induced, and he patient's powers succumb beneath this formidable train of ymptoms.

The physical characters of this affection are somewhat eculiar. At an early stage of the disease the inner surface

of the rectum feels irregular and warty, as if studded with numerous small excrescences. Generally, says Sir Benjamin Brodie, whose description we are mainly following, some small flattened excrescences exist at the same time about the margin of the anus. The mucous membrane, which lies in the interstices between the excrescences, is occasionally ulcerated. In some cases Brodie found this state of the mucous membrane to exist without any contraction of the gut whatever; so that he holds the stricture to be an accidental, and not a necessary concomitant of the disease. Still, in the great majority of instances, there is a circular constriction of the bowel about one or two inches above the anus, or there is a contracted state of the anus itself.

Success in the treatment of these cases almost entirely depends upon the period at which it has been undertaken. When the disease has led to great structural changes in the gut, and much suppurative action about it, we may be unable to effect a cure. The means to be adopted are such as has been already pointed out. The mechanical treatment will require all our gentleness and tact, for the diseased bowel is extremely tender and irritable, and resents all rough or precipitate attempts at dilatation. With care and gentleness, however, there are no cases of the kind in which our art gives greater relief.

Obstruction of the Bowels, as connected with the Rectum.

Long-continued obstruction of the bowels is fatal to life; but there is a vast difference in the degree of rapidity with which the fatal effect is brought about in different instances. The commonest cause of obstruction in surgical practice is strangulated hernia. Then there are other cases of obstruction in which death ensues in forty-eight hours from the commencement of strangulation; others, in which nothing menacing shows itself for a week, and then two, three or four days intervene before the termination of the case. In the first class of cases there supervene tenderness, distension o

the abdomen and vomiting, in three or four hours; in the second there are no symptoms but the tumour, some general indisposition, and a knowledge thereupon that all is not right. There is little or no action of the bowels, and that is ill. The wonder is that the patient was not seriously ill earlier, or that having endured the inconvenience so long, it should now be accompanied by such serious symptoms. In fact, however, in either case there is, sooner or later, peritonitis, and death ensues from that cause.

1. In infants with imperforate anus, and in whom the intestine is so greatly deficient that no operation reaches it, it is wonderful how slowly death takes place. They live two, three, or four weeks, or even longer; at first not suffering at all, then uneasy, the belly swelling, then vomiting occasionally, the belly becoming more tumid and tense as the rest of the frame shrinks and wastes, and so in time they die.

2. Comparable with this is the case of obstruction in elderly persons, almost always women, arising from accumulated fæces in the rectum. The patient is uncomfortable, uneasy, distressed; the bowels have not been relieved for several days, nor after waiting, or taking purgatives, does relief take place. The belly becomes rather tumid, not very tense, the pulse irregular, there is delirium at night, the patient's strength fails; she has no appetite, or taking food excites vomiting; she is unaccountably wrong; she becomes weaker; death ensues.

CASE.—A lady somewhat advanced in age, and who had from her youth a very bad distortion of the spine, complained for years of constipation, flatulency, a sense of weight in the pelvis, and of feeling habitually uncomfortable. Upon one occasion she experienced symptoms of piles, and I had an opportunity of examining the rectum. Immediately above the sphincter, and within easy reach of the finger, was a large mass of indurated fæces, which, judging from the portion that could be felt, must have been larger than an ordinary cricket ball. During the examination a portion of the mass was detached, and extracted. The odour was intole-

rable. This lady made several appointments in order to have the accumulation removed, but upon each occasion, when the time arrived, she became too nervous to submit to the operation. As time advanced she became weaker, and with the weakness her nervousness increased. After several years of much discomfort, her strength failed, her pulse became irregular, and she died with symptoms of bronchitis.

Many such cases that would have admitted of complete relief by surgical means, the obstruction being purely mechanical and removable, are represented from first to last as cases of obstinate constipation, and the patient is said to die at last of unremoved constipation of the bowels. But constipation of the bowels properly means the want of fæces, the absence of intestinal secretion, and is analogous to suppression of urine. Unquestionably great disturbance, death even, may ensue through that cause. But here the condition of things is reversed; there is no lack of fæces; the bowels are actually obstructed by the enormous accumulation of their contents.

Women are very apt, from motives of delicacy, to retain the fæces in the rectum. The rectum, hence, becomes large and capacious, and with age proportionately indolent. If the fæces happen to be less stimulating than they ought to be; if there is a deficiency of what is commonly called bile, for example, there may exist in the great intestine a large quantity of clayey or putty-like material, which does not irritate the bowel enough to lead to its expulsion, and the rectum and sigmoid flexure of the colon become completely plugged up by some pounds of a soft tenacious substance. Then the course of symptoms, which has been above described, supervenes, and the patient sinks under them. Many such attacks are overcome by active purgative medicines, and, unless things have gone very far, the exhibition of croton oil will often produce the requisite evacuation; but there is a time when the violent irritation of this drastic medicine, used too late to overcome the accumulated obstruction, only precipitates the end.

In all such cases it is most important to examine the

condition of the rectum. In many instances the canal of the intestine will be found plugged up with tenacious fæces, which extend to near the anus. The distended rectum has lost its expulsive power, and there is no force from within by which the offending matter can be dislodged, but it may most easily be removed by a well rounded scoop, assisted by the repeated injections of small quantities of water. The finger introduced, by which the nature of the obstructing material is identified, will often serve better than any instrument to detach and bring away the lower strata of the accumulation.

3. A similar accumulation to the last described is liable to take place in children in whom there has been a small perinæal opening artificially made,—the anus having been naturally deficient—on the fæces becoming more solid. And in these cases, it is sometimes necessary, not only then to make a larger artificial anus, but by a similar operation to scoop out, and wash away the accumulated clayey fæces, which would otherwise form a source of mortal obstruction.

4. In cancer of the rectum, the fatal termination is often brought about by obstruction of the bowels; and it is almost always much accelerated by the frequent recurrence of such attacks, which help to wear out the patient's vitality. And great comfort and relief of great distress may occasionally be given by passing a long flexible tube, with a rounded end, and large holes in it, through the mass of disease into the fæces accumulated in the sound intestine above. Then, by gently stirring and breaking down the mass of fæces, aided by throwing in, from time to time, a few ounces of tepid water through the tube, the accumulated fæces may be reduced to a softer consistence, or a fragmentary state, in which they can pass through the smaller and contracted scirrhous portion of the canal.

5. In simple stricture of the rectum, such an occurrence as serious obstruction from accumulation of fæces above the stricture, must be extremely rare, and would be obviously most easily removed in the way just described.

6. But every now and then stricture occurs in the colon

above the rectum, and in the course of time an attack of obstruction is liable to take place. Even in such a case, if the true idea of the disease be seized, by means of a long elastic tube carefully introduced in a similar manner, the obstruction also may be obviated. Nor is it always so difficult, as might be at first expected, to identify the particular cause of obstruction. For the patient in these rare cases, either knows it, or suspects it already. For years he was liable to confined and irregular bowels, and his sensations have enabled him to identify a point of the colon as the seat whence the mischief has proceeded. So the first supposition of ileus, or of internal strangulation of the intestine is set aside, and the surgeon lends his attention first to make out the probability of the case being stricture of the colon, then to reach and pass it with the flexible tube.

When an obstruction to the fæcal flow has been caused by organic disease of the larger bowel, it is, unfortunately, very frequently of a cancerous nature. It may be due to simple stricture, or to intussusception. If it depend upon the last-mentioned cause, we may sometimes detect the inverted bowel descended into the rectum by careful examination, and our efforts must then be directed to its return. This may be accomplished by injecting warm water in a slow and equable stream, or by pumping air up the bowel, so as to carry the inverted portion upwards. In the remaining cases an exact diagnosis of the nature and, above all, the seat of the obstruction is the main point, if we are to attempt any operative interference. Now, what are the facts by which we are to be guided? There is the history of constipated bowels, followed by complete obstruction; the feelings of the patient himself as to its seat; the secretion of urine continued, at any rate until vomiting becomes an urgent symptom;* the impressions gained by careful palpa-

* In the author's opinion, the reason why the urine continues to be secreted in cases where the seat of obstruction is low down, and becomes suppressed where this is high up, is, that vomiting ensues earlier in the one case than the other, and, therefore, the absorption of fluids no longer takes place through the stomach and intestines.

on and percussion of the belly; and, lastly, the evidence fforded by the passage of a long elastic tube, and the injection of water. These things, carefully weighed and considered, will generally direct us to the seat of obstruction. In passing a long elastic tube we must remember, of course, the natural obstructions in the way, such as the promontory of the sacrum, and folds of mucous membrane getting in front of the tube. Let the tube be passed very gently, occasionally withdrawn a little, and slightly rotated, at the same time that we inject a stream of fluid through its extremity, and no difficulty will be experienced from these causes. But we will suppose that some obstruction is found, beyond which neither instrument nor fluid will pass, and that the latter returns uncoloured and inodorous, we may then include that the seat of the obstruction has been reached. In the same manner it is proper to suggest here, that at a point much higher than the rectum, even at the commencement of the colon, mechanical obstruction may take place through accumulation of scibalous fæces.

The diseases known as peri- and endo-typhilitis, are of this nature; these may often be removed by local depletion and fomentation, combined with purgatives. Sometimes, inflammation of the areolar tissue ensues at this part, ending in abscess. This may be in consequence of a perforation at the posterior part of the cœcum or its appendix; or the irritation caused by a distended bowel may give rise to a form of pelvic cellulitis, which terminates in an abscess that opens into the bowel and through the integuments also. These are not very uncommon cases, among rare ones. In one of three such fatal instances, witnessed by Dr. Marston, there was the history of a chronic constipation, followed by illness and tenderness in the right iliac region. This was succeeded by a well-defined, boggy, elastic tumour, immediately within the iliac bone, slightly above Poupart's ligament. Abscess and sinuses followed: Dr. Marston was enabled to determine the communication between the bowel and abscess by the detection of starchy, and other vegetable matters, in the discharges when microscopically ex-

amined, and the pus issuing from the sinuses had a fæcal odour, and gave a blue reaction with iodine. An ulcer was found after death to have perforated the cœcum, and from the larger size and bevelled edge of the opening on the exterior, as compared with its very small orifice in the mucous membrane, the ulceration had evidently, in this case, extended from without inwards.

There is at present (January, 1866), under the author's care in St. George's Hospital, a patient in whom an abscess formed on the left side of the pelvis after childbirth. This abscess opened into the rectum on the one hand, and above the crest of the ilium on the other.

Obstruction to the bowel, in cases where the impediment is high up in the colon, is one of slow invasion. There have often been small accumulations before. The patient has been often attacked by indisposition and confined bowels, and after taking many doses of medicine has at last obtained a large relief, passing, among other fæcal matters, a quantity of scibalæ. Now his bowels have been confined, for weeks perhaps, but have become at the same time very irritable, and he is often led to try to have a motion, and little or nothing comes away. The belly is rather swollen, some greater and more solid fulness is detectable on the right side than on the left, that is to say, in the place of the head and ascending portion of the colon. The patient has no appetite, rejects food, perhaps, as soon as it is introduced into the stomach; he is uneasy and feels himself reduced in strength, and seriously ill; his tongue is furred, but his pulse is not excited, nor is there evidence of febrile or inflammatory action. He is pale, bloated, swollen.

The only way to relieve this threatening state is to wash out the whole of the great intestine, by means of an enormous injection of warm water, slowly pumped and forced along the canal. This will penetrate among and loosen the cohesion of the scibalæ, and when they begin to move all will come away. It is to be understood, of course, that many a slighter attack will yield to purgative medicine, which is for such the proper remedy. Sometimes the same mechanical

obstruction will be caused by accumulations of insoluble substances in the colon that have been taken by the mouth.

In one case that the author heard of, the material was cotton, which had been swallowed with some ravenously eaten food after long fasting, the cotton not being easily separable from the food with which it had been packed. The husks of oatmeal will thus accumulate, and in the cow- and horse-hair licked off the sides by the animals themselves.

Dr. Marston mentioned a case to the writer, in which obstruction was caused by an accumulation of the seeds of the prickly pear (opuntia vulgaris) in the rectum and colon. In this case active purgatives had been exhibited to overcome the constipation. The large bowel became inflamed; tormina and tenesmus ensued, the patient passing bloody mucus with violent straining and pain, and the gut was prolapsed. The symptoms had been mistaken for those of acute dysentery, and the state of the patient indicated much danger. Upon examination the extremity of the finger reached a hard substance in the gut, which was removed by mechanical means, and proved to be portions of the above-mentioned fruit, of which the patient had consumed a large quantity some days before.

It is obvious that in some of the instances above described, where the cause of the obstruction is permanent, we can only afford temporary relief, or none at all, by the means suggested. The only method then left open to us is the establishment of a vent for the fæces above the seat of obstruction. The nature of the case and our inability to compass its relief having been thoroughly determined, then, the sooner this is done the better, if it is to be done at all. In cases of malignant disease it is cruel to attempt any operative interference in an advanced stage, when the patient is a skeleton and his days are plainly numbered; and, in the remainder, it is useless to operate when the symptoms indicate that the patient is sinking under the harm that has already been done. An operation however may be undertaken, at a proper time, to establish an artificial anus, and the best site for this is in the left loin; that is the situation recommended by Mr. Curling, and his experience of this

operation exceeds that of any other surgeon. The patient is to be placed on his face, or nearly so, with a pillow beneath the lower part of the belly. A point is selected about two fingers breadth above the crest of the ileum bone, and midway between its anterior superior spinous process and the spinal column. The incision is to be transversely outwards, from the outer margin of the erector spinæ muscles, for four or five inches. All the muscles are to be divided down to the transversalis fascia; this is to be pinched up and divided on a director to the same extent. Then the posterior aspect of the colon is to be sought for, seized, and drawn outwards to the wound with forceps, and a longitudinal opening made into it of an inch or rather more. The divided edges of the gut are then to be tacked to the outer wound by four metallic ligatures passed through them to the external integument. This keeps the artificial anus near the surface, maintains its patency, and prevents extravasation of its contents. The presence of much fat may so obscure the position of the bowel as to render the search for it tedious, so may a contracted state of the intestine, but under ordinary circumstances it is not a difficult proceeding.

In a case in which the obstruction in the bowel was complete for many days, the author performed the above-mentioned operation, but instead of the colon a portion of small intestine, greatly distended, was seen through the peritoneum. This portion of bowel was opened, and stitched to the integument; a very copious flow of fluid fæces occurred, and the patient for a time experienced relief. He died however a few days afterwards, when it was found that the small intestine had formed very firm adhesions to the edges of the wound. There were no indications of any undue inflammatory action in this situation; at the seat of stricture, however, the small intestine had become completely ulcerated through, and some fæcal matter had from this part escaped into the peritoneal cavity. The preparation is preserved in the museum of St. George's Hospital.

Of the Sphincter Ani.

The diseases specially connected with the sphincter may be treated either with regard to the morbid alterations upon which they depend, or with reference to the physical and mechanical alterations produced. In the present treatise the latter arrangement has been principally adopted as being of a more practical character, and as not necessarily involving any change of system with each new idea regarding the intimate nature of the different morbid products which may be produced by disease.

The office of the sphincter is twofold; it regards, first, the bowel itself; secondly, its contents. It supports the bowel and confines it within the lax chamber in the pelvis; the contents of the bowel, it alternately retains or allows of their escape. These are its purposes and actions in health. But in disease the sphincter is liable on the one hand to lose its tone, on the other to have its contraction preternaturally increased. Serious inconveniences arise from either cause. The simplest are those which flow from

Relaxed Sphincter.

This is a partial palsy, and often goes with partial palsy or weakness of the lower extremities, but it may exist alone. The consequences are very distressing. The fæces, when at all liquid, come away involuntarily; and when a patient strains at stool the bowel protrudes, inverted, in the state of prolapsus. Even when the patient stands or walks the same distressing inconvenience is liable to occur. This complaint manifests itself as often in middle as in advanced life.

Two indications of treatment present themselves. The first is to restore tone to the reflex functions of the spinal marrow; to invigorate the nervous system; to combat the disease as partial paraplegia from deficient innervation. The use of the sitz-bath; the application of cold followed by friction to the hips is here often beneficial; an occasional blister over the sacrum, or the internal administration of strychnia and iron, &c., are also useful. The second indica-

tion, the purely surgical one, is to supply the diminished local or muscular support by making the large and flabby anus smaller and more rigid in itself. This is accomplished by an operation invented by Dupuytren. Some folds of skin which radiate from the anus are included in strong forceps with narrow, blunt, curved ends: These forceps can be fixed at pleasure by a nut. Two or three of these folds of skin, extending quite to the anus, are thus to be seized and fixed; and then each cut through at the edge of the forceps which holds it. The wounds quickly heal, and their healing is attended by some degree of contraction and hardening of the anus, which in slight cases of the kind restores to the patient comparative security and comfort. When any such operation fails, which it too often does, we may again endeavour to impart firmness and procure contraction of the aperture by dividing and removing a portion of the sphincter muscle and bringing the cut edges together by silver sutures. The patient may also sometimes derive considerable comfort from the use of an ivory compress and spring, the former covering and bearing up, as it were, constantly against the anus.

By far the most convenient form of support, where it can be worn, is an instrument made with a cylindrical stem, slightly curved backward, so as to fit the natural shape of the bowel, with a bulb at one extremity and a cross bar at the other. The bulb, which should rise rather abruptly from the stem, is introduced into the bowel and rests above the sphincter, which retains it in position. The cross-bar prevents the instrument from passing too far up the bowel, while the stem acts as a support to the sphincter.

This contrivance not only prevents the prolapsus of the bowel, but it also enables the enfeebled sphincter to retain its contents.

CASE.—An eminent engineer had become much enervated by excessive work, and among other symptoms the sphincter ani had lost its power. He could not walk across the room without the danger of some of the contents of the bowel escaping, and was for a time consequently prevented from leaving the house. An instrument such as has been above

described was made for him, and with it he found he could go about with the greatest comfort, and actually undertook a long journey without experiencing any inconvenience so long as the instrument was worn.

CASE.—A lady was completely excluded from society on account of having lost control over the sphincter ani. A friend of mine mentioned the case to me, and I gave him an instrument which I thought would be suitable for the patient, and I have since several times heard that by wearing it she is enabled to go into society like other people.

The size and shape of these instruments should be adapted to particular cases. If the muscle is much relaxed, the stem should be thicker. If the upper fibres have descended, so as to be contained within the lower, the stem should be shorter than usual. It would be a great mistake to suppose that the same instrument will suit every case. The common fault of such instruments is, that the stem is not sufficiently long to allow the bulb to rest fairly above the sphincter. When this occurs, the upper fibres grasp part of the bulb, and tend to force it upward, while the cross bar keeps it down. The instrument then becomes a source of irritation instead of a means of relief. Various kinds of ointment may be applied upon the support. Those which have been attended with the most satisfactory results are such as have contained tannic acid or cubebs.

The true prolapsus of the rectum is in reality a very different phenomenon from that protrusion which ensues from internal piles. In both cases there is prolapse no doubt, but in the latter more or less mucous membrane only descends with the hæmorrhoids, while in the former all the coats of the bowel are prolapsed. This affection is common enough in children, and relatively rare in adults.

Here the sphincter only seems in fault; it does not, it is true, accomplish its first purpose, but, nevertheless, its tone and quality of action are exactly right.

The ordinary tone and force of the sphincter are not enough to keep the intestine from descending everted, under the influence of long-continued straining, and forcing down-

ward. And, on the other hand, when the intestine is thus thrust out, the ordinary tone of the muscle is in the way, and very great difficulty is often thus experienced in getting the intestine returned. In prolapsus from piles the patient has only to lie down, and through the lax sphincter the bowel will be spontaneously drawn, or may easily be passed back.

In prolapsus involving all the coats of the bowel the patient is only able, with some minutes or half an hour's labour, to effect this object.

Prolapsus ani may be said in every case to proceed from one and the same cause, namely, an altered relation between the pressure upon the bowel and the supporting power. So, in palsy of the sphincter, the ordinary pressure to which the bowel is exposed is sufficient to thrust it everted out of the anus. And when the sphincter is in its natural state, to account for the phenomenon we have only to inquire what cause has been brought into operation to increase the pressure from above.

The mechanical means must always be increase of strain by the abdominal muscles and diaphragm, but the causes provoking this increased strain may be various. In children, for instance, worms, stone in the bladder, or polypus of the rectum, often originate prolapsus. In them, too, the urinary organs are not fully developed, and occupy an abdominal rather than a pelvic site; the rectum is less supported and more moveable, and hence peculiarly liable to become everted during the straining attending diarrhæa and irritability of the bowels.

But a common cause, both in children and adults, is costiveness. A scanty fragment of fæces is passed; the patient goes on straining in the expectation of getting rid of more. But there is no more to be got rid of; yet he has the sensation, as if there were something still lodged in the rectum. It is a false sensation, or the result only of the lower part of the intestine being pinched and irritated; and he continues to strain, and something is extruded. It is a bit of the bowel, and every day more and more is forced down, until at length

perhaps every time the bowels act four or six inches of intestine project everted. And the patient does not feel relieved till this is the case. Then, only when after the scanty fæces, all the dispensable bowel has been expelled, does he feel light and easy.

But he has then to commence a second operation, that, namely, of replacing the bowel, which he has first displaced. And for this purpose he has to lie down, and it will take him from ten minutes to two or three hours before he accomplishes the reduction of the part. So the action of the bowels is a grievous operation and tax upon him, and he probably ventures only once in two or three days upon its performance; and he generally contrives to get it done at night, that he may thereupon go to bed, and get the complete replacement partly effected in sleep.

But during the day time he is never quite safe. The bowel is then large, and disposed to protrusion and eversion, and the anus lubricated with mucus. When he walks he is in constant danger of suffering from prolapsus. But for this in time he finds a mechanical remedy in some kind of rectum support.

The first thing in the treatment of prolapsus is to get rid of the cause which occasioned and is increasing it.

In weakly, flabby children, with large bellies, the general health must be carefully attended to; irritability of the bowels and diarrhæa must be checked, and any disorder of the assimilative organs must be corrected by medicine and a well-regulated and good diet.

The cause, as has been explained, is very frequently costiveness. And it is unluckily, in confirmed cases of costiveness, much easier to talk of obviating the ailment, than to do it. The remedies upon which reliance have been placed are, brown meal bread, exercise, medicine, such as the occasional exhibition of small doses of the purest aqueous extract of aloes with a little extract of belladonna after the dinner meal; the administration of strychnia with arsenic or phosphate of iron, and the frequent use of cold water enemata, where the digestion and muscular tone are impaired, and

change of air where the general health appears to have suffered. The patient should also remain horizontal as much as practicable, and learn to evacuate the bowels in that position. Then, the costiveness being removed, or in the course of removal, another thing is to be thought of, namely, the habit of the intestine to become displaced. This is the result of lax attachments of the part, and the habit has to be restrained, the preternatural laxity to be got rid of.

Both ends may be obtained by the same means—by stimulating the intestine, heating it slightly, or making it sore, and exciting points of local inflammation.

It is sometimes sufficient for this purpose to inject into the intestine before rising 3 to 6 drachms of an astringent infusion, or to stimulate the rectum by giving the confectio piperis comp: two or three times a-day. In slight cases, the production of superficial sloughs of the mucous membrane near the skin, by the application of strong nitric acid, produces sufficient contraction to prevent the descent of the bowel. But if these means fail, the part may be made sore and excited sufficiently in the following method. Two or three small portions of the mucous membrane are to be pinched up with forceps and tied, each with a single strong silk. The portion included may be about the size of a silver penny. The silk is cut close to the knot and the part returned. If the sphincter be relaxed and flabby, exerting but little force upon the finger when inserted into the gut, it is as well to excise two or three little pieces of skin from the anus at the same time, and bring the edges together with metallic ligature. When the ligature and the included portion of mucous membrane separate, there is left a shallow ulcer, which is for the moment sore; it quickly heals, however. But, in the mean time, the part has seemingly been spared in the action of the muscles; it has instinctively been not so hardly borne upon, being sore; and afterwards, perhaps, a little consolidation may have taken place about the intestine at the points operated upon. However that may be, in a great number of cases the prolapsus disappears.

Sometimes it favourably happens that the prolapsus has

been caused by the irritation of an inward pile. The latter has been habitually first protruded, and then more and more of the intestine has been thrust out after it. The removal of the pile by ligature cures the prolapsus.

A surgeon, if sent for on an emergency, very seldom has any difficulty in returning a prolapsed intestine. It takes time however, from the slipperiness of the folds, which come back as fast as they are up. An adult patient knows all about this. But mothers sometimes send in alarm for medical advice, when in a young child considerable prolapsus has made its appearance, which their nervousness prevents them from replacing.

If, however, there is a large mass of hæmorrhoidal induration; a pile, for instance, as big as a French walnut, hard and firm, the cause and basis of the protrusion, there is sometimes a little difficulty experienced. The parts may have been out some time, and the patient may be alarmed. But there is no reason why some graduated force should not be used in such a case; and if the great lump is first returned the remainder follows. It is necessary, however, before any force is used to be assured that the protrusion comes from within, because surgeons, less accustomed to these cases, have been known to work away to the great harm and damage of their patients, trying to replace a tumour which always was external.

In a few rare cases, the prolapsus is both very considerable and chronic, resisting all attempts at cure. There may be four, six, or even ten inches of intestine protruded which cannot be returned. Great irritation, ulceration, or sloughing of the bowel may eventually ensue, and the patient's life is made miserable. Now, in these extreme cases, the author would act upon the hint which Sir Benjamin Brodie has left us, viz., to apply several ligatures around the gut and excise the protruded portion. No doubt, this is a severe measure, but the patient must be content to run some risk, seeing that the natural course of the disease tends ultimately to a fatal issue, through a long and painful malady. The operation—as Sir B. Brodie has pointed out—is analogous to that which

nature herself performs in certain cases of intussusception of the bowel. Here the protruded portion of gut, becoming constricted by the edge of that into which it has passed, sloughs away, as if a ligature had been placed around it.

Contracted Sphincter.

Those descriptions of disease are often the most useful in which extreme strictness of method is put aside, or sacrificed for an arrangement based upon natural and practical relations.

So the author has ventured, under the head of relaxed sphincter, to look at all cases of prolapsus ani, though the smaller number of cases of the latter complaint are alone strictly referable to that cause. In the same manner a general view of the present subject will now be taken under the head of contracted sphincter, and a variety of complaints that hang loosely to it may be advantageously considered, which have most important diagnostic and practical bearings to each other.

Two groups of cases naturally present themselves: one where the inconvenient opposition of the sphincter is attributable to induration; the other, where it depends upon spasm.

1. Under another heading, that of malignant disease, the writer has described an ulcer surrounded with induration; commencing on the mucous aspect of the verge of the anus, with a disposition to unlimited extension, so as to occupy the whole circumference of the anus, and spread gradually higher into the intestine. The disease is closely comparable to epithelial cancer of the lip, and is to be treated like it; the part engaged is to be largely and freely excised. The characteristic feature is, that the ulceration bears a large proportion to the induration. The case is not indurated anus, with an ulcerated crack or fissure; but a red excavated ulcer of the anus, on a red and hardened base. It is red because it implicates the mucous surface of the intestine. But in a yet early stage there is soreness, and more or less narrowing of the anus. The outlet of the bowel is through an irregular

gged and somewhat excavated ulcer, which will creep on sstroying the surrounding parts.

2. The anus may be narrowed by indurated external piles, hich have been described separately. A good deal of general al thickening and hardening may attend these trouble- me little lumps, with cracking of the surface, soreness, coriation, ulceration occasionally.

3. The anus may be involved in a general brawny harden- g, occupying the adjacent buttocks; the skin thickened and arse; the passage more or less narrowed. The only cases hich the author has seen of this kind were attended with ulceration; and after the lapse of many months, during e early half of which period they were condemned as ncer, the disease slowly dispersed.

4. *Scrofulous Disease of the Rectum.*—A gentleman of rumous habit and complexion, who had been under the re of physicians for his chest, and had habitually been bject to excessive perspiration, had a disease of the rectum 1863. An operation was then performed, and for a time e local symptoms were relieved. In 1865 this gentleman gain suffered from his local complaint. A large abscess rmed by the side of the bowel, which, when opened, dis- arged a large quantity of dark-brown pus. A communica- on with the bowel was now found, and the ordinary opera- on for fistula was performed. The wound healed very owly. After the lapse of two or three months some caustic as applied, which gave great pain, and appeared to aggra- te the disease. Four months after the operation, upon amination with the speculum, an ulcerated livid surface, rger than a shilling, was seen on each side of the bowel, ttending forward to the situation of the fistula. This ed upon the slightest touch, and was accompanied by a nse of dull aching pain whenever the patient had been long the erect position. The treatment adopted was steel in- rnally, a suppository of cubebs introduced into the bowel very night, an issue in the arm, and the recumbent position uring a greater part of the day. The ulcers now soon lost eir dark livid appearance, and became covered with bright

red granulations, and healed in a month from the commencement of the last mentioned treatment.

5. The anus may be confined and narrowed, rendered sore, and in effect contracted by the growth of common warts. Where they are neglected in the heat, and moisture, and irritating secretions of this part, warts are liable to attain a wonderful amplitude and development, forming an arborescent forest, or, to use a more appropriate image, they resemble a small head of broccoli. The first inspection suggests the idea of malignant disease, of fungus shooting from the extremity of the gut. On close examination the growths are found to spring from the skin at the margin of the anus by many roots. The proper way to get rid of them, when they have attained so great a development is to clip them close off with scissors with blunt points, bent on the flat, and to touch the wounds with nitrate of silver. Like warts in other parts, they are liable to recur for a time. Cleanliness, washing the anus with soap and water three or four times a day, is the best mode of getting rid of the disposition to their formation.

6. When the system is affected with syphilis the anus occasionally becomes the seat of one of its manifestations. What in another part of the body would be a hardly elevated blotch of lepra or psoriasis, in the heat of this region, becomes a lump, or commonly a pair of lumps, one on each side of the anus, but of unequal sizes; thick, firm, flattened against each other, sore in time, the surfaces opposed to each other are covered by a white film of mucus, or, in the severest cases, become ulcerated. So swelling, hardening, ulceration of the verge of the anus may be brought about, attended necessarily with soreness, aching, pain, as the complaint progresses. The worst cases might certainly for a time be regarded with suspicion, and suggest a momentary doubt that the hardening and ulceration may be malignant, the more so that this outbreak of secondary syphilis occasionally manifests itself alone, without spots on the hands and face to suggest its true nature. A well-informed and circumspect surgeon, however, would at the first examination of the patient be satisfied as to the real nature of the case.

7. The anus is also liable, apart from the preceding maladies, to degenerate into a firm, hard, almost cartilaginous, contracted ring; the opening narrow, the texture gristly; so rigid that no dilating means will make any impression upon it. There can hardly be said to be swelling; the part is rather atrophied, and degenerated into this fibro-cartilaginous ring, or what it something resembles (only the whole history and mode of the disease is different) is the contracted circular mouth, which is seen in cicatrising lupus of the face. The author does not know how this begins, but there is the firm undilatable ring. Its *accident* is more or less cracking, fissuring, or ulceration, but there is little probability of its running into malignant ulcer. It is, in fact, an indurated stricture of the orifice of the gut, and it will go on for years in this state. The patient experiences great pain on forcing the fæces through this narrow ring, which, of course, has gradually become sore in consequence of the continued straining and pressure against it from within. The case is cured at once, by the operation of dividing the indurated ring externally. If it is very narrow, it is better to cut it through on both sides. Portions of lint are then interposed to prevent the sides of the wound uniting; and, after forty-eight or seventy-two hours, a rectum bougie it introduced by the patient daily, and kept in the part an hour or two. The hardening is absorbed; the complaint and all inconvenience often disappear.

Of Spasmodically Contracted Sphincter.

1. One class of these cases is purely neuralgic. The patient has violent accessions of pain and spasm of the sphincter muscle. It is a sort of cramp. Like other cramps, it is best allayed by stretching the fibre. If there be spasm of the foot, the toe must be stretched by the hand. If there be spasm of one of the portions of the rectus abdominis, the body should be bent strongly backward, the fibre stretched and extended, and the pain and spasm disappear. So it is here; introduce a soft bougie, well rounded and conical into the

anus, and distend it gradually, the pain and cramp will wear off.

The prevention of their return is another thing, and not so easily compassed; diet, air, and general rules; the correction of what can be found amiss in the patient's habits, or bodily functions; his excesses perhaps, or his liver, are to be attended to.

2. Another cause is hypertrophy of the sphincter, and its consequent abnormal action. The patient complains of having to exert considerable force to expel the fæces, and this has gradually brought on soreness and pain as attendants of the action of the bowels. On examining the rectum the cause of all this is discovered. The sphincter is enormous, and proportionately powerful.

In one case this state of things was apparently produced by the habit of eating spiced dishes, and that on principle, under the idea, on the part of the patient, that this kind of diet would prevent his having piles.

There is a perfect resource in these cases, namely, to divide the sphincter on each side, and let the wound unite slowly—if everything else fails. Moderation in diet, and a soluble state of the bowels obtained by gentle aperients, may alone be sufficient. As long as the fæces are soft the patient is not annoyed by the size and power of the sphincter.

The preceding are infrequent forms of disease; the following is of daily occurrence:—

The symptoms are like those of the last cases, but more severe. The patient has pain and difficulty in passing the fæces. The pain and difficulty are in proportion to their solid character. A loose stool causes little annoyance. An ordinary solid motion, on the other hand, gives him intense anguish when he forces it from him. And the pain perhaps takes two or three hours to subside. Ladies often suffer from this complaint, they are forced afterwards to recline on the sofa, with the hips bent, the knees drawn up towards the body in order to bear with the pain. Then they learn to manage thus. Every second or third night they take opening medicine, and they are thereby purged, but

suffer much less with the loose evacuation; and the intervening day or two, in which the bowels do not act, they pass in comfort.

Such are the symptoms of fissure of the rectum, as the disease, which the author means to portray, is named by English writers. In its source and nature it is a small ulcer, situated at the inner or superior edge of the sphincter. A shallow ulcer of the mucous membrane, which is exquisitely sore, and all the pain arises from the fæces being pressed against this sore part, and the seeming difficulty in voiding them lies in the instinctive shrinking from incurring acute pain.

The long diameter of the ulcer may be transverse, but from the corrugated state of the skin and mucous membrane at the anal aperture, the lesion resembles a fissure rather than an ulcer. This affection is not unfrequently seated on the posterior aspect of the intestine, close to the anus; but it may be on either aspect. It occasionally occupies the skin as well as the mucous membrane at the verge of the anus, and its exact situation may be indicated by a small excrescence, like an atrophied external pile, about the size of a pea, at the base of which the fissure may be detected; or this excrescence is divided into two by a small cleft, and one extremity of the little ulcer may be detected at the bottom of this cleft.

The ulcer or fissure is quite superficial, and generally has no induration at its base or round it, so that it is liable to escape detection, but that the patient says, "Ah! there—that is the pain, and its seat." Then you begin to distinguish the less smooth, and slightly depressed surface of the superficial ulcer. Sometimes it is situated on the sphincter fibres, and by opening the part with a speculum, you may see it; but generally it is situated just within, at the upper edge of the sphincter; its probable cause is costiveness. It has a mechanical origin. It proceeds from the frequent strain and forcing of solid contents against the soft mucous membrane, so the term *fissure* is well chosen. It often is at first an actual rent of the tender membrane.

It is a fortunate thing that the most painful complaints, are often the simplest, and most easily cured.

The present, most acute as it is, will occasionally get well rapidly, merely by the use, every other night, of some mild aperient, such as half a drachm of sulphur, or 5 or 10 grains of the compound rhubarb pill.

Or, if these means alone should fail, the use in addition, of a mild mercurial ointment—which is to be passed into the rectum, so that it may lie and dissolve upon the ulcer—will often save the necessity of any further treatment.

Otherwise, introducing a straight probe-pointed bistoury on the finger, or better, a straight Cooper's hernia knife, and then bringing it to bear on the ulcer, and making a nick in it, is sufficient at once to relieve the acute pain and cure the disease. A few drops of blood are lost; it is no operation. The patient goes about as usual, and yet he gets well.

In very exceptional instances—in the worst and most obstinate cases alone—it is requisite to divide the sphincter entirely through on one side, implicating, if possible, the ulcer in the rectum. The sides of the wound are prevented, through interposing a piece of lint, from healing by adhesion. They close gradually by granulation. At that time the passage of the anus is perfectly free. The ulcer then heals, and the patient loses all his pain.

A peculiar Form of Internal Fistula.

Allied in some of its characters to fissure of the rectum, and in others to internal fistula, is an affection which has not hitherto received that attention which its importance demands. It consists of an ulceration of the mucous membrane of the rectum, situated generally an inch or an inch and a half within the bowel, accompanied by a sinus which leads down generally between the mucous membrane and the sphincter to near the external opening of the bowel. This affection is attended with the same kind of pain as that produced by fissure of the rectum. The pain, however, is not so severe, but it often lasts much longer.

It is a disease which may not be recognised, even when the surgeon has an opportunity of making the most careful examination. The finger introduced into the rectum may glide over the superficial ulceration, without detecting its existence, or a probe may be repeatedly passed over the opening without meeting the slightest obstruction. The way he detects this disease is as follows :—

Bend a probe at an acute angle, and introduce it upon the finger into the rectum. The patient may complain of pain at one particular spot. The point of the bent probe should then be drawn *down* over the tender spot, and if the mucous membrane be ulcerated in the way above described, the probe will pass between it and the fibres of the sphincter muscle, and its point may then be felt under the thin skin on the margin of the anus. Immediate relief is given in these cases by dividing the mucous membrane over the whole length of the sinus. This may be conveniently done by introducing a probe in the manner above mentioned, and cutting it out with a probe-pointed knife.

CASE.—A lady had for several years suffered very severe occasional pain at the lower part of the back and around the hips. This pain was most severe after passing a motion, or after using an injection which she had often been directed to do under the idea that costiveness had to do with her sufferings. Sir B. Brodie and myself saw this patient in consultation. The nature of the complaint was not upon that occasion ascertained, although a careful examination of the parts was made.

After the lapse of a short time another examination was made, and the nature of the affection was then detected. The sinus was laid open from within, and the patient completely recovered.

It is hardly credible what an amount of suffering so trifling an ailment as that in the preceding and following case may produce. The disease, although sometimes very difficult of detection, may at other times at once be recognised by an educated finger.

CASE.—A lady had for six months suffered severe pain

about the sacrum and hips. This pain was always increased after a motion of the bowels. She had undergone a variety of treatment, including the application of caustics, under the idea that she was affected with piles. Upon the introduction of the finger into the bowel a circumscribed roughened spot was felt at the most tender part. The patient was placed under the influence of chloroform, and a speculum with an opening on one side was introduced. A probe, bent at an acute angle, was then introduced through the speculum, and its point could be seen entering the internal fistula. Upon drawing the probe down, without using any force, its point projected under the thin skin on the margin of the bowel. The probe was cut out and the wound, after being once dressed, was allowed to heal of its own accord. The patient was permanently cured.

Malignant Diseases of the Rectum.

Malignant diseases of the rectum affect two distinct forms, the diagnosis of which is, for the most part, easy, and to which in all their varieties, a considerable variety of treatment is available.

I.

In the first of these, the rectum is the seat of a morbid growth, which, whatever be its primary seat, has a tendency to invade every tissue, substituting for all a uniform mass of disease. The commonest form the growth assumes is the encephaloid, and this occasionally, here as elsewhere, is black with melanotic deposit. The scirrhous stands next in frequency, and it is only very rarely that the tumour consists of the gelatiniform or colloid variety of cancer. The growth commonly originates from two to five inches within the anus; its centre being mostly within three to four inches of it. It invades, in a very short time, the whole circumference of the intestine, which becomes a tube of cancerous growth from two or three, to five or six inches in length.

The complaint, though it may occur at any period of life, from boyhood upwards, is not often met with in patients under thirty years of age.

The cylinder of cancerous growth, thus substituted for a certain length of the natural structure of the rectum, is externally of a firmer, denser consistence. There is a basis of greater induration, and firmer thickening. The inner portion, that looking to the cavity of the intestine, is in either case, whether the mass be encephaloid or gelatiniform, of a looser texture, readily broken down upon pressure, soft and spongy. The volume of the tumour is in this soft inner stratum, and appears to be due to the development of the disease in the mucous and submucous tissues. Sometimes the growth is irregular; or a long shoot, like a bell rope with a festooned end, escapes from the anus with every stool. After a time, the inner surface ulcerates, so that its margins become more elevated than the centre, by reason of the combination of a disintegrative and ulcerative action with one of progressive growth. The approach, or the commencement of the complaint is very insidious. It has happened that, for years, the patient has suffered from costive and irregular bowels, from a sense of irritation in the rectum, and he has been carefully examined by surgeons, and no disease could be detected. Often, on the other hand, the disease has made considerable progress before it has been even suspected. It is easy to deduce the symptoms of the disease, from the history which has been given of its nature.

The canal of the rectum has been gradually encroached upon and obstructed. Then, the fæces have been expelled with difficulty when solid; at length, in that state they have been retained, and have only come away through the action of medicine, or increased secretion dependent upon irritation, in serous solution or in fragments combined with mucus. The occurrence of more or less constant discharges of this kind may closely resemble the symptoms of diarrhœa; but the character of the discharges, and the concomitant symptoms, will indicate their true nature.

At length there is a frequent call to empty the bowels,

always with an imperfect relief—small fragmentary quantities only passing, leaving tenesmus afterwards.

Then, arising conjointly from the narrowing of the passage and the growth of formidable disease, there is experienced a sense of weight—sometimes making it difficult to rise from a chair—in the rectum, aching round the hips, pains of the thighs, and irritation of the bladder.

The soft surface of the tumour, slightly torn perhaps by the passage of fæces, bleeds continually; blood and mucus are constantly, pus more obscurely, mixed with the discharges from the bowel.

Now, it by no means follows that a person who has these symptoms labours under cancer of the rectum; stricture or even piles will produce them. The patient's look, however—the complexion, the facial expression, and the marks of a progressive emaciation—generally tells you beforehand how grave his case is. But diagnosis can only be made through surgical examinations of the part. The finger introduced into the rectum, can feel whether or not there exists a growth in it, such as has been described. As in everything else, there is room here for tact and experience. Yet a very little experience suffices, in cases that are at all advanced—the change from the natural condition of things is soon so clearly marked.

It is not so, however, in all cases at an early stage. The distinguishing a cancerous narrowing of the gut from chronic inflammatory stricture may not then be so easy. The disease may, however, be generally recognised by its history, the severe character and the extensive seat of the pain, the patient's aspect, the detection by the finger of an irregularly indurated structure, and by the cartilaginous, or the soft elastic consistence of the morbid growth, which leaves perhaps a bloody stain upon the examining finger.

These unfortunate cases are almost uniformly progressive; they necessarily get worse, and end fatally. But they admit of considerable mitigation. The patient may be spared much suffering. The following means are in their turn available:—

The occasional use of a soft rectum bougie of half an

inch in diameter or less to press aside or repress the tumour, and shape a passage through it. This is often a temporary source of relief to the patient; but then he must have first been suffering from obstruction, and the means must be resorted to occasionally only, or it produces its own direct irritation. Great gentleness must be used also in the introduction, or laceration of the softened coats may take place. The bougie is to be retained on the tumour from a minute to a quarter of an hour, as experience may teach.

Injections of tepid water, which often soothe, but occasionally distress the patient, are among the things to be tried with caution. If the water passes easily through the narrowing, it is particularly soothing to the intestine above, and helps to relieve it by bringing away fæces in fragments or in a softened state. Aperients are commonly necessary from the want of relief to the bowels without their use, and from the aggravated distress the patient feels from accumulation in the colon. Small doses of castor oil or rhubarb, 5 to 10 grains of the compound rhubarb pill, and the like, answer very well. The mildest aperients are the best. Everyone has had experience in himself how drastic purgatives heat and disturb the rectum. They do so, of course, in a tenfold degree in cases of disease of the bowel. In combination, or rather alternation, with the above-named means opiates are of sovereign importance. An injection of a drachm of laudanum in two ounces of solution of starch, or the introduction of a two-grain opium suppository, may be very useful; yet, in general, it is better not to trust to their local use, but to administer the narcotic in an opiate draught, or by subcutaneous injection. How often this opiate should be given, whether twice in the twenty-four hours, or every night, or every other night—the aperient being given on alternate nights—or every third morning—the opium being taken every night;—all these things are minutiæ—minutiæ in a book—minutiæ in general, not minutiæ by any means to the individual suffering patient, and which observation alone of the individual case will enable the surgeon to suit and adapt to its requirements.

The question naturally arises in these cases: can nothing be done to divert the channel of the fæces to another and healthy locality? The answer to this is affirmative; but then, the case manifestly must not have advanced to the last stage of the disease, and the chief cause of the pain must be clearly traced to the obstructive nature of the disease, and to the great local suffering produced by the flow of fæcal matter over the diseased parts. We may then seek to palliate the patient's sufferings, or if he strongly desires it, we may, in cases of extreme obstruction, purchase him a respite from suffering and death, by opening the bowel in the left loin.

II.

Under the second head of malignant disease of the rectum, a disease presents itself generally, as destructive as the above described, but in which there is no prominent or obvious morbid growth.

A few words give its whole features. The mucous membrane disappears by ulceration; the subjacent tissues of the bowel are indurated, very slightly thickened.

This state may occupy, and often does occupy the same region as malignant growth, and is often confined to it; but it may extend very far indeed along the intestine, to as much as 14 or 15 inches, penetrating far into the sigmoïd flexure of the colon. It comparatively rarely spreads to the anus. This is equally the case with malignant growths. Both generally stop two inches short of the anus.

This disease can be identified only at the last. The finger passed into the rectum, feels the length of bare, contracted, and hardened tissue, that now forms the cylinder of diseased intestine. The treatment of this form of the complaint is exactly the same as that given for malignant growth.

But there exists an important variety of this disease; the indurated ulcer occasionally commences at the verge of the anus; and, if it is unchecked, spreads round the whole circumference, and extends gradually into the intestine, and ends in the same manner as that commencing inwardly.

The disease is easily verified, for it is not only felt but seen; the ulcer is apparent, and its hard, but not much thickened base, may be felt.

The complaint is of slow progress, but it is desirable to treat it actively, and to get rid of it at once, when it is met with in an early stage. Like a cancer of the lip, it may sometimes be got rid of easily at its commencement; when it is large and well established it is fatal. The only available mode of treatment is the destruction of the ulcer. For this purpose, if it is of small extent, on one side of the anus, nitric acid, potassa fusa, and such like may be used. But the knife is preferable: clean excision of the indurated part is surer, and upon the whole less painful. By passing two tenacula through the small portion intended to be removed, and widely dissecting them out, the operation secures the entire removal of the matrix of disease.

It is for the patient's interest that the surgeon should be bold in this complaint; and even when it has invaded the whole circumference of the anus externally, and spread to an inch or an inch and a half of the interior of the rectum, its edge being quite defined, and all above being soft and clear of disease, and the patient of an unbroken constitution, not passed middle life, or not beyond 50, then certainly the complete removal of the disease by an operation should be attempted. If left, a fatal result only can be expected.

These cases are much more common in women than men. There is at present (January, 1866) under the author's care in St. George's Hospital, a very well marked instance of this disease. A young woman, seven months gone in the family way, was admitted, suffering almost continual and most excruciating pain in the lower part of the rectum. Upon examination the whole circle of the mucous membrane was found to be ulcerated, and portions of the remaining tissue was thrown up into slight elevations by the spasmodic action of the sphincter muscle. At first sight the parts presented the appearance produced by warts growing from the anus; but a closer inspection proved that the inequality of surface was produced, not by any additional growth, but by unequal

ulceration of slightly thickened parts. Ulcerated fissures existed around the whole circumference of the bowel, and the pain which the patient suffered was in proportion. She was delivered a few days after her admission, which prevented any operation being at that time performed.

Of some Restorative Operations connected with the Rectum.

The most interesting field of surgery is that in which its means are immediately directed to repair lesions or deformities unconnected with disease, and where they are resorted to for correcting, in a frame otherwise sound, some mechanical imperfection.

The cases of this kind which present themselves in connection with the rectum, are of great gravity, implicating the comfort, or existence even of the patient. They belong to two heads.

Under the first, we may include laceration of the sphincter in labour; and a fistulous communication between the rectum and vagina, constituting recto-vaginal fistula, a condition which also generally takes its origin from some injury, abscess, or sloughing of the parts after tedious parturition.

Under the second head are included congenital deficiencies of the terminal part of the rectum.

Whenever a labour proceeds rapidly, the perinæum is in danger of being torn. Sometimes the laceration is superficial, and involves with the integument a few fibres only of the sphincter. Sometimes the muscle is entirely torn through. The insignificance or gravity of the case turns upon this difference, for if the principal part of the sphincter remain entire, the laceration, however it may heal, leaves no unpleasant consequences, as far as the function of the rectum is concerned. Nevertheless, even this lesion should not be neglected, because any tendency to prolapsus of the pelvic viscera is liable to be greatly aggravated by the loss of the natural support of the perinæum, and prolapsus may ensue when the patient has recovered from her confinement. If the laceration,

however, be of limited extent, we have only to maintain the knees together by a bandage, and keep the parts clean, by washing them four or five times a day in tepid water, to secure union. If the rent be greater than this, it is desirable to close it as soon as possible after delivery by sutures, and if this cannot then be done, we must defer any operation until the lochial discharges have ceased.

But when the sphincter is completely divided as the effect of the laceration, the natural result is that the edges of the wound cicatrise *without uniting;* that the office of the sphincter ani is at an end; that there is nothing to prevent the fæces escaping, as soon as they reach the lower part of the rectum; and finally, that the sphincter ani being diseased, wastes, becomes atrophied, and in a great measure disappears.

The case is occasionally presented to the surgeon in either of the above conditions, with the laceration still presenting a raw surface, or after some lapse of time, a cicatrised tear with a wasted sphincter.

Under very favourable circumstances, that is to say, where the parts are extremely relaxed and continue so for some days after the labour, where great attention is paid to cleanliness, &c., where the bowels are in a soluble state, and the patient is kept perfectly still with the knees bound together, union of a laceration, even through all the fibres of the sphincter, may possibly take place. But the chances are always against this favourable result, and it is prudent to have recourse to an operation to remedy the mischief.

Two procedures used to be adopted in these cases, the one originating with Mr. Copeland, and the other with M. Dieffenbach. The object of the first was to remove the tension, and allow the edges of the laceration to come into the close apposition necessary to their union. This was accomplished by dividing the sphincter muscle deeply on each side, and preventing the union of these wounds, while the attention was directed to the healing of the original laceration. M. Dieffenbach's plan combines these lateral sections of the sphincter with the simultaneous sewing up of the laceration by means of four or six uninterrupted sutures.

The success which attended these plans of operation was never very promising, and they have been superseded of late years by another method, which has proved eminently successful in practice. There is much nicety required in this operation; but then it is altogether preferable. For the extent of the incisions no exact rule can be laid down. Foresight and skill in planning, with tact and dexterity on the part of the surgeon to avail himself of the exact circumstances of the case, are no doubt required, but the principles are clear and simple.

The method of operating will be essentially the same, whether the sphincter ani has been torn across or not, and it makes no difference as regards the closure of the wound, which will take place as easily where the sphincter is involved as where it remains intact.

The operation consists in denuding the mucous membrane of the vagina and the edges of the laceration, applying *some* metallic ligatures deeply, on the principle of the quill suture, and *others* superficially, in order to bring the parts fairly and firmly together. In all cases it is necessary to perform this denuding process extensively and deeply, so as to get the support of a good thick cushion, and we must pay great attention to the angles of the wound, particularly the lower one at the orifice of the bowel. As rather smart hemorrhage may be anticipated, it is well to have a good supply of ice at hand. Chloroform having been given, the patient is to be placed in the lithotomy position, or to lie half over on her face. The vagina is to be kept well open by means of the duck-billed speculum. The mucous membrane about the opening of this canal is to be dissected upwards for a good extent, and the skin about the edges of the laceration is to be dissected off for about an inch and a-half forwards, and obliquely backwards on each side, so that the denuded surfaces may become continuous at the posterior angle of the laceration. Three or four sutures of stout silver wire are then to be passed deeply through the denuded surfaces, so as to bring them firmly together, the sutures nearest the rectum passing the deepest. The edges of the flap of mucous mem-

rane are next to be trimmed, and it is then brought down o the upper angle of the wound, and united by silver wire utures to this part, so that it may cover in and slope over he deep surfaces of the denuded parts as the wound heals. The deep sutures may be tied over a piece of quill, or a ougie on each side of the wound; or two bars, composed of ieces of ivory or metal, and perforated with holes, may be ssed, the ligatures being passed through the holes and roperly secured. The anterior part of the wound may be nited by three or four superficial sutures of thin silver ire.

Mr. Thomas Bryant has invented an instrument with a mall, sharp-curved prong at its extremity, by means of hich the mucous membrane may be raised from the sub-acent tissues to the exact extent that may be requisite. By utting on the convex side of the prong, the raised mucous embrane and nothing more is removed. The prong may erminate in one, two, or three sharp points, which may be irected so as to take up the mucous membrane either in the ertical or in the transverse direction.

The use of such an instrument very materially facilitates he operation above described.

If the laceration of the perinæum is complete and extends ny distance into the bowel, it is necessary to divide the phincter freely, at least on one side. If any vessel "spurt" uring the operation, it ought to be secured at once, and the ound should not be closed until the bleeding has materially iminished. As hemorrhage is apt to recur, it is well to in-ert a piece of ice in the vagina, and keep an ice bladder in ontact with the parts.

The deep sutures and bars should not be removed for four r five days, and the superficial ones should remain six or ight days. The bowels must be kept confined with opium, nd the urine removed by the catheter being retained in the ladder, or passed at regularly stated intervals. The patient ust be retained in bed for three weeks, and even longer, here prolapsus has formed a feature in the case.

By this operation we may almost always afford the

patient perfect control over the bowel, so that the inability to retain the fæces no longer exists; but we cannot always prevent her suffering from prolapsus, because, in many cases, this condition arises from other causes than loss of perinæal support. The most effectual way of guarding against it, however, is to make the new perinæum as thick as possible, and to plan our incisions so as to contract the orifice of the vagina.

There are probably no operations which require more than the present, that the surgeon should have the clearest conceptions of all that he contemplates doing before their commencement. When the different sections that have been described have been all made, and he has to commence his sutures, the parts are really hardly recognisable; and the author has seen surgeons end these operations very imperfectly, and evidently in a totally different manner to that which had been originally intended. This operation, in fact, as it contributes more than any other in the compass of surgery to the comfort of the patient, when it is successful, so is it in every sense one of the most delicate and difficult.

The battle, unluckily, is not won in the present case, when we have only got as far as to the successful mechanical termination of the operation. The parts may have been admirably adjusted and secured, but it still remains to be seen whether they will unite. And it requires only the event of an ordinary motion to ruin in an instant all the foregone care and labour.

It is desirable, therefore, to make a preliminary trial with the patient, to see how this matter can be carried through; a week should be given to this experiment; at the commencement of which the bowels should be fully and largely emptied by a given purgative dose, and immediately a strict course of rest and diet to be observed; the patient taking daily a very small quantity of digestible, and highly nutritive food—arrowroot for breakfast and tea, soup and jelly with a biscuit for dinner, and drinking very little. With this plan the administration of opium may be combined, so as thoroughly to lock up the bowels. This state of things may

maintained for a week, and then a gentle aperient should given, and its operation studied, to make it evident whether e use of an injection might be further required to relieve e rectum of its contents without any straining, or the ssage of any hard mass.

This experiment having been successfully made, the ttient should again get about, take plenty of her customary et, with exercise and air, and bring herself into her full con- tion of strength, vigour, and spirits. When this is accom- ished the operation should be performed.

Recto-vaginal fistula commonly ensues, as has been said, m some injury or sloughing of the soft parts after a pro- acted labour; sometimes, though rarely, from other causes, ch as stricture of the rectum, abscess in the recto-vaginal ptum, and so on. The form and extent of the lesion may ry very much from a small round, oval, or oblong opening a complete loss of the septum, and a perfect communica- n between the contiguous canals of the vagina and rectum, m the anus to the os uteri.

The amount of success attending surgical attempts at ring this distressing affection used to be very small and promising; but it is so no longer. The results obtained m recently devised measures have been so good that we y regard the operative treatment of both recto-vesical and sico-vaginal fistulæ as among the most satisfactory pro- edings in surgery.

The greatest ingenuity has been exercised in the way instruments, and there exists a variety of needles for ssing the sutures and bars, metallic buttons, and little re splints for fixing them. The most ingenious of these ttons are, perhaps, some little metal cones with a hole in e centre, and a slit on one side, invented by Mr. Pollock. e main thing, however, is to see that the edges are properly reshened" and denuded, and accurately brought together sutures.

The principal points to be attended to are—

1st. To get the patient into a satisfactory state of health, o such a condition as will promote a healthy and vigorous

process of union, and to ensure a right state of the secretions.

2ndly. Chloroform should be given to prevent the pain, and allow of a clear view of the parts involved during all the details of the operation.

3rdly. The most careful denudation of the edges of the fistula should be made, so that not the least portion of mucous membrane be left at these parts when the edges are brought together.

4thly. Needles with handles should be used to insert the ligatures, and these last should be metallic.

5thly. Careful attention to the bladder and rectum is necessary afterwards, to prevent the urine from coming in contact with the wound on the one hand, and to avoid any strain on stitches or wound by the action of the bowels on the other.

The author prefers Mr. Startin's tubular needles, and the silver wire for the purposes of this operation, which may be performed in the following way :—

The bowels are to be well cleared out by enema, and chloroform given. The patient may kneel and lean forward, so that the chest is lower than the abdomen, or she may lie upon the left side with the knees well drawn up, or as in the operation for lithotomy. If she occupies the first position, and the belly is relaxed and pendulous from previous confinements, the air will rush into the dilated vagina as the abdominal viscera fall downwards, and a good view of the canal will be obtained. The parts are to be well exposed. This is done by an assistant maintaining the nates widely apart, while a duck-bill speculum is inserted into the vagina. The opening of the fistula is then to be well drawn down by the use of hooks, or by means of a flexible metal sound, hooked through the fistula from the rectum by bending its end forwards. The edges are then to be most carefully pared to their whole extent, making the section with a small and thin knife, obliquely from the vagina towards the gut, in such a way that the wound is bevelled at the expense of the vaginal mucous membrane, great care being taken to avoid the lining membrane of the rectum. The

sutures are next to be inserted, by piercing the parts obliquely rather more than a third of an inch outside the incised edges of the wound. The ligatures are then to be tightened and twisted in such a way as accurately to oppose the raw edges without the least interposition of the mucous membrane in the line of the wound by its folding over or inversion, and without inducing any undue tension. If the fistula extend very close to the anus the degree of tension may be considerable at this part, and it is necessary then to make a section of the sphincter, but not otherwise. The bowels must be confined for ten or twelve days after the operation, and the urine removed by the retention of a catheter in the bladder, or by its insertion at regular intervals of six hours. The parts must be maintained in perfect rest and cleanliness, the latter, by means of injections of tepid water into the vagina.

The operation now described resembles that which has lately been performed with so much success in cases of vesico-vaginal fistula. If the septum between the rectum and vagina be thin, it is well to remove a portion of the mucous membrane only from around the orifice in the vagina without interfering with the edges. The raw surfaces of the mucous membrane may then be brought into apposition with the sutures, passing from the healthy mucous membrane outside that which has been removed, to near the margin of the fistulous opening. For removing the mucous membrane in this way, the prongs invented by Mr. Bryant afford great assistance.

Whenever the mucous membrane is abraded in a healthy constitution, it has a natural tendency to contract, like the skin on the surface of the body, and advantage may sometimes be taken of this tendency to procure the closure of a fistulous opening. The repeated application of caustic will sometimes cause a fistula to heal, and after an operation such as that above described, should any small sinus be left, it may frequently be closed by this means. Mechanical laceration of the mucous membrane will sometimes be followed by this process of contraction.

CASE.—A lady was confined of her first child in the country, in 1864. The labour was protracted, and the surgeon felt called upon to use instruments. Chloroform was at the same time administered, under which the patient became excited. Having no assistance, it was impossible to prevent the patient moving about in a violent manner. The result was a recto-vaginal fistula, situated above the sphincter ani, which subsequently showed no disposition to heal. The patient now came under my care, and the operation last described was performed, and when the patient recovered, all inconvenience with regard to the communication between the rectum and vagina appeared to be at an end. Upon examination, however, a small oblique fistula was still found to exist. A probe passed obliquely upward from the rectum into the vagina, but from the valvular nature of the opening no inconvenience was experienced, and no further operation was contemplated.

This lady became pregnant again in 1865, and when she was confined, great care was taken that no fresh laceration should take place. It was found, however, that the mucous membrane around the original fistula had become lacerated to a slight extent in different directions. The surface so exposed became covered by a mass of healthy granulations, the size of a small two shilling piece. These gradually contracted, and firmly and permanently closed the opening.

The *second class* of cases for which restorative operations in connection with the rectum are required, comprehends a vast variety of congenital malformations, some of which admit of complete reparation, others of relief, while some are utterly hopeless. The slightest forms of these cases may be a mere occlusion of the anal aperture by the integument only; or an incompleteness of the anus when, in place of the regular structure and opening, there is a small aperture like the opening of a fistula, on one side perhaps of the median plane, while there may be a small cul-de-sac, big enough to hold a millet seed, in the exact axis of the deficient anus; or the single small opening may be in the same situation.

In the first mentioned instance the meconium collects, and

forms a swelling in the perinæum, corresponding to what should have the aperture of the anus; a darkened hue or colour is given to the tumour by the contents of the gut, and the case is simple enough. A sharp-pointed bistoury is to be plunged into the centre of the protruding skin, and a small transverse incision should be made; then, another little incision, at right angles with this, and the four angular flaps of skin should be excised. A bougie is passed daily, to maintain patency of the aperture during the healing process, and the cure is easily effected.

In the other cases, the true state of things is sometimes overlooked at the birth of the infant, and for a few weeks, as long as the fæces are nearly liquid, nothing may occur to draw attention to it. In time there is swelling of the abdomen, distress, obstruction of the bowels, often accompanied with straining, and frequent expulsion of small quantities of liquid matter, and then the truth is suspected, and the parts examined. This case also admits of a complete remedy; the imperfect opening is to be enlarged by the introduction of a straight probe-pointed bistoury, carried, if the opening is not in the proper place of the anus, in a direction towards that part; if it be exactly situated there, then carried a quarter of an inch forwards, and a quarter of an inch backwards, so that the end of a small rectum-bougie may be admitted.

It is on no account desirable at this moment to make the opening large: it should be free enough to give exit to the inconsistent pulp, or putty-like material, with which the bowel may now be loaded, but not larger; for it is impossible to tell how much of the natural sphincter apparatus may be there, and it is all important to preserve what there may be of it. A larger opening by the bistoury might get beyond its confines, dividing the few vestigial fibres there may be there. The surgeon is to act on the principle of preserving every bit of this structure which may happen to have been formed.

Then the small but sufficient opening, obtained in the manner described, is to be maintained by the daily introduction of the bougie, an inch into the rectum; this may be kept

there an hour. And for this purpose it is best to use a small stump of a polished, rounded, metal cylinder attached to a broader disc, which will rest on the perinæum, and may be secured there with ties.

The use of such an instrument serves further to stimulate and excite to growth any rudimentary sphincter fibres there may be, which it holds out, stretches, and extends. Gradually, a larger and larger instrument may be substituted as the child grows. Perhaps, when it is weaned, enlargement with the bistoury may be necessary to allow the passage of more solid fæces. By such management these cases end most prosperously; the natural sphincter structure, apparently, being often thus educed, as it were, from the rudimentary state and becoming perfectly efficient.

The next case in lightness, is when the rectum is complete to within an inch of the anus, terminating within that distance of the sphincter in a cul-de-sac. The origin of these deviations from the normal state—the congenital imperfections of the anus and rectum—possesses interesting physiological as well as pathological considerations. They depend upon one of two causes:—1. Arrested development. For instance, the bowel is not from the first one continuous tube, but the anal portion is developed separately from the upper part, and, as the two unite, the continuity of the passage is effected by the absorption of the septum. Again, the cloaca which naturally exists at one period of fœtal life, where the rectum is in contact with the vagina or urethra, may become the seat of a communication between these parts. 2. On the other hand, it occasionally happens that a part of the rectum above the anus becomes obliterated by some intra-uterine disease, and we may then have an external anal pouch, an areolo-fibrous cord, and again the bowel in its normal state. Let us take the first case, the rectum terminating about an inch from the anus.

Then there may be, or there may not be, a superficial cul-de-sac of the integument, the end of which, if it exist, may abut upon the end of the intestinal cul-de-sac, so that only a thin partition, after all, exists between the cavity of the

intestine and the surface of the body. When this is the case, it is obvious that a very simple proceeding alone will suffice: the septum is to be perforated with a middle-sized trochar in the axis of the cutaneous cul-de-sac.

Should the cul-de-sac extend to any depth at all, there may be a slight interval between the anal and the upper portion of the gut, occupied by the septum and a little intervening areolar tissue. Something more than puncture is then required. Having determined the close proximity of the upper part of the bowel, and made a free opening into it for the exit of the retained fæces, we must seize the mucous coat of the bowel, draw it downwards, and tack it to the edges of the wound in the skin by means of silver wire ligatures.

The other case is, however, the more frequent; the perinæum plane is no indication whatever of the deficient intestine. In this case, the first rule is, not to be in a hurry to do anything. It will be several days before the meconium and other contents of the intestine accumulate to a degree to be troublesome. The infant does not suffer by the delay, and there will be this gain:—the operation, which you perform in the end, will be one of *relief*, and all such operations do best; that is to say, those in which the wound and its attendant irritation are made up for by immediate functional restoration or relief of suffering.

But it is not possible to tell, except by the event, that the case is so simple and straightforward as we are supposing it really to be. For all the accoucheur can observe or determine is this, *there is a plane perinæum with nothing to be felt of intestine above or behind the integument.* It is impossible, therefore, to say how far from the perinæum the terminal cul-de-sac of the intestine may be. Wait, then, for events which may throw light upon the matter. Wait till the rectum becomes distended with contents, which will happen in a few days' time, and then you may very possibly feel with distinctness an ill-defined, soft, fulness when you press with the finger on the perinæum, that at first was not distinguishable from its not having been there. The cul-de-sac has become filled, ex-

tended probably, pushed downwards, and brought nearer to the point, from which you may hope successfully to open it.

Indeed, the matter is settled as soon as you distinctly feel, when the child strains, or vomits perhaps, the obtuse, obscure forcing of the full cul-de-sac downwards against the finger. You have only then to calculate, as exactly as possible, where the axis of the intestine should reach the perinæum, and then introduce a middling-sized trochar directly into the gut. The child of course receives instantaneous relief. The canula is left in the perforated wound you have made, or taken out only to be cleaned, and the passage gained is then preserved by dilatation, or by cutting even, if required. It may afterwards be enlarged if necessary; but this will hardly be requisite. The canal artificially made will be ready enough to grow with the rest of the frame, and it is only necessary to have a series of canulas, or, more properly, a set of metal plugs; for, in a short time, the inner surface of the tube that was made by the trochar cicatrizes, and forms a channel through which the fæces readily and naturally pass.

It will readily enlarge with the child's growth, if the proper means to encourage it be not neglected; that is to say, if the metal cylinder or plug be worn constantly, and if, from time to time, one a shade larger be brought into use. There are necessary conditions. For, if on the one hand, there are almost unlimited sources of accommodation in the growing body, which may by proper means be turned to proper account, yet, on the other hand, is there an inherent tendency in all cicatrized wounds and cicatrices to contract and draw together; so, that left to itself, such a channel as we have supposed, after it has once been ever so fairly healed and established, will, nevertheless, very rapidly narrow to a small, hard fistulous canal, through which nothing but liquid can pass, and the restoration of which is a work of great trouble and difficulty.

Therefore the metal plug has always to be worn. It is to be taken out only to be cleaned, or to allow of the action of the bowels. The pewter-like metal, of which flexible metal

bougies are made, is better for this purpose than silver. It is less hard and harsh. Its surface has a sort of greasiness, and its substance is yielding in a degree. It should rest, of course, upon a good broad base, fitted to the perinæum. The surface should be polished, so as to be very smooth, a crack in it, making a sort of hardly perceptible edge, will be felt, and distress and irritate. But if the instrument be well made, of the proper diameter and length—for an adult, at least about two inches in length, and half an inch in diameter, and terminating in an extremely evenly rounded end—it will answer the purpose of preserving a sufficient passage for the contents of the bowel, and, being constantly worn, will be never felt as of the slightest inconvenience. The patient may walk, ride, and take exercise as prolonged and violent as any one else. He is in comparative comfort so long as his bowels are not irritated and loose; but then he has to be on his guard or lie by. But all the requisite self-observation will have grown up with him, and he is, with his alleviated ailment, quite as independent a person, practically, or nearly so, as the most perfectly constituted being.

When in an infant with imperforate anus, nothing like a permanent cul-de-sac of intestine is to be felt in a week or ten days—distress and obstruction supervening, distension, vomiting, emaciation,—the surgeon may still attempt something. Then he had better make an opening in the integument of the perinæum, and introduce the point of his little finger, to try and feel for something like the end of the intestine within, and puncture it. If the pelvis be not small and contracted, and the perinæum becomes convex when the infant screams, success may be anticipated; if the opposite condition exists, failure will probably attend any operation. When such attempts are made, though unsuccessfully, it is wonderful how long the infants survive; three weeks or a month are often gone through ere they perish. Failing to reach the bowel by the perinæum, there only remains one plan open to us, viz., to establish a vent through the colon, by the operation in the loin which has been already described. There are some rare complications, such as imperforate anus,

with the rectum communicating with the vagina, the treatment of which is to be accommodated to the circumstances of the case, and is obviously deducible from the principles which have been now laid down.

In these cases the writer would feel inclined to proceed in the following manner. First, to seek the point of communication between the gut and the vagina or urethra; then, if practicable, to pass some sound by the latter canals into the bowel by the aperture of communication, so as to make it project in the perinæum. Taking the sound as a guide, an incision should then be made from the point selected for the site of the anus to the sound, the end of the bowel sought for, opened freely, the mucous coat drawn downwards, and connected with the edges of the wound in the perinæum by metallic ligatures. Care must be taken, of course, to carry the new tract as far away from the old one as possible, by keeping the incisions well towards the coccyx. When the rectum communicates with the vagina, this plan is a perfectly practicable one; but it is not, when the fæces escape by the urethra, nor can the opening in this canal be closed afterwards. The new and artificial tract must be kept perfectly patent, and its contraction prevented by the insertion of metallic bougies. As soon as this has been accomplished, the closure of the entrance into the vagina must be attempted by the actual cautery, or, what is better, by a plastic operation.

THE END.

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