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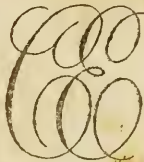
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CHAPTER XXXVI.

Of WOUNDS.

SECTION I.

Of Wounds in general.

VARIOUS definitions have been given of the term Wound; but few if any of them appear to be exact. Boerhaave defines a wound to be, a recent bloody solution of continuity in any soft part, by the motion, pressure, or resist-

ance of some hard or sharp body. By Sauvages, it is said to be a mechanical division of any fleshy part, attended with a separation of the parts newly divided, together with a discharge of blood and a tendency to inflame and suppurate. And Ludwig defines a wound to be a morbid division of parts which in a state of health ought to be united.

These are the definitions of this term which have been most generally adopted; but it is evident that none of them are sufficiently correct. A part may be deeply cut, even large blood-vessels may be divided, without any discharge of blood taking place, as frequently happens in lacerated wounds, and in such as are attended with much contusion: and where the smaller vessels only are divided, the discharge of blood ceases, almost in every instance, in the course of a few hours from the time that the wound was inflicted.

The definition recited above from Mr Sauvages is too extensive: It comprehends a period or stage of wound which
does

does not always exist, viz. a tendency to suppurate. We know that wounds frequently terminate in gangrene and death, without any previous suppuration; while in other instances they heal by the first intention, and their edges adhere to one another without any appearance of pus.

Neither is Dr Ludwig's definition of a wound correct: Parts which ought to be united, may be divided without being wounded. Thus a blood-vessel, nerve, tendon, or muscle, may be completely ruptured either by a violent sprain or a contusion; but unless the corresponding skin and other teguments are divided, we do not say that such parts are wounded. Nor are these affections confined to the smaller muscles and tendons; for instances often occur of the different parts even of the largest muscles being thus violently separated from one another.

Every recent solution of continuity in the softer parts of the body, when attend-

ed with a corresponding division of the teguments, may be denominated a wound.

From this definition of wounds, it is evident that they will exhibit great variety in their nature and appearances. This will arise from different causes, but more particularly from the nature of the injured parts; from the manner in which they have been produced; and from their extent.

Thus wounds in fleshy muscular parts are very different, both in their nature and appearances, from such as affect membranous or tendinous parts only. Wounds that are made with a sharp cutting instrument are materially different from such as are attended with much contusion or laceration: and punctured wounds exhibit very different appearances, and for the most part are productive of very different effects, from such as are more free and extensive. In the subsequent parts of this section these varieties in wounds will be considered. In the meantime, we shall give a description of the phenomena

phenomena which usually take place in the most frequent form of this affection, what may be termed a Simple Incised Wound; by which both the theory and practice which we mean to inculcate will be rendered more intelligible.

On the instrument being withdrawn with which a wound of this kind has been made, the first appearance we take notice of is a separation to a certain extent of the divided parts; and this always in a greater or lesser degree, according to the depth and length of the wound, and according as the fibres of the injured part are divided more or less transversely. Thus a wound, even of a considerable length, if it runs in the same direction with the fibres of a muscle, will be attended with a small retraction of the skin; while a large vacuity will take place in a wound of less extent where a strong muscular part is cut directly across. Nay, in this last case, the separation of the divided parts is in some cases so considerable, as to give cause to suspect that a portion

of them has been removed ; while in the other it is often so trifling, that even an extensive wound will have the appearance of a straight line only : a circumstance by which practitioners have been often led to consider as of no great importance, wounds which in their consequences have proved to be formidable ; and by which the propriety of examining every wound with attention is strongly pointed out.

The next appearance which takes place in wounds, is a discharge of blood to a greater or lesser extent, according to the size of the cut, and to the number and size of the vessels that are divided ; at least this is the case in wounds made with a sharp cutting edge. Where the parts have been much bruised or lacerated, we have already remarked, that even large blood-vessels may be divided without any hemorrhagy ensuing.

For the most part, this evacuation of blood from wounds proves so alarming that means are employed to stop it ; but when this is either neglected or not considered

sidered as necessary, if the injured vessels are not large, the irritation produced by the wound itself, as well as by the free application of the external air to their divided extremities, excites such a degree of contraction in them, that in this way alone the hemorrhagy is soon checked. The discharge of red blood becomes gradually less: It then ceases entirely, and is succeeded by an oozing of a serous fluid, which in the course of a few hours likewise stops, when the whole surface of the fore is found either somewhat dry or even parched-like; or it is covered over with a cake of coagulated blood.

In this way nature seems to operate in putting a stop to hemorrhagies which arise from wounds. Another idea is commonly entertained indeed of this salutary process: It is supposed that small coagula of blood plug up the orifices of the vessels, and remaining in them preserve them of the same size of which they were before being divided.

This, however, is by no means the case,

as will at once appear to any who will take the trouble of dissecting the stump of a patient dying after an amputation. Instead of the mouths of the divided arteries being plugged up with blood, he will find them perfectly empty and contracted for a considerable space from their extremities; nay, in most instances, he will observe that they become firm solid cords, so as never afterwards to be capable of receiving a supply of blood. Nor is this process of nature difficult to explain. It is arterial hemorrhagies we are now considering; for wounded veins, if they be not compressed between the injured part and the heart, seldom discharge so much blood as to prove alarming. Now, as the arteries are possessed of a strong contractile power, they will readily exert this power on the irritating causes mentioned above as attendants on wounds, being applied to them. In this manner the blood is prevented from flowing in its usual channel; but nature does not fail to provide a different route for it,
by

by forcing it through, the most contiguous anastomosing arteries, which soon become so much enlarged, as to allow it to pass with freedom; while, in the mean time, the contracted state of the wounded extremities of the arteries terminates in a firm adhesion of their sides, in consequence of that inflammation which in some degree succeeds to every wound.

When a wound is made with a clean cutting instrument, the pain attending it at first is in general inconsiderable, unless a nerve or a tendon has been partially divided; in which case it proves commonly severe. But in every case the wounded parts become painful in the course of a few hours from the time of the injury being inflicted. They become red, tense, and even considerably swelled: And where the wound is extensive, an increased degree of heat takes place, together with thirst, quickness of pulse, and other symptoms of fever.

In some instances these symptoms continue

tinue to increase, and to prove more and more severe, till at last they terminate in mortification; but for the most part they are carried off in a more favourable manner. The surface of the wound, which for some time remained perfectly dry, is gradually rendered moist and soft by a thin serum oozing into it; which being allowed to collect, is at last, by the heat of the affected parts, and in some cases by the application of artificial heat, converted into purulent matter: and in general, the preceding symptoms of pain, tension, and fever, abate more or less quickly according as this formation of matter is more or less plentiful. From the time that serum begins first to ooze into the cavity of a wound, the tension and pain begin to abate, and they vanish [entirely on a free suppuration taking place; by which the most natural balsam is produced that can be applied to wounds.

From this history of the progress of a wound, it is evident that all the symptoms

we have enumerated, are such as originate from inflammation. Indeed, they are exactly such as accompany a common phlegmon. The pain, redness, and tension, which always accompany wounds to a certain degree, are the leading symptoms in every case of phlegmon; and the serous effusion into the cavities of wounds, with the suppuration which ensues, are circumstances exactly similar to those which occur in every case of abscess. I therefore consider a wound as an exciting cause of inflammation; and some advantage, I think, may be derived, in practice, from considering it chiefly in this point of view. This, however, will more clearly appear when we come to speak of the method of cure; when it will be rendered obvious, that in the treatment of wounds, those means prove uniformly most effectual which are most powerful in preventing any violent degree of inflammation.

The description I have given of wounds
relates

relates to the most simple and least hazardous kinds of them ; where the injury has been done, as was already remarked, with a sharp cutting instrument, and where the parts have been laid freely open. In such circumstances, when no organ of much importance to life has been divided, and when the cut is feated in a fleshy muscular part, if nature be not impeded in her operation, the whole surface of the sore becomes covered with small sprouts or granulations almost immediately on a free suppuration taking place ; and these continuing to advance, a cure is at last accomplished in the manner already described in a former part of this work *.

This happy termination of a wound, however, may be prevented by various causes. Indeed, it requires the concurrence of many circumstances. These we shall afterwards have occasion to treat of
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* Vide *Treatise on the Theory and Management of Ulcers*, &c. Part II. Section II. § 2.

in a particular manner. At present I shall enumerate those only which arise from the nature of the wound.

In a free incised wound, the inflammation which takes place is not in general greater than is necessary to produce that degree of suppuration which we have shown to be requisite; and in wounds of this description, matter is never allowed to lodge, as it is commonly discharged almost as soon as it is formed. These are points of the utmost moment in the management of wounds. Indeed, it is known to every practitioner, that a cure can never be expected if a due degree of inflammation does not take place, and if a free outlet be not given to the matter that may form. Every circumstance therefore in the nature of a wound, which tends either to excite an undue degree of inflammation, or to produce a lodgement of matter, must be considered as unfavourable: And hence punctured wounds, and those that are attended with
contusion

contusion or laceration, are particularly hazardous.

Punctured wounds prove often more dangerous than wounds of greater outward extent, from large blood-vessels and other deep-seated parts being hurt; and they are commonly more painful, being frequently attended with a partial division of contiguous nerves or tendons; a circumstance productive of more violent pain than what usually ensues from a free division of them. But the greatest risk in a punctured wound arises from the lodgement of matter; a circumstance which takes place more readily in this than in any other variety of wound; and to obviate which, the nicest attention on the part of practitioners is often requisite.

In contused and lacerated wounds, if the violence with which they have been inflicted has not been considerable, the parts will frequently recover their tone; the attending inflammation will not run to any great length; and a free suppuration

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tion being induced, a cure will at last be accomplished in a manner similar to what we have described, in cases of simple incised wounds. But it often happens that the contiguous parts are so much injured as to give no cause to expect such a favourable event. Where a violent degree of contusion has been applied, the texture of the parts affected is sometimes so completely destroyed, that the circulation is stopped, and mortification ensues; and where this proceeds to any considerable extent, the danger attending it is always great. Again, in wounds attended with much laceration, mortification is apt to occur from a different cause. The pain and irritation attending them proceed sometimes to such a height, as to induce a great degree of inflammation; which, notwithstanding the means usually employed to prevent it, very frequently terminates in the manner we have mentioned. Indeed, so far as my observation goes, inflammation induced by this cause is more apt to terminate

minate in gangrene than any other inflammatory affection proceeding from external violence.

In forming a prognosis of wounds, the circumstances we have just been considering merit our particular attention: but there are others which should likewise be kept in view; and these more especially are, the age and habit of body of the patient; the texture of the wounded part; the part of the body in which the injury is inflicted; and the risk of such parts of importance as lie contiguous being ultimately made to suffer, although not immediately injured.

Thus, it is obvious, that in a sound healthy constitution, wounds will, *cæteris paribus*, be less hazardous than those that are inflicted on people of diseased habits of body; for we commonly observe, where the constitution is tainted with any disease, that even the slightest wounds are apt to become troublesome, and to degenerate into sores which will

not

not heal till the disease of the system be removed: And we also observe, that the healing of sores depends in some measure upon the age of the patient; that is, a cure is for the most part more quickly accomplished in youth and in middle age, than in very advanced periods of life.

There are many exceptions, however, to this; for whenever the natural firmness and elasticity of the muscular fibres are not much impaired, we do not find that old age proves unfavourable to wounds. When the constitution is possessed of such a degree of firmness and irritability, that any wound which takes place will be productive of a necessary degree of inflammation, old age ought by no means to be considered as a disadvantage. On the contrary, in such circumstances it proves always salutary, by tending to render the symptoms more moderate than they are apt to be in more early periods of life. This is particularly the case in extensive wounds of every kind:

and we observe it in a remarkable manner in chirurgical operations; especially in lithotomy, and in the amputation of any of the extremities; which have commonly, in the course of my experience, proved more successful in healthy old people than at any other period of life, and evidently from the cause we have endeavoured to point out.

With respect to the texture of a wounded part, it is well known that wounds heal not only more quickly but more kindly in some parts than in others. Thus wounds of the cellular substance heal more easily than such as pass through any of the muscles; while those that are confined to the fleshy parts of muscles prove much less formidable than wounds of tendinous or ligamentous parts; for, besides occasioning less pain and inflammation, they are not so apt to be productive of any permanent disadvantage. The deepest cuts may be inflicted on the belly of a large muscle, with little or no risk of any inconveniency being experienced
from

from them in future ; but the contiguous joints are very apt to remain stiff and unmanageable, when the tendons which pass over them are much injured.

When wounds penetrate to a still greater depth, so as to do any material injury to bones, they prove always more tedious and uncertain than when soft parts only are divided ; for in such cases a wound will seldom or never heal till some portion of the bone exfoliates ; a process which very commonly requires a considerable length of time to be accomplished*.

Wounds in glandular parts are more to be dreaded than the mildness of the symptoms which appear at first would lead us to imagine. When small glands only are divided, they often heal readily ; but when any of the larger glands are injured, the system is not only apt to suffer from the secretion for which they are intended being impeded, but the

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* Vide Treatise on Ulcers, &c. Part II. Section VII.

fores which ensue very commonly become fungous, and are cicatrised with difficulty.

When any of the larger lymphatic vessels are wounded, the cure often proves tedious by a constant discharge of a thin limpid fluid, by which the formation of a cicatrix is prevented: And when at last a cure is obtained, very troublesome swellings are apt to occur in the under part of the limb, owing to the obstruction of the lymph in its passage to the heart by the newly formed cicatrix. Of this every practitioner of experience must have seen some instances. I have met with several; particularly after the extirpation of scirrhus glands when deeply seated in the arm-pit. In such cases the large lymphatics of the arm are very frequently cut, and very obstinate œdematous swellings of the whole member are apt to ensue.

When a large nerve is completely divided, the pain attending it will be inconsiderable; but the parts beneath will

be

be deprived both of their sensibility and power of motion, unless they are supplied with some other branches. But when a nerve is only punctured, the pain which takes place is commonly severe: and this is apt to be followed with a high degree of inflammation; smart fever; subsultus tendinum; convulsions; and even death. These violent appearances, however, do not often occur in northern climates; but they frequently happen in warm countries, where they are apt to terminate in a symptom which often proves fatal, the locked jaw.

In wounds of any of the larger blood-vessels, our first object is to discover, whether the hemorrhagy which ensues proceeds from arteries or veins; for in general no material inconvenience is experienced from wounds even of the largest veins, while the utmost danger is to be dreaded from wounds of the larger arteries. If the artery be so situated that a ligature cannot be put round it, the loss of blood will probably soon prove fatal: and even

where the discharge of blood can be stopped with ease, if the limb has no other artery to supply it, a mortification is to be dreaded. It often happens, indeed, even that large arteries are secured by ligatures without any detriment to the parts beneath: But in this case there are other arteries or anastomosing branches of such a size as to give passage to a sufficient quantity of blood.

The site of a wound is also an object of importance. Thus wounds in the extremities, when confined to parts lying above any of the hard bones, are not to be considered as so hazardous as those which pass into any of the joints: and in other parts of the body, wounds which penetrate any of the larger cavities, prove always more dangerous than those which do not run to such a depth.

This will proceed from different causes. The danger will be increased by the chance of some organ of importance being directly injured: By air, and in some cases by extraneous bodies, finding access

to cavities which nature never meant to be exposed: And lastly, by the lodgement of matter; a circumstance which is with much difficulty avoided in all wounds which penetrate to such a depth.

We have likewise to consider, that although no organ of importance may be directly wounded in such a manner as to produce immediate death; yet that much danger may arise from a variety of circumstances; and wounds may eventually prove mortal which at first were not attended with any evident risk.

Thus wounds in the lungs, and other viscera, prove sometimes fatal, from continuing to discharge such quantities of blood for a considerable time as at last destroy the patient; although at first the discharge might not appear to be of much importance. The stomach, and different parts of the alimentary canal, may be injured in such a manner as to terminate in death without exhibiting any immediate appearance of danger. The external coat of the aorta has been removed by

the point of a small sword ; and the wound has been nearly healed when the patient died suddenly from a rupture of the artery : And wounds of the gall bladder, or of its excretory duct ; of the receptaculum chyli ; of the thoracic duct, and some other viscera ; may for several days afford no suspicion of danger, and yet terminate fatally at last.

Wounds sometimes prove fatal from inflammation spreading to contiguous viscera, which were not at first injured ; and wounds, which have at first appeared to be of little or no importance, have at last terminated in the worst manner, merely by mismanagement, either in the application of dressings or bandages, or in the conduct of the patient with respect to food, drink, and exercise ; for it is well known, that much mischief has been done by improper dressings, and especially by too tight bandages : and we likewise know, that misconduct with respect to food is daily the cause of wounds going
wrong,

wrong, which otherwise would probably have done well.

It thus appears, that a variety of circumstances fall to be considered, to enable us to judge of the probable termination of wounds. In doing this with accuracy, practitioners of experience have frequent opportunities of showing their superiority. This subject ought therefore to be considered as highly important by all who wish to distinguish themselves. A minute knowledge of anatomy, a cool temper, and a steady hand, will enable any practitioner, even with no great experience, to perform many of our most important operations sufficiently well: And accordingly in different hospitals, we daily meet with good operators; but we do not often find surgeons possessed of that knowledge in the prognosis of surgical diseases which might be expected; that attention being seldom bestowed which is necessary to attain it.

SECTION

SECTION II.

Of the Cure of Simple Incised Wounds.

IN the management of wounds of every kind, the first object requiring our attention is the hemorrhagy; more especially when it is profuse. The safety of the patient requires it: The alarm which it gives, not only to bystanders, but to the practitioner himself, renders it necessary. Nor can the real state of a wound be discovered with accuracy till the discharge of blood be checked.

Hemorrhagies are most immediately stopped by pressure applied to that part of the divided artery which is next to the heart: This pressure is made by the tourniquet, when the wound is in any of the extremities*; and by the hands of assistants, in wounds of the trunk of the body or of the head.

In

* Vide Vol. I. Chap. II.

In this manner, if the pressure be properly applied, almost any hemorrhagy may be stopped till the wounded vessels can be secured with ligatures ; which we have elsewhere shown to be the safest, as it is the easiest method of preventing patients with such injuries from suffering *. Much indeed has been said, even of late years, of the inconveniences which ligatures are supposed to induce : but this has proceeded either from the interested views of some individuals who may have wished to establish the reputation of different styptic applications ; or from the groundless fears of young practitioners. Where the contiguous nerves, or even where much of the surrounding muscular parts, are included in ligatures, severe pain, and other troublesome symptoms, will no doubt be induced ; but this is not the fault of the remedy, but of the method of using it. Indeed this is so obviously the case, that reasoning in the farther support of it does not seem to be necessary ; for every practitioner of ex-
perience

* Vide Vol. I. Chap. II.

perience will admit, that a proper application of the ligature is seldom if ever productive of any material inconvenience, and that we can depend on it with more certainty than on any other remedy for putting a stop to hemorrhagies from wounded arteries.

When treating of the method of applying ligatures to arteries, in the first volume of this work, I gave it clearly as my opinion, that it may be best done by the tenaculum, an instrument represented in Plate I. fig. 1. And after much additional experience of its utility, I now think it right to say, that I am more and more convinced of its being much superior to the needle; which cannot be used without a portion of the contiguous soft parts being included in the ligature; a circumstance which in every instance we should endeavour to avoid. Many imagine that the tenaculum may be used with safety in the application of ligatures to arteries of a middling size, while they are afraid of cutting those of a small size
afunder,

afunder, if some of the contiguous cellular substance be not included along with them: and in tying the large trunks of arteries, they suspect that the ligatures would be apt to be forced off by the strong pulsations of these vessels, if they were not supported by being firmly fixed in the contiguous parts. I have not, however, had a single instance of observing that either of these objections to this practice is well founded. For a number of years past, I have laid aside the needle, for the purpose of applying ligatures to arteries, almost entirely; and in the course of that time, I have employed the tenaculum indiscriminately in hemorrhagies from arteries of all sizes.

Wounded arteries are seldom so situated as to prevent the hemorrhagy from being stopped in the manner we have mentioned: for when they lie at the bottom of deep wounds, with narrow contracted mouths, the wound may commonly be enlarged so as to admit of their being tied with ligatures; and for the most
part

part it may be done with safety. Where the enlargement of a wound is not clearly necessary, no person of experience would advise it; but the practice is always safe and proper in hemorrhages proceeding from arteries lying so deep that ligatures cannot otherwise be applied to them. As this practice, however, has been very inadvertently condemned by some practitioners in a general way, from their supposing it to be rarely if ever necessary; a timidity has been thereby introduced, which, in various instances, has been the cause of mischief: Patients have been tormented with the application of tight bandages, and with the trial of different styptics, which seldom if ever succeed, when the hemorrhagy might have been stopped in the most effectual manner by a small enlargement of the wound: Nay, many limbs have been amputated from the same cause, which might easily have been saved; particularly in cases of compound fracture, where a hemorrhagy, proceeding
from

from a deep-seated artery which cannot be easily tied, is too frequently considered as a sufficient reason for removing the limb. From particular circumstances, in a few cases of compound fracture, it may happen that hemorrhagies cannot be stopped without laying the injured parts so extensively open, as might induce more hazard than amputation itself. This, however, is a very rare occurrence; and it will seldom take place where the case has been properly treated from the beginning.

When the injured artery runs in the substance of a bone, no ligature, it is evident, can be applied to it; and, therefore, in such a case, enlarging the wound could not be attended with much advantage. But arteries in this situation are never so large as to lead us to be much afraid of any hemorrhagies that may proceed from them; nor does it often happen that they continue to bleed long after they have been completely divided. An artery thus situated, being merely wounded,

wounded, may discharge a great deal of blood ; but I have met with different instances of the hemorrhagy stopping almost immediately on the vessel being cut across. Authors indeed have said, that the utmost danger has been induced by arteries surrounded with bone being wounded ; nay, that death itself has happened from this cause, owing to the impossibility of including them in ligatures. I am convinced, however, that it is a partial division only of such arteries that will ever produce hemorrhagies of any importance ; for they are always small, and they never adhere so firmly to the surrounding bone as to be prevented from contracting on being freely divided.

Where the discharge of blood proceeds from large vessels, the means we have mentioned are the most effectual for putting a stop to it. But when it occurs from an infinite number of small arteries over the whole surface of the wound, other remedies must be employed. We must refer, however, to a former chapter
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of this work, where this subject was more fully considered*.

The hemorrhagy being stopped, the next object requiring our attention is the removal of any extraneous body that may have been admitted: and where such substances are not deeply seated, this is always done both with most ease and safety with the fingers alone; for when forceps and other instruments are employed, we can scarcely fail to injure the contiguous parts.

The examination of wounds, with a view to discover extraneous bodies, ought to be made with much caution and delicacy; for handling the parts roughly gives unnecessary pain, and is apt to induce a degree of inflammation, which often proves hazardous.

But although it is always proper to accomplish the removal of extraneous bodies with as little pain to the patient as possible; yet wherever we have any certainty of bodies of this kind being lod-

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* Vide Vol. I. Chap. II. Section II.

ged, we ought by all means to proceed with firmness, in the first place, in discovering their situation, and afterwards in removing them, excepting in a few particular cases where this cannot be done without much risk of injuring parts of real importance to life. In such cases the judgment of the practitioner must decide between the danger that may probably ensue from the extraneous body being allowed to remain, and that which may arise from his proceeding to remove it immediately.

Modern authors in general strictly forbid much assiduity in the removal of bodies of this kind: for they very properly observe, that in former times much mischief was done by exploring wounds with more exactness than was requisite; by which unnecessary pain was induced, and cures rendered more tedious than they otherwise would have been.

But in this matter the moderns seem to have gone from one extreme to another: for although much handling of fores, and

a free use of probes, forceps, and other instruments, are seldom necessary, it is equally true, that by allowing extraneous bodies, which might have been removed at first, to remain in wounds, much future pain and inflammation have been occasioned.

In support of the practice we are told, that various cases are on record of extraneous bodies continuing to lodge in different parts of the body without any inconvenience; that this will commonly happen when the substance is not of a stimulating nature; and when it is of such a form or texture as to induce pain, that will soon excite such a plentiful suppuration as will quickly throw it out in a much more easy manner than if it had been removed at first. In answer to this, I shall observe, that where extraneous bodies in wounds cannot be removed without giving the patient a great deal of pain; and especially where there is any risk of large contiguous blood-vessels being wounded by it; we

ought by no means to attempt their removal. In such cases we ought certainly to trust to the subsequent suppuration for throwing them out: But they ought always to be taken out immediately, when it can be done with tolerable ease, or without injuring any parts of importance. In this way a more expeditious cure is obtained, and we accomplish our purpose in an easier manner, than could be done in any future stage of the sore. For in a recent wound, while no inflammation or tension takes place, the contiguous parts easily stretch and yield to the extraction of any substance that may be lodged in them, if it be not of an angular form, and if the operation, instead of being performed quickly, be done with slowness and caution: whereas, when the contiguous parts become stiff and painful, which they always do in the course of a short time, any substance lodged in them is removed with much pain and difficulty: for even after a free suppuration has taken place, although the parts will
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be considerably relaxed, yet still they will be more stiff and tense than they were at first ; and the opening through which the substance is to be extracted will likewise be much diminished.

We gain another very material advantage by the immediate removal of extraneous bodies from wounds. While a fore is recent, almost every patient will allow every thing to be done which the practitioner in attendance may think necessary ; but they frequently refuse, in future stages of the fore, to submit to any thing besides the usual dressings.

It may be remarked in this place, that of the extraneous bodies that are apt to be lodged in wounds, some are more harmless than others. A prudent practitioner will therefore be more or less anxious in attempting to remove them. Thus we all know, that a lead-ball may be lodged very deeply, for a great length of time, without being productive either of pain or inconvenience ; while a splinter of wood, glass, or iron, or even a bit of cloth,

will often create a great degree of uneasiness. When therefore it is known that a lead-ball is the only substance that is lodged, if it cannot be easily removed, we have at least the satisfaction of being assured that it will not probably do much harm. We will therefore allow it to remain, either till it be loosened by a plentiful suppuration, or till some future period, when it may perhaps be discovered in a different situation, so as to be taken out with safety at a counter-opening: While, on the other hand, when such substances are lodged in wounds as will probably excite much irritation and pain, it will be much for the interest of the patient, and will be the means of preventing much perplexity and trouble to the surgeon, to have them removed as soon as possible after the injury is inflicted.

We have observed above, that in removing extraneous bodies from wounds, it should be done with the fingers alone, rather than with forceps. Some few exceptions may occur to this, which we shall afterwards

afterwards have occasion to mention. But substances are sometimes lodged in wounds that cannot be easily taken out either with the fingers or forceps. This is particularly the case with sand, dust, and small pieces of glass. These are best removed by bathing the parts in warm water, or by pouring water upon them; squeezing it gently from a sponge, or injecting it slowly with a syringe.

In performing even this very simple operation of washing a wound, as well as in extracting foreign substances either with the forceps or any other way, it is proper to observe, that much advantage may be derived from placing the patient in such a posture as tends most effectually to relax the injured parts, so as to obtain as wide a separation as possible of the lips of the wound. I have seen different instances where, from want of attention to this circumstance, patients have suffered much unnecessary pain; where, after various trials, the practitioner has been obliged to desist without accomplishing

his object; and where another practitioner has proved at once successful, merely by putting the wounded parts in a relaxed position.

After paying due attention to the circumstances respecting extraneous bodies lodged in wounds, our next object is the conduct of the cure.

In incised wounds, a separation of the parts that have been divided takes place; and as every wound proves a cause of irritation, the separation which at first appears continues for some time to increase, merely by the contractile power of the injured muscles. In the usual way of covering wounds with lint, or with pledgits of ointments, and where the parts have not been previously drawn together and retained in their situation, an effusion of a ferous fluid soon takes place from the great number of small vessels that have been cut. This is afterwards converted into purulent matter: in a short time the fore is found to be covered with an infinite number of small sprouts or granulations;

nulations; and these having advanced to a certain extent, a dry pellicle of scarf-skin, termed a Cicatrix, forms over the whole extent of the wound, and thus the cure is completed.

This is the manner in which the healing of wounds is effected, when nature is not assisted by art, or when her operations are only promoted by proper coverings, and protection being given to such parts as are injured. But although, in some cases, this is our only resource; and although even in this way practitioners have it always in their power to forward the cure of fores; yet it is liable to many very important objections, which may be obviated by a different treatment.

When a wound is healed in this manner, if the parts which have been divided have separated to any considerable extent, the suppuration which ensues will be plentiful; by which, if the constitution is weak, the patient is apt to be materially injured. In extensive fores, this method of cure is always tedious: When deep
muscular

muscular parts are injured, the motion of the contiguous joints is apt to be affected, by the divided parts healing when too far separated from each other. And the cicatrix of a large wound, when cured in this manner, is always stiff, unseemly, and disagreeable: nor is it possessed of that strength and firmness which the parts beneath require for their protection.

Patients, however, are seldom under the disagreeable necessity of submitting to these inconveniences: for in general, wounds may be cured in a much more easy as well as in a more agreeable manner. We know from experience, that two inflamed surfaces of an animal body, when kept in contact, will soon adhere together. This was probably at first pointed out by accident; but practitioners now derive much advantage from it in various operations, as well as in the treatment of accidental wounds. By drawing such parts as have been divided into contact with each other; and especially by taking care to have them all as

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completely covered as possible with the cutis vera, very extensive wounds are often quickly cured ; the power of moving and of using limbs with freedom is often preserved which otherwise would be lost ; the scar or mark which remains is seldom of any importance ; and the wounded parts have the advantage of being sufficiently protected.

The fact has been long known with respect to this point ; for there is nothing more certain, than that parts recently divided, will unite firmly together, if they be kept in contact for a sufficient length of time. The cause, however, of this phenomenon has not hitherto been rendered clear. The prevailing idea is, that it proceeds from a direct inosculation or junction of the different parts that have been divided ; and that those parts only will adhere together which were formerly united. Thus it is imagined in the healing of wounds in this manner, that a divided artery on one side of a cut must be made to adhere directly with

with its fellow on the opposite side ; that veins must unite with veins ; muscular fibres with fibres of a similar nature, &c. But although it is necessary in practice to keep this idea so far in view, as to place parts that are to be healed as exactly opposite to each other as possible ; yet this proceeds more from a requisite attention to symmetry and neatness in the external parts after the cure, than from any other cause : for it is certain, that no such exactness is required for the mere adhesion of the divided parts ; and whoever doubts of the fact may with little difficulty prove it experimentally. A membrane may be made to adhere to a bone ; and the divided end of an artery or a vein will unite with almost any substance with which it is kept in contact.

It is indeed true, that blood circulates through the cicatrix of a wound ; a fact which few will doubt, and which probably gave rise to the opinion we are now considering. But we have reason to believe

lieve that this circulation does not take place immediately on the formation of a cicatrix. It seems rather to be an after-process of nature, and is evidently accomplished by an infinite number of small vascular sprouts or newly created blood-vessels, which proceed from the larger arteries and veins on each side of the wound, and inosculate with each other, so as to give a sufficient circulation in the parts through which they pass. At least I have found, in different instances, on examining the cicatrix of a large wound, that it was always very vascular; and I conclude that it happens from a new formation of small blood-vessels, as the divided extremity of every blood-vessel, whether artery or vein, when of such a size as to be easily distinguished, is always shut, and even obliterated for a certain space, from the point where the injury happened, in the same manner as in arteries that are tied with ligatures, in cases of amputation and other capital operations. And if this happens

pens in vessels of a large size, there is reason to suppose that it does so in those that are smaller.

In confirmation of this opinion, we may observe, that a circulation of blood betwixt adhering surfaces takes place where inosculation of the kind in question can never occur, from no previous division of blood-vessels having been made. Thus, when the skin of two contiguous fingers or toes becomes raw or tender, without any blood-vessels being injured, it is difficult to prevent them from adhering; and when they do adhere, a free circulation is afterwards found to take place between them. Other instances might be adduced; but I notice this one, as it is not unfrequent, and as it is perfectly applicable to the present question.

I therefore conclude, that wounds cured in this way are healed in the same manner as adhesion is produced between inflamed surfaces, namely, by exudation of the glutinous part of the blood from
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the extremities of the divided vessels; which in the first place retains the parts together, and afterwards serves to support the new formation of small blood-vessels, which nature puts forth as a farther and more certain means of retention.

I have entered into this physiological discussion, imagining that it tends to establish a material point in practice. It has commonly been supposed, that the space of twelve, fourteen, or fifteen days, is necessary for the complete adhesion of divided parts: a supposition which proceeds upon the idea that this adhesion is formed solely by the inosculation of blood-vessels. But if agglutination alone is necessary, in the first instance, to accomplish this adhesion, it is evident that it must be effected sooner. Accordingly, I have uniformly found divided parts adhering firmly about the fifth day; and have known the bandages accidentally removed from wounds on the second and third days, without any separation

ration of the parts newly united being the consequence. From this it appears, that a shorter application of the usual means of retention will answer than is commonly practised. Surgeons term this treatment of fores, Healing by the First Intention; and as it is in every respect the most desirable method of cure, it should always be followed when practicable.

In other varieties of wounds, different reasons often occur to prevent us from curing them in this manner. These we shall afterwards have occasion to mention. But in the simple incised wound, where the injury has been inflicted with a clean-cutting instrument, without producing puncture, laceration, or contusion, the only objection that can occur to it, is our not being able to draw the divided parts into contact, and to retain them in that situation till they adhere together. This, however, will seldom happen, unless a loss of substance takes place to a considerable degree. Where a large por-
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tion of skin, with the muscles beneath, has been entirely cut out, it may in some cases be impossible to bring the retracted edges of the wound together; but we may always make them approach so as to diminish the size of the sore, and may thus have it in our power in every instance to forward the cure. In deep transverse wounds, even where no substance is lost, the retraction is often so great, as to render this practice somewhat difficult: But by placing the injured part in that situation which tends most effectually to relax the divided muscles, we may effect our purpose almost in every instance. It is indeed surprising to see how completely divided parts will be made to approach, which, while the muscles were upon the stretch, were separated to a considerable distance from each other. We should not therefore despair too soon; for even in the worst cases we seldom fail by due perseverance to produce some very essential advantage.

When it is found that the divided

parts may be drawn together, we have next to fix upon the best and easiest method of retaining them in this situation during the cure. There are various means proposed for this; namely bandages of different kinds, adhesive plaisters, and futures.

The sides of wounds of a longitudinal direction, situated in any of the extremities, and of some wounds of the head, may be retained by the uniting bandage. But it seldom answers in the trunk of the body; nor can it ever prove useful in wounds, either in the legs or arms, of a transverse direction: And even where there is reason to imagine that it will answer sufficiently well for retaining the sides of the wound in contact; yet we ought never to trust to it entirely; for we cannot depend upon it with any certainty for preserving the skin smooth and equal; a circumstance of much importance in the cure.

The easiest method of retaining the skin exactly in its situation, is by means of adhesive

adhesive plasters applied in the manner represented in Plate LXVII. In some cases plasters alone will prove sufficient ; but when much retraction is expected, the uniting bandage should be applied over them whenever the direction of the wound renders it admissible.

Many practitioners, in every instance of wound, prefer adhesive plasters to the use of futures ; but it is in particular cases only that this preference is proper. Adhesive plasters may be used with advantage in superficial wounds that do not penetrate much deeper than the cellular membrane ; and where there is such a loss of substance as prevents the sides of a wound from being drawn close together, they may be employed for the purpose of retaining the retracted parts as near to each other as they can be easily brought. But in all wounds that penetrate to any considerable depth, and when their edges can be drawn into contact, the twisted future is by much the most effectual means of retaining them. For

a description of this and other futures, we must refer to Volume I. Chapter I. The common interrupted future is indeed more frequently employed than the other; but it does not support the parts with such certainty; the ligatures are more apt to tear or cut out the parts which they surround; and they frequently leave disagreeable marks.

On this subject it is the common opinion, that adhesive plasters and futures are admissible only in the recent state of wounds. But however desirable it may be, for various reasons, to have the application of either made as early as possible; yet where they have been neglected at first, they may be employed with advantage during any stage of the sore: for we are wrong in supposing, as is commonly done, that wounded parts will not adhere when in a state of purulency. I have repeatedly treated in this manner, sores of two, three, and four weeks duration, and always with advantage: Insomuch, that I believe the practice

tice will very commonly succeed in every stage of a fore when the retracted edges can be brought together.

Whether we employ adhesive plasters or futures, we should be very attentive in supporting the parts, as far as it can be done, by the posture of the patient; for if this be neglected, futures of every kind will yield so as not to answer the purpose: And along with this, when plasters are used, a farther advantage, as we have already observed, may be derived from a proper application of the uniting bandage; but for the reasons given in the chapter on Sutures, and again when treating of the Hare-lip in Chap. XXIX. Vol. IV. neither this nor any other bandage can with propriety be employed with the twisted future.

When a wound is treated in this manner, as soon as the retracted edges are drawn together and properly supported, whether by plasters or futures, no other dressings are necessary, excepting some thin covering of soft lint to protect the parts beneath from cold; and with a

view to prevent as much as possible any access to air, the lint should be spread either with some unctuous substance, or with mucilage of any inoffensive gum.

This being done, the patient should be enjoined to preserve the injured parts in the posture that is judged most favourable; and care should be taken to put him under proper regulations with respect to diet. If he is low and emaciated, he may with propriety have a small allowance of light nourishing food; but if he is in any degree plethoric, or liable to inflammatory affections, if the wound is of any considerable extent, a strict antiphlogistic course will be absolutely necessary: for although inflammation to a certain extent be highly necessary for the cure of the wound; yet a prudent practitioner will always guard against excess of inflammation, as productive of much mischief.

In open wounds, one of the most effectual applications for removing extreme degrees of inflammation, is warm emollient cataplasms; but as they tend

to induce the formation of matter, and as this would be directly opposite to our views in adopting the mode of cure we are now considering, it is evident in such circumstances that they are altogether inapplicable. But although warm emollients cannot with propriety be employed; yet much advantage may be derived from a prudent use of any cold emollient oil or unguent. When the attending symptoms of pain and inflammation continue moderate, the dressings should never be removed till the cure be completed; but whenever the pain becomes severe, as it would probably, if neglected, terminate in a considerable degree of inflammation, by which our intention might be frustrated, the dressings should be immediately taken away, so as to admit of the pained parts being freely rubbed or even bathed with an emollient. By repeated applications of this kind, I have seen different instances of very distressing degrees of pain being much alleviated, and of the contiguous parts being so

much relaxed, as to admit of the cure by adhesion going on without interruption. In some cases, however, we are under the necessity of employing other means; and of these the most effectual are opiates and blood-letting, particularly local blood-letting by means of leeches; which often proves effectual in removing pain and inflammation, when every other application has been tried in vain.

In general, a continuation of these means will answer the purpose: but it sometimes happens, that notwithstanding all our endeavours, the pain and inflammation increase, and the tension of the wounded parts becoming more considerable, the plasters and ligatures with which they have been kept together must be taken away, otherwise they will do mischief; and at last will yield, so as to be productive of no advantage whatever. In such circumstances it is better to remove them at once; and for the most part this will give the patient immediate relief: the pain and tension
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will soon disappear; and a cure will be accomplished in the ordinary way: for it might prove hazardous to attempt the same method of treatment again.

By these means the bad consequences now mentioned may be obviated: But it is proper to remark, that symptoms of this kind are not frequent. In general, the cure goes on without interruption; and where this is the case, our views are completed as soon as there is reason to suppose that a firm adhesion has taken place between the edges of the wound. We have already remarked, that this process is commonly effected in a shorter time than is usually imagined. In superficial wounds, the ligatures, or other means of retention, may be removed sooner; but even in deep extensive wounds, when the habit of body is sound, they may with safety be taken away on the fifth or sixth day: for by this time all the advantage that can be derived from them will be gained; while much inconvenience, and some mischief, may arise

arise from their being allowed to remain longer.

We have already mentioned many of the advantages which result from this method of curing wounds. Indeed they are so great, that there should be no hesitation in attempting it almost in every instance: for even when it fails, we are certain that any troublesome symptom that may be induced by it, will be removed by due attention to the means we have mentioned; while much time will be gained when it succeeds. Two objections are commonly made to this mode of treatment, which we shall shortly mention. It is said, that the ligatures with which it is often necessary to secure the arteries, will act as extraneous bodies, and prevent the sides of the wound from uniting. And it is likewise observed, that in the course of the cure matter is apt to form, from the lodging of which, troublesome sinuses are produced. Neither of these objections, however, is in any degree well founded; at least, I have
never

never met with a single instance of either of them. It seldom happens that more than one or two arteries in any wound are so large as to require to be tied : but I know from experience, that wounds may be cured by drawing their edges together, even where a considerable number of arteries have been secured by ligatures : for the threads occupy very little space ; and when they are applied with the tenaculum, which ought always to be done, they are easily removed without any disturbance being given to the other parts of the wound. And again, with respect to sinuses being apt to form from this method of treatment, if the edges of a wound be only drawn together above, a cavity will thus be formed beneath, where matter will no doubt be apt to lodge ; but this should not be attributed to the method of cure, but to the mode of putting it in practice : for in every wound which ought to be treated in this manner, the whole of the sides or edges may be drawn together from top
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to bottom; and by this means the formation of sinuses prevented.

We have now to speak of those wounds which do not admit of this mode of treatment. When the edges of a cut cannot be drawn together, after the hemorrhagy is stopped and extraneous bodies removed, we find by experience, that the most effectual assistance we can afford, is to promote as much as possible the formation of matter: for the fact is undoubted, in every wound of this kind, that a free suppuration proves the most effectual relief to every symptom; at the same time that it appears to be so materially connected with the cure, that the healing process never begins till the sore is covered with good pus; a circumstance by no means difficult to account for. The cure of sores healed in this manner, is so far effected by nature alone, that although some advantage may be derived from art, yet the chief object of practitioners is to remove such impediments as might tend to obstruct the operations of nature, and

to protect the injured parts till the cicatrix becomes sufficiently firm. Now, as we know that a fore will never be covered with granulations, or be cicatrised, as long as it is very painful; and as nothing with which we are acquainted proves so mild an application to wounds as pus, we may conclude, that it is chiefly useful by preserving the injured parts in that easy, pleasant state, which seems to be indispensably necessary for the cure of every fore. It should therefore be our first object, in treating fores in this manner, to forward the formation of pus as quickly as possible; and the most effectual method of doing it is, by treating every wound in the same manner as we do a common phlegmon; namely, by a free use of warm emollient poultices and fomentations. In the first place, the parts ought to be immediately covered as completely as possible, so that they may be protected effectually from the admission of air. When the pain which occurs is excessive, poultices may be directly applied,

plied, as being the surest means of relieving it : but, when the pain is moderate, it is better to delay the use of emollients for a day or two ; for as pus cannot be produced till a serous effusion has first taken place, and as we know that some degree of inflammation is required for effecting this, when the pain and tension in wounds are inconsiderable, an immediate application of poultices is apt to do harm, either by preventing altogether, or by retarding and rendering too languid that inflammatory affection which is so highly necessary for the cure. But in every instance of wounds of any considerable extent, remedies of this kind prove always useful after the first two or three days have elapsed : for by this time a sufficient degree of inflammation has commonly taken place for effecting the wished for effusion ; and we have elsewhere had various opportunities of showing, that in no way whatever can this be so readily converted into purulent matter as by a free application of heat ; so that

that whenever this remedy is judged to be proper, it should be used to the same extent as we commonly find to be necessary in every case of abscess.

It is proper, however, to remark, that some caution is required in the use of this remedy: for although heat, whether conveyed by means of poultices or fomentations, is perhaps the most useful application in the stage of wound we are now considering; yet a long continuance of it is very apt to do mischief, as we have daily opportunities of observing where it is employed by those who do not consider upon what principles it acts in proving serviceable. When the purpose we have mentioned is gained, namely, a free and kindly suppuration, as it is for this only that poultices are used, they should now be laid aside: for when continued longer, they almost constantly do harm, by relaxing the parts to which they are applied too much; by which they are apt to become pale, soft, and spongy, instead of being of a healthy red colour, and of a considerable

able degree of firmness. Nay, they are at last often productive of the very contrary effect for which they are employed: for although much inflammation proves always hurtful in the cure of wounds, yet in some degree it is in every case necessary. Now, by continuing the use of warm emollients too long, this salutary degree of inflammation is so entirely carried off, that the matter becomes thin and in too great quantities. And thus troublesome vitiated sores are produced, which a different management might have prevented. The period at which the use of poultices and other warm applications should be laid aside, must be determined in every case by the judgment of the practitioner; but this general rule may be safely adopted, That they may at all times be persisted in as long as much pain and inflammation continue; but these symptoms becoming moderate, the discharge being good, and the surface of the wound covered with granulations of a healthy appearance, they

they should now be laid aside. In this state of a sore, all the advantages are gained which poultices can produce ; and a longer continuance of them might occasion some of the inconveniences we have mentioned.

With respect to the most proper dressings for wounds, as we have considered this subject elsewhere*, it will not be necessary to treat of it at present with that minuteness which otherwise would have been proper.

We have already had different opportunities of remarking, that a certain degree of inflammation is necessary in the cure of every sore ; but as this very rarely proves deficient, and as there is more to be dreaded from its proceeding too far, especially in the first stages of large wounds, the mildest dressings only should be employed. During the progress of the cure, much advantage indeed may sometimes be derived from the applica-

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* Treatise on Ulcers, &c. Part II.

tion of dressings of an irritating, or even of an escharotic nature. This, however, is only the case when a wound has advanced to the state of an ulcer. While a wound is yet recent, there cannot be a doubt of the mildest applications being the best. In this country, soft dry lint is commonly employed, and by some, pieces of soft sponge are recommended; and it must be admitted, that they answer much better than any of the irritating balsams which till of late were so universally used, and which in most parts of Europe are still continued: for it was in Britain that mild dressings to wounds were first introduced; and it is in this country only where even yet they have been generally received. But although dry lint is an easy mild application when compared with many others, yet it is certain that it always creates some degree of pain and irritation on being first applied; and it is apt to adhere to the edges of a wound, so as to cause some pain and difficulty on being removed. With a view

view to prevent these inconveniences, it should be thinly spread with some mild emollient ointment; such as Goulard's cerate, or the Unguentum Simplex of the Edinburgh Dispensatory. By this means it gives no pain in the application, and it is removed with ease, at the same time that it serves more effectually than dry materials to prevent the air from finding access to the sore. As dry lint, however, has long been very generally employed in this country, any innovation will not be readily admitted; but what I have advised being the result of a good deal of experience, I can with confidence recommend it.

A piece of soft lint, spread with any ointment of this kind, being laid over the wound, a bolster of fine tow should be applied above it for the purpose of keeping the parts warm, as well as for absorbing any matter that may be discharged; and this being covered with a compress of old soft linen, the whole should be retained by a bandage of fine

flannel, which is preferable to linen, in so far as it is more agreeable to the feelings of the patient, and as it yields to any accidental swelling or tumefaction of the neighbouring parts: whereas linen, possessing little or no elasticity, is very apt to do mischief, by remaining stiff and immoveable, notwithstanding any swelling that may ensue.

Practitioners are not agreed respecting the time at which the first dressings of sores should be removed; and nothing decisive can be said on the subject, as in some measure it must be directed by the circumstances of every case. This general rule, however, may be properly adopted, that a sore should always be dressed when it is found to be plentifully covered with matter. This will generally be the case about the fourth or fifth day; but as the formation of pus depends upon different circumstances, particularly upon the health of the patient, and upon the degree of heat in which the parts have been kept, some latitude must be allowed in

in this matter. A free use of poultices, after the second day, puts it in our power to remove the dressings much sooner than we otherwise could do: for they not only promote the formation of matter, but they soften all the coverings that have been used, so as to admit of their being easily taken away.

When the cure of a wound goes on without interruption, the second, as well as all the subsequent dressings, should be precisely the same as the first: for our object being still the same, no variation, it is evident, can be necessary. As nothing proves more hurtful to sores than exposure to the air, one great object in our application of dressings, is to prevent any inconvenience which might arise from this. And the same reason renders it necessary to change the dressings as seldom as is consistent with cleanliness; and to be as expeditious as possible in the renewal of them. In general, however, no harm will occur from a daily dressing of wounds. They should not, but in very particular

circumstances, be dressed more frequently; nor can it often be proper to dress them seldomer than this: for when matter is allowed to lodge for a longer time, the heat in which patients with large wounds are usually kept, is apt to make it become putrid and offensive. But as I have elsewhere had occasion to speak fully upon this subject, it is not now necessary to enter upon a more particular consideration of it *. I shall just observe farther, with respect to the continuance of mild dressings to wounds, that it ought to be regulated by the progress of the cure. As long as it continues to advance, they should be persisted in; but when the sore assumes appearances in any degree morbid, some variety in the dressings will be highly proper; and the nature of any change that is to take place must be regulated by the particular situation of the affected parts. We must refer, however, for a more minute consideration of this

* Vide Treatise on Ulcers, &c.

this part of our subject to the different sections in the Treatise on Ulcers alluded to above.

We have hitherto been supposing that none of the symptoms which take place are violent; in which case the cure of every wound will, for the most part, go easily on under the mode of management we have mentioned. But in some cases the cure is not only much interrupted, but even much hazard is induced by the unusual height to which some of the symptoms proceed; and these particularly are, pain, inflammation, and convulsive affections of different kinds. We shall therefore offer a few observations upon the means of obviating these symptoms, when they proceed to such a height as to prove any interruption to the cure.

A wound cannot be inflicted without inducing pain: for even the slightest injury which can be done to any part of the body, must necessarily affect some of the smaller branches of nerves; by which

pain, to a certain degree, will be induced.

It commonly happens, however, that any pain which at first takes place in wounds, is not so severe as to require any particular management: and in general, it subsides entirely upon the removal of any extraneous bodies which have been introduced; by protecting the injured parts with proper coverings; and by a plentiful formation of matter. But in a few cases the pain continues violent after every usual method of removing it has been attempted. Opiates in large doses are in such circumstances more to be depended on than any other remedy; and they do not often fail of giving relief. But it frequently happens that their effect is only temporary, the pain being apt to recur after the strength of the opiate is exhausted.

In this event we are to search with much care for the cause of the pain. It may proceed from some particles of extraneous matter which have not been discovered;

covered ; from inflammation of the wounded parts ; or from some portion of a nerve or of a tendon being partially wounded without being divided ; or from irritation over the whole surface of the fore.

We should therefore, in the first place, examine the wound with attention, so as to be as certain as possible that no extraneous matter has found access to it : for when pain is produced by any foreign body lodged in a wound, the removal of it will, for the most part, procure immediate relief ; while no remedy that can be advised will have any effect as long as it is allowed to remain. When any thing of this kind is not readily discovered ; or when the particles of any extraneous matter that may be lodged in a wound are so small that they cannot be removed with the fingers ; we have already advised the injecting of warm water, by which they will often be washed out when every other trial has failed. But when this does not succeed, it some-
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times answers to immerse the wound for a considerable time, perhaps for an hour, morning and evening, in warm water, or in warm milk; by which particles of matter are sometimes dissolved and carried out, which would otherwise have continued to excite much uneasiness.

If no trial, however, which may be made for this purpose, should prove successful, we must look for some other cause of the pain; and it will often be found to originate from inflammation. When the external parts of a wound are inflamed, the cause of the pain is at once rendered obvious; for even the slightest degree of inflammation is very readily discovered. But it sometimes happens that the periosteum, and other deep seated parts, are affected in this manner without any external marks of it appearing. This, however, is only the case for some short period after the inflammation has commenced: for even when it first attacks parts that are deeply seated, it commonly spreads in the course of a day or
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two, so as to be discovered outwardly; and when this does not happen, we may in general be directed to the cause, by the heat of the patient's body; by the state of his pulse; and by the degree of thirst, which in every case of this kind are always increased.

When these general symptoms of fever run high, it is sometimes necessary to take away considerable quantities of blood by one or more general blood-lettings. But for the most part this measure is not necessary, and our views are obtained with more certainty by local blood-letting from the edges of the wound by means of leeches. In such circumstances, indeed, no remedy will prove so successful as the discharge of blood in this manner. I have long been in the daily practice of using it in every wound where inflammation proceeds to any height; and I have often seen great advantages result from it. In cases of pain proceeding from this cause, I have known the application of a few leeches to the edges of a wound procure

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cure immediate relief, even where large doses of opiates, as well as other remedies, had previously been tried in vain. And that it is not the quantity of blood, but the manner of discharging it, which proves successful, is evident from this, that the pain is often relieved immediately on a few drops being taken away by means of leeches, which did not yield in any degree to the loss of a considerable quantity by venesection. In using leeches for this purpose, they should be applied as near as possible to the edges of the wound; nay, when they will fix within the wound itself, the practice proves still more successful: but unless the inflammation be very deeply seated, this measure will seldom be necessary. It sometimes happens, however, as we have observed above, that in deep wounds no inflammation of any importance appears externally, while the periosteum is discovered to be much inflamed and very painful. In this situation nothing affords so much relief as scarifications
made

made in the inflamed membrane, either with the shoulder of a lancet or with the point of a scalpel. Nor need we hesitate in putting them in practice, on the supposition of their being apt to produce exfoliations of the bone beneath. Instead of this, they tend more certainly than any other remedy to prevent them; for exfoliations seldom happen merely from the periosteum being divided; of which we have daily instances in wounds penetrating to this depth, which are rarely attended with this effect; unless the bone itself be at the same time considerably injured. In different cases I have scarified the periosteum in the manner here recommended, which in the meantime tended always to remove the inflammation; while in no instance was it productive of any disagreeable consequences. On the contrary, there is nothing more apt to induce exfoliation than an inflamed state of the periosteum, when it is allowed to proceed to the length of suppuration: and we know no remedy by which this

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is with such certainty prevented as by incisions made in the inflamed parts, and carried to such a depth as to remove the tension which commonly takes place.

After as much blood is discharged as may be judged proper, whether by leeches or scarifications, no application will prove so useful as warm emollient poultices and fomentations frequently renewed: for in such circumstances nothing will afford such effectual relief as a plentiful suppuration being induced. We constantly observe, that as long as a wound remains dry on the surface, the parts are tense, much inflamed, and very painful; and that they become lax and easy as soon as they are properly covered with purulent matter.

For the most part, the means we have mentioned will be attended with the desired effect; and especially if the operator be not too timid in making the scarifications: for we must again observe, that they may be done with much more safety and freedom than is commonly imagined;

gined ; and when membranes in any situation are much inflamed, nothing with which we are acquainted will so certainly prevent the accession of gangrene as deep and free scarifications. Even this remedy, however, will not always succeed : for in some cases the inflammation, instead of abating, becomes more and more violent, till at last it terminates in mortification. But as we have elsewhere treated fully of this subject, it is not at present necessary to enter upon it*.

When wounds are attended with violent pain, proceeding from inflammation, the cause is for the most part very readily discovered. But severer pain sometimes exists independent of inflammation : for although much pain very seldom fails to induce an inflamed state of a wound at last, it will often subsist for a considerable time before this takes place. In such cases, and especially where we have no cause to suspect that it arises from the lodgement

* *Treatise on Ulcers, &c. Part I.*

lodgement of extraneous matter, it will probably be found to proceed from the partial division of a nerve or tendon: for we know, that in various instances the most excruciating pain has been induced in this manner.

In some cases, the pain produced in this way is effectually relieved by putting the injured parts into a relaxed state; but, for the most part, the only remedy upon which we can depend is a complete division of the wounded nerve or tendon: and as this is a means of cure which may at all times be practised without risk, it should never be delayed when the pain is found to proceed from this cause; and especially when, from its violence, there is reason to suspect that it may induce convulsions or any other alarming symptoms. As a free use of the scalpel, however, is necessary, patients in general do not easily submit to this division; nor do we commonly find that practitioners are apt to recommend it. But I can say from different instances of its beneficial effects,
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that we ought more frequently to practise it: for it seldom fails to afford immediate relief, even in the severest degrees of pain; and I never knew any bad effect result from it. It ought always, however, to be advised as soon as any other means that may be employed have failed: for when violent pain has subsisted so long as to induce any material affection of the convulsive kind, even this remedy will not readily remove it. On the parts being freely divided, they should be placed in a relaxed posture; and an emollient poultice being laid over them, if the practice proves successful, the patient will soon find himself relieved from his distress, and the wound may afterwards be treated in the usual way. But when it fails, as it will be apt to do, when from timidity, or any other cause, it has been long delayed, there will be much cause to suspect that the patient will at last die convulsed, notwithstanding the use of opiates, and every other remedy that may be employed.

In some cases again, the pain which occurs in wounds, instead of being deep seated, which it always is when it proceeds from an affection of any particular nerve or tendon, is found to originate from a peculiar degree of irritability of the nerves on the surface of the injured parts. The pain, in such instances, is not very severe; but it often proceeds to such a length as to excite much uneasiness, by which the patient is apt to be deprived of rest, and the matter discharged from the sore to be rendered sharp and acrid.

For the removal of this kind of pain, emollient poultices, and other warm applications, are commonly employed; but seldom with any advantage. Indeed they often seem to increase the irritability. Large doses of opium afford the most certain relief; and a solution of opium in water, or a weak solution of saccharum faturni, are the best external remedies. When of a proper strength, they commonly prove successful.

While treating of the cause and removal
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of pain in wounds, it was necessary to mention inflammation, with the means best adapted for the cure of it. We have now to attend to the nature and treatment of some convulsive affections which injuries of this kind sometimes induce.

Subsultus tendinum, and other spasmodic affections of a slight nature, are frequent consequences of wounds: They are more particularly apt to occur from the amputation of limbs, when they often prove the cause of much uneasiness and pain; for the starting which they are apt to excite in the affected limb, produces a violence of action which muscular parts newly divided are not well fitted to support. And when they are severe, and return frequently, they prevent the dressings from being kept properly applied, at the same time that they are often the cause of hemorrhagies from arteries which have even been tied with ligatures. We ought, therefore, in every instance, to treat them with attention. Indeed the risk of their producing hemorrhagies

is so considerable, and the sensations which they communicate to the patient are so disagreeable, that a prudent practitioner will at all times consider them to be of importance.

As these convulsive twitchings are evidently the consequences of pain and irritation produced by the wound, it is obvious that those means are most likely to prove effectual in removing them which are most powerful in procuring ease. Hence much advantage is derived from placing the patient's body, and especially the affected limb, in the easiest posture: indeed more benefit is derived from it than we are often aware of. I have known severe degrees of this affection relieved almost immediately, by changing the posture of a stump. But when this does not prove successful, opiates will seldom fail.

It is worthy of observation, in using opium for this purpose, that it answers better to give it in small doses frequently repeated, than to give large doses at once.

once. The latter often produce sickness, and even vomiting; and after their effects are over, the spasms are apt to become more severe than they were at first; which we seldom find to happen when the remedy is used in smaller doses, and repeated at proper intervals.

There are other convulsive affections, however, still more alarming, which even in this country sometimes occur from wounds, but which happen much more frequently in warm climates; the locked-jaw, and tetanus. These affections proceed in many instances, indeed, from other causes; the nature of which we cannot discover: but when they are not obviously induced by deep or extensive wounds, they may often be traced, by a more minute investigation, to some slight injury done to the surface of the body. Even the slightest scratch, which does not penetrate to a greater depth than the skin, has been known to induce them.

As we know that severe degrees of pain are often productive of involuntary contractions of such muscles as have been

injured, we would naturally expect that extensive wounds would be frequently attended with this effect. But we do not so readily see how the most violent affections of this kind should occur from such wounds as are so slight as scarcely to be noticed, and which never of themselves produced much uneasiness.

Nor do injuries of greater importance induce these symptoms so readily while they are recent and painful; for they seldom occur in large wounds till the cure is far advanced; and in some instances, particularly after the amputation of limbs, they are never more apt to appear than when the cicatrix is nearly completed. At least this has been the case in almost every instance of this kind which I have met with in this country; and we are told from very certain authority, that the same observation has been made in warm climates*.

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* Vide Observations on the Diseases incident to Seamen, by Gilbert Blane, M. D. &c.

The cause of this may be difficult to explain ; but our knowledge of the fact leads to some advantage in practice. We have hitherto been made to suppose, that the locked-jaw, and other convulsive symptoms which sometimes succeed to wounds, are most apt to occur from the violence of pain induced at, or soon after the time of wounds being inflicted ; and therefore practitioners have guarded with most assiduity against them while the pain has continued severe. But when it is known that they seldom or never occur at this period, and that they frequently appear in more advanced stages of wounds, those means of prevention which are found to prove most effectual, will more readily act with advantage if applied at this time.

Practitioners, therefore, in warm climates, should be particularly attentive in the advanced stages of wounds ; and the most effectual remedy which can be applied on the first appearance of a locked-jaw, is immersing the patient, so as to

cover the whole body in a warm bath. The heat of the bath should be regulated by the feelings of the patient; and he should continue in it as long, as he is able to bear it. Water is commonly used for this purpose; but where milk can be procured, it should be preferred: for, as a warm bath proves, in cases of this kind, chiefly useful by its relaxing powers, we have reason to suppose that the oily particles contained in milk render it particularly proper; and the idea appears to be well founded by the beneficial effects which in different instances have resulted from the use of it.

It may often happen, however, that milk cannot be procured in quantities sufficient for this purpose. In such situations, fat broths, or water combined with oil in any other manner, may be used instead of it. When one application of a bath proves successful, the use of it need not be continued; but for the most part several repetitions of it are necessary. Nor are we to imagine that warm bath-
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ing is a certain remedy. It has frequently indeed proved highly useful, and many cures have been accomplished by it; but we must likewise confess that it has often failed, and that patients are daily carried off in warm climates by the locked-jaw, and other convulsive symptoms, notwithstanding the most ample application of the warm bath, and of every other remedy that has hitherto been employed.

The failure of warm bathing has induced some practitioners to make trial of the cold-bath; and in some convulsive affections it has certainly proved useful; particularly in cases of universal tetanus: but as yet it has not been so frequently employed as to enable us to judge with precision, whether it will often prove useful or not in the locked-jaw, which we are to consider as the most obstinate as well as the most dangerous symptom of this kind.

At the same time that we persist in the use of warm bathing, other remedies ought not to be neglected; and of these
opium

opium is the most certain. It proves useful both as an external application and as an internal medicine. By rubbing the contracted muscles with laudanum, or by keeping them covered with an extract of opium, or with opium merely softened with spirits or water, the spasm has in some instances been lessened: but the most effectual relief obtained from this remedy is by giving it inwardly; not in large quantities as we have remarked above, but in small doses, frequently repeated. The doses should be such, however, as may effectually allay the pain and uneasiness produced by the disease; but more than this is unnecessary: and, when exhibited in large quantities, it seems to do mischief, by inducing that very state of the system it was meant to prevent, namely a great degree of irritability: for as soon as the operation of a large dose of opium is over, we commonly find, in all spasmodic affections, that the disease returns with double violence. But this may be easily prevented, by giving

ving such doses as the patient can easily bear, and repeating them at short intervals, in such a manner that the effects of one may not be over before another is given. *Æther* and musk have sometimes been conjoined with opium; but no advantage of importance has been derived from them.

We have mentioned opium as an external application; but the remedies of this kind from which we would expect most advantage are emollients, freely applied over all the contracted parts. The nature of the disease seems strongly to point them out; and experience has, in some instances, shown that they may be used with advantage. Emollients of every kind may be used for this purpose; but animal fats of the softer kinds seem to be preferable: for they certainly prove more powerfully relaxing in all cases of contracted muscles than any of the vegetable oils; at least, in the course of my experience, they have uniformly proved to be so. By boiling recent bones in water,

a very pure oil of this kind is obtained ; and the fat of all kinds of fowls answers well.

Mercurials have been frequently given in diseases of this kind : but if mercury has ever proved useful, it has been in such cases only where it was rubbed upon the contracted parts in the form of an ointment, and where it would probably act with advantage as an emollient.

When a locked-jaw occurs from a wound in any of the extremities, if the disease does not yield to the remedies we have mentioned, it has been proposed to amputate the member ; and in various cases this hath been practised. I am sorry, however, to observe, that we have scarcely an instance of its proving effectual : for in this disease, as in almost every spasmodic affection, the effect is apt to remain after the cause is removed. We have therefore no encouragement, from past experience, to put this remedy in practice. Instead of proving useful, the disease has, in different instances, been
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evidently rendered worse by it. The remedies therefore which we have to trust to, are those we have mentioned above, namely, the warm bath, opiates, and a very free application of emollients.

While we are depending on these for effecting a cure, the patient's strength should be supported by mild nourishment given by the mouth, when this can be done; and by glysters of strong broths, when the jaws are so firmly contracted as to prevent food from being received by the mouth: And we may, by removing a tooth or two, even in cases of this kind, convey food to the stomach; so that wherever the symptoms of locked-jaw are observed to be approaching, one or two of the teeth should be taken out, as they cannot be removed but with much more difficulty after the jaws are firmly clinched.

Having thus considered the various circumstances relating to wounds in their most usual form, with the means of cure adapted to each of them, we shall now proceed

proceed to mention more particularly some varieties in those affections which point out a different mode of treatment ; and these are, punctures, laceration, and contusion.

SECTION III.

Of Punctured Wounds.

A WOUND is said to be punctured when it is made with a small pointed instrument ; and when the external aperture, instead of being wide and extensive in proportion to the depth, is small and contracted. A wound made by a thrust of a small sword is of this kind.

Wounds of this kind prove, in general, more hazardous than incised wounds of a much greater extent ; from deep seated nerves and other parts of importance being more apt to be partially hurt ; from extraneous bodies being carried to a depth from whence they cannot be easily removed ;

ved; from the discharge which they afford being more apt to lodge; and from the sides of the punctured parts being in many instances made to adhere with difficulty. These are points of the utmost moment, not only from their being often productive of much distress to patients, but from the embarrassment which they give to practitioners, who are more apt to fail in their treatment of this variety of wound than of any other which falls within their management.

It is obvious, that all the risk which occurs in these wounds proceeds from their being so contracted, that free access cannot be got to their full depth: And it is equally evident that this can be obviated only by laying them freely open. Indeed, this is the idea which, in the treatment of punctured wounds, we should always keep in view, that of converting them as far as possible into incised wounds with wide extensive openings. This, however, is a question about which practitioners are not agreed: Some advise the
openings

openings of punctured wounds to be enlarged either with tents or with the scalpel; while others alledge that this is seldom requisite: And they have also differed with respect to the time at which any dilatation of this kind should be made; for while some advise it to be delayed for a few days only, others do not attempt it till every other means have failed.

In the treatment of punctured wounds our views ought to be the same as in cases of sinus. Indeed, a wound of this kind is exactly a sinus in a recent state; and by considering it as such, the means of cure that will most likely prove successful are at once pointed out. In every sinus, our intention is to procure a reunion of the parts which have been divided; but we know from experience that this cannot be effected till a certain degree of inflammation is induced upon them. For this purpose, the introduction of a cord or seton along the course of a sinus has frequently proved successful; and

and some have, with the same views, employed irritating injections. When by these means the internal surface of the sinus is sufficiently inflamed, the cure is to be completed, by compression applied in such a manner as to keep the parts intended to be united in close contact, till a sufficient degree of adhesion is produced. Now, in the application of this treatment to punctured wounds, it is obvious, that the previous steps which we have mentioned for exciting inflammation, would seldom if ever be necessary; for one certain effect of every wound is to induce inflammation over all the parts which have been injured: So that *a priori* we should be led to conclude, that compression alone would in all such cases prove successful: for we know that it seldom fails in other cases of sinus where a due degree of inflammation is induced. But we are deterred, in punctured wounds, from the immediate use of this remedy; at least where they penetrate to any considerable depth, from

our uncertainty with respect to extraneous bodies being lodged in them or not, and from the inflammation in wounds of this kind being apt to run too high. In superficial wounds, indeed, where we are certain of being able to extract any extraneous matter, and where the inflammation is for the most part moderate, compression may be employed immediately; and when properly applied, it will not often fail. But for the reasons just mentioned, it can seldom be employed with safety in wounds of much importance.

The practice I have long adopted in wounds of this kind is this: When they run in such a direction as to prevent a fetor from being carried along their whole course, I lay them open immediately from one extremity to the other, or as far as it can be done with safety, either with a probe-pointed bistoury, or with a scalpel and director: and this being done, the parts are dressed in the manner we have advised above, in cases
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of simple incised wounds. - But when it appears that a seton can with propriety be used, emollient poultices are first applied and continued till a free suppuration is induced, and till there is no longer any cause to fear that the symptoms of inflammation are to proceed too far. A cord is then introduced nearly equal to the size of the opening; and being allowed to remain till there is reason to imagine that any extraneous matter lodged in the wound is discharged, it is then gradually lessened, by taking away a thread or two every three or four days; and when reduced to a third or fourth part of its original thickness, it is taken out entirely; when the remainder of the cure is for the most part easily effected, by the application of moderate pressure along the course of the wound.

When a punctured wound is laid open at both ends, a cord may be easily introduced by means of a blunt probe, with an eye at the end of it. But when the instrument has not passed through the

integuments on the opposite side to which it entered, a counter opening must be made, either by cutting with a scalpel on the round end of a blunt probe, or by passing a lancet-pointed needle, covered with a canula, along the sinus, and pushing it out at the opposite side with the seton attached to it.

In either of these ways the cure of such wounds may often be accomplished. But wherever the practice is admissible, I am clearly of opinion, that laying them open immediately after the accident is preferable to the other: for by means of it all extraneous bodies are at once brought into view; hemorrhages are easily restrained; and all that pain and trouble which sometimes occur from a partial division of nerves or tendons are directly obviated. Nor is the inflammation, which often succeeds to punctured wounds, apt to run so high as it usually does when any other mode of treatment is adopted: So that much distress would be prevented, and much
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time saved, if this method of cure was more generally practised. To those not much accustomed to this kind of business, the enlarging of a small puncture, so as to form an extensive wound, appears to be unnecessary and cruel: but whoever has seen much of this branch of practice will know, that the greatest distress often arises from the smallest punctures; that surgeons are often baffled and much disappointed in their treatment of them; and he will soon find, that nothing so effectually obviates this as the practice we have mentioned, that of laying the punctures freely open as soon as possible after they are inflicted. Indeed, the sooner it is done, the better. No advantage can accrue from delaying it; and a patient always submits to it most readily at first, while at the same time it is productive of less pain than it must necessarily give when the parts are swelled and inflamed, which they commonly are in the course of a few days from the time of such injuries

being inflicted. In every wound therefore of this kind, particularly in those which are often received in duels with small swords, and in battles with the points of bayonets, the enlargement should take place even before the parties are carried from the field; by which many inconveniences which naturally attend these injuries would be prevented.

There are some cases, however, in which this practice cannot with propriety be followed; in punctures which run deep among the large muscles; and especially in such as are contiguous to any of the large blood-vessels and nerves. As more danger would accrue from wounding these than could probably be compensated by any advantage gained by dilating the wounds, it is better in such circumstances to rest satisfied with laying the parts open as far as it can be done with safety; to trust to the suppuration which will ensue for bringing off any extraneous matter that may be lodged in the wound; and to a proper application
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of pressure for completing the cure. Or the practice we have mentioned above, of introducing a seton, may be attempted; for a cord may be passed with safety where it might be very improper and even dangerous to make a deep incision.

But it is proper to observe, that there are some cases in which even a seton cannot be introduced: for a puncture sometimes runs in such a direction, as not to admit of a counter-opening. We must here trust to a proper application of pressure, not merely for preventing any lodgement of matter, but for effecting a cure by producing an adhesion of the divided parts; and when this fails, injections of a moderate degree of astringency may be used with advantage: but as remedies of this kind tend to counteract the very intention for which setons are employed, they should never be advised till it appears that the latter will not succeed. Setons, as we have already observed, prove useful, by exciting inflammation along the course of a sinus. Now, one

usual effect of astringent applications is, to diminish or even to remove inflammation. They should never therefore be employed till all the ordinary means of cure have failed, when they may be used with a view to check the flow of matter when it is discharged in too great quantities, and in order to induce some degree of callosity over the sides of the fores.

We think it right in this place to remark, that practitioners have differed much in their opinions with respect to the use of astringent injections in wounds: for while some are in the daily habit of employing them, others have said that they are always pernicious, and ought never to be used. In the early stages of wounds they can never be necessary; and as they may do harm by washing away the matter too freely, they should never be used as long as a cure is expected, either by the formation of new granulations, or by adhesion: but whenever we have reason to conclude that this cannot probably hap-
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pen, we may with propriety recommend them. Various forms of them are mentioned by authors; but none of them are so harmless, and at the same time answer with such certainty, as weak solutions of saccharum saturni. Lime-water is used with the same views; and water strongly impregnated with alum, or mixed with an equal quantity of claret or port-wine, is often employed with success.

In the treatment of punctured wounds where setons cannot be employed, it is sometimes difficult to prevent the external aperture from closing long before any tendency to heal appears in the bottom of the sore; and if it be not prevented, much mischief is apt to ensue by matter collecting beneath, and bursting out from time to time. With a view to prevent this disagreeable occurrence, tents are employed of prepared sponge, gentian root, and other articles, which, by swelling with the moisture of the sores, serve very effectually to keep them open.

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But while they answer this purpose, they are very apt to do mischief. When the opening of a fore is plugged up with a tent, the matter which forms can never be discharged but at the renewal of the dressings; by which means it will necessarily collect in such quantities as to give rise to absorption, as well as to the formation of sinuses, by the matter spreading between the layers of the contiguous muscles. Tents, therefore, which are of solid materials, ought never to be of such a magnitude as to fill the openings of fores. They will not readily do harm when they are of such a diameter as to admit of a discharge of matter while they are inserted. But when they are employed of such sizes as to fill the openings entirely, they ought always to be hollow; by which the apertures into the fores will be prevented from contracting, while the matter will be discharged as quickly as it is formed. For this purpose practitioners should be provided with tubes of different

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rent forms and sizes, so as to be able to suit any aperture they meet with. Silver tubes are commonly employed; but those of lead answer better. Being softer than the others, they do not create so much uneasiness, and they are more readily formed into any particular shape, so as to answer for sinuses of a straight or crooked direction.

We must observe, however, that tents and tubes of every kind should be used with caution; and it is more particularly necessary that this should be held forth to beginners, for there is no point in practice in which they are more apt to err. As they are early made sensible of the danger which ensues from matter being allowed to collect in sores, they very universally fly to the assistance of tents wherever a puncture or a sinus is discovered. But it is right they should know that tents are seldom necessary: for when once a vent is given to matter, the opening will in general be preserved merely by the continuance.

tinuance of the discharge. In a few instances, indeed, it is otherwise; and in all such cases the leaden tubes should be preferred.

We come now to speak of those wounds which are attended with laceration and contusion; and as both of these circumstances require nearly the same method of treatment, it will not be necessary to speak of them in separate sections.

SECTION IV.

Of Lacerated and Contused Wounds.

A WOUND is said to be lacerated, when the parts, instead of being divided with a sharp-cutting instrument, are forcibly tore asunder; and when, instead of a smooth equal surface, the edges are ragged and unequal: And we conclude, that contusion takes place when a wound
has

has been made with a blunt or obtuse body.

Contused and lacerated wounds differ in many points from simple incised wounds; but in nothing more than in this, that while they are commonly more hazardous, they seldom at first exhibit such alarming appearances. Thus a simple cut, which commonly heals with ease, is often attended with a much greater retraction of the divided parts, and with more profuse hemorrhagy, than a contused or lacerated wound. Indeed it is a frequent effect of contusion and laceration to prevent the effusion of blood, by which inattentive observers, in forming opinions of injuries of this kind, are very apt to be deceived: for as hemorrhagy is the most alarming symptom with which wounds are attended, when it does not occur to any great height, they are apt to conclude that nothing bad can happen. Practitioners of experience, however, will not be deceived by this: for it has long been
known,

known, that injuries of this kind prove always more dangerous than any other kind of wound; and the more violent the contusion or laceration has been, the less blood is always poured out, insomuch that there are instances even of limbs being tore off without any hemorrhagy ensuing.

The pain of lacerated and contused wounds generally varies according to the violence of the injury. Thus, in lesser contusions, the pain is often severe, while it is apt to be inconsiderable where the nerves of any part have been completely destroyed.

The immediate effect, both of laceration and contusion, is swelling or tumefaction, which always takes place in a greater or lesser degree in the retracted edges of the wound. This seems to be the consequence of effusion into the surrounding cellular substance. When the violence has not been severe, this effusion commonly terminates in suppuration; the contused parts separate from those
beneath

beneath in the form of sloughs; and a cure of the remaining sore is obtained by the means we pointed out when speaking of simple incised wounds. But when the parts are so much injured as to have their texture much destroyed, and especially when any of the larger arteries have been obliterated, there will always be cause to suspect that mortification will occur. In sound constitutions, and where the wound is not extensive, even this will not often prove fatal: for in such circumstances the mortified parts commonly fall soon off, and a cure is afterwards effected in the usual manner. But in wounds attended with contusion or laceration to any considerable extent, if the habit of body be not perfectly good, the gangrene which ensues is always to be considered as hazardous: for the disease does not necessarily stop with the parts which have been injured; but is apt to proceed to those which were not immediately hurt by the accident.

And again, even where mortification
does

does not succeed immediately, when parts have been either much lacerated or contused, such a violent degree of inflammation is apt to occur as often terminates in mortification, notwithstanding all our endeavours to prevent it; and in whatever way the disease be induced, it is always attended with much danger: for besides the risk of parts being destroyed by it, which are immediately necessary for life, the absorption of putrid matter from a gangrenous surface proves often suddenly fatal, even when the size of the sore is so inconsiderable as to give no cause to suspect danger.

It is therefore obvious in the treatment of contused and lacerated wounds, that our principal object is to guard against the accession of gangrene. But it is likewise clear, that this is not always to be done by the same sort of means: for we may readily suppose, that much advantage may be derived from blood-letting, and other evacuations, where the injured parts are highly inflamed, while

no benefit would probably result from them in any other situation. This, however, is a point of importance, and merits particular attention.

In lacerated or contused wounds; where the parts are much injured, it is the common practice to give large quantities of bark almost immediately, and to apply warm dressings and other antiseptics with a view to prevent gangrene. It is evident, however, that the indiscriminate adoption of this practice must frequently do mischief: for however beneficial it may be in particular cases, where gangrene has already taken place, it is certain that it will rather do harm where symptoms of inflammation still continue violent; and unless mortification actually exists, it is not clear that in any instance it will prove serviceable; for although we have various proofs of the efficacy of bark in putting a stop to the progress of gangrene, I have never in any case been sensible of any advantage being derived

from it when used as a preventive of it.

Gangrene may arise in these wounds from two causes: From the stoppage of the circulation by the total destruction of the large blood-vessels of a part; and from violent inflammation.

Gangrene proceeding from inflammation is most to be dreaded here; for that which arises from the destruction of blood-vessels is by no means so frequent. The inflammation therefore which takes place in wounds of this kind, will always demand our attention in the first place.

As the hemorrhagy, subsequent to contusion or laceration, is seldom alarming, and as blood discharged from any of the vessels that have been injured tends more effectually than any other remedy to prevent inflammation; such quantities should be taken away in this manner as the nature of the injury may indicate, and as the strength of the patient may admit. Af-

ter

ter this, if the divided arteries continue to throw out blood, they must be secured by ligature: for till the discharge of blood be stopped, the patient will not consider himself as safe; nor can the wound be examined with accuracy. The parts are now to be cleared of all extraneous bodies, as far as this can be done with propriety, and are to be placed as much as possible in their natural situation; but no kind of suture should be employed for their retention. If the violence which has been done to them has been considerable, and especially if the patient complains of much pain, it will be still necessary to take away blood in proportion to the strength of the patient: and as local blood-letting proves in such cases always highly serviceable, the best method of discharging it is by means of leeches, applied as near as possible to the edges of the sore. Indeed no remedy I have ever employed proves so certainly useful as the discharge of blood in this manner; for it not only tends to

prevent the inflammatory symptoms from running high, but it very commonly renders the pain moderate, even when it has previously been severe. It ought never therefore to be omitted; but the practitioner should take care that it be proportioned as nearly as possible to the violence or urgency of the symptoms: for the discharge of a small quantity of blood will in some cases of contusion or laceration prove fully sufficient; while in others, it is necessary to repeat the operation once and again.

As soon as a sufficient quantity of blood is discharged, the parts affected, after being dressed with pledgits of any emollient ointment, should be completely covered with a warm emollient poultice; and this, together with warm fomentations, should be renewed three or four times a-day, so as to promote, with as much certainty as possible, the formation of pus. To induce suppuration in wounds of this kind, is indeed an object of the first importance:

it

it generally relieves all the symptoms; and till such time as it takes place, we have often reason to dread the event.

We commonly find, when sores of this description become covered with good pus, that the pain and tension abate; and such of the parts as have been much lacerated and contused, and which hitherto have been sloughy or perhaps black with mortification, begin now to separate from those beneath: and this being accomplished, they may in general be cured in the same manner with wounds of any other kind. Nay, when brought to this healing state, we may even attempt with safety to expedite the cure by drawing the edges of the retracted skin into contact, either by means of the uniting bandage or with adhesive plasters; for although this would be improper in the commencement of such wounds, while there is any risk of the tension and inflammation proceeding too far, it may with much propriety be advised when

there is no longer any reason to be afraid of these symptoms.

When practitioners are immediately called, so as to employ the means we have mentioned in due time, they will not often fail in ordinary cases: but it frequently happens, whether from the violence of the injury, the tendency in some constitutions, not only to inflammation but to gangrene, or from the proper remedies not being timeously applied, that all the symptoms become daily worse, and, notwithstanding repeated blood-lettings both general and local, all those parts which were at first inflamed become perfectly black and mortified. We are not now to trust to evacuations: on the contrary, whatever tends to debilitate should be avoided; and we know from experience, that, in this situation, no remedies prove so useful as those which invigorate and restore the tone of the constitution.

With this view, the patient should be desired to live upon nourishing food.

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He should be allowed as large a quantity as he can take, of good wine, or of strong malt-liquor, or of both; and Peruvian bark should be given in as large doses, and these should be as frequently repeated, as his stomach will permit. Indeed bark is perhaps the only remedy on which we can place any dependence; and as we know from experience that it may with safety be given in great quantities, it should always be exhibited in cases of this kind without farther limitation than what necessarily arises from the state of the stomach. We may remark, too, that it proves in general useful nearly in proportion to the quantity which is taken; and it often happens, that large doses are not more nauseated than those which do not contain above half the quantity. Where it is of importance to throw in a large quantity of the remedy in a short space of time, as is always the case in gangrene, it should never be given in less than doses of a dram, or even of two drams when the patient can bear it;

and these should be repeated every hour. Bark, in some cases, seems to prove more powerful when conjoined with the vitriolic acid: elixir of vitriol may therefore be given along with it. In gangrene arising from debility, opium frequently proves useful; and as it does not counteract the bark, the two remedies may with safety be prescribed together.

In the mean time, the state of the fore must be particularly attended to. As long as there is any tendency in the contiguous parts to inflammation, the best applications, perhaps, are warm emollient poultices and fomentations; for, as we have elsewhere shown, that the separation of mortified parts is commonly effected by a suppuration taking place between them and the adjoining sound parts, we necessarily derive most advantage from whatever tends to promote it*. But as no suppuration will occur without some degree of inflammation, when there
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* Vide Treatise on Ulcers, &c. Part I, where this subject is more fully considered,

is no reason to imagine that this will otherwise happen, we should endeavour to excite it by the application of warm dressings to the fore, and especially by the use of stimulating substances to the contiguous sound parts. Mustard applied in the form of a poultice, as well as some others of the rubefacients, have proved useful in this manner; and I have employed with advantage a strong solution of crude sal-ammoniac in vinegar and water. It is proper, however, to observe, that this practice must be managed with caution: for much inflammation might often prove detrimental, while in every instance it would be unnecessary; for we know from experience, that a small degree of it proves always sufficient. As soon, therefore, as it is observed that the mortified parts are surrounded with a kind of inflamed ring, the stimulating applications should be removed in order to give place to warm emollients for the purposes mentioned above. Any parts that are completely

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pletely mortified may with safety be removed; indeed the offensive smell which they produce renders this a necessary measure: but the common practice of making incisions through the diseased parts into those beneath which are still found, should never be adopted. No advantage can be derived from it, and it may be productive of much harm. It is recommended with the view of giving more free access to the ointments, and other remedies used as dressings, than could otherwise be obtained; but I have not in any instance seen it prove useful, and in different cases I have been sensible of its doing mischief. It may very readily carry the putrid matter of gangrene more deeply into the contiguous sound parts than it would otherwise penetrate. In some cases it has evidently induced more inflammation than was necessary; and in more instances than one I have known scarifications prove hurtful, by exciting very troublesome hemorrhagies.

By

By persisting in the use of bark, and of the other remedies we have just mentioned, and especially if the strength of the patient be supported with wine and nourishing food, even bad cases of gangrene will often terminate happily; the mortified parts will separate, and the remaining fore will heal kindly and easily with common mild dressings: But in other instances, notwithstanding all our endeavours, the disease will continue to spread, and nothing will prevent its fatal termination. When gangrene is seated in any of the extremities, it is the common practice, when other means of cure fail, and when the mortification is still advancing, to amputate above the diseased parts: we have elsewhere shown, however, that this practice should not be adopted; and when treating of amputation, we shall again have occasion to enter on the consideration of it.

In the treatment of mortification, it is a good general rule to be very sparing of every evacuation from the first appearance

ance of the disease, and this especially with respect to blood-letting. But in addition to what I have already observed, I think it right to remark, that in all cases of inflammation where the approach of gangrene is dreaded, and particularly in wounds attended with much contusion or laceration, till mortification actually occurs, we should proceed with freedom in an antiphlogistic course, particularly in discharging as much blood as the degree of inflammation may appear to render necessary; and I insist on this point the more fully, from having often observed much mischief ensue from practitioners being too timid in advising it. Being afraid of sinking the patient too much, they avoid the only remedy that could probably save him: for, in such circumstances, it is the violence of the inflammation of which we have most reason to be afraid; and as we know of no remedy which can with such certainty be depended upon for removing inflammation as blood-letting, it should be prescribed

scribed with as much freedom as the strength of the patient and other circumstances will permit; by which the accession of gangrene will often be prevented when all the usual remedies would probably fail.

What we have hitherto said in this and the preceding sections, may be considered as common to wounds in general: We now proceed to consider those wounds, which, either from the nature of the part wounded, or from its situation, demand a peculiar treatment.

SECTION V.

Of Wounds in the Veins.

IT is difficult to restrain the hemorrhagies which sometimes ensue from wounded arteries, on account of the force with which the blood is propelled

pelled into them by the heart, and on account of their muscular coats, which prevent them from collapsing readily. But in the veins neither of these circumstances take place; the contractile power with which they are endowed is very inconsiderable; and we do not perceive that the circulation in them is much affected by the action of the heart.

For these reasons, wounds in the veins heal with more ease and are attended with less danger than wounds of the arteries: Indeed we know, that the largest veins are often much injured, and that no bad symptom will ensue; while very troublesome consequences will follow from wounds even of small arteries. In general, therefore, we have no great reason to be afraid of wounds in the veins: for while we have it in our power to check the hemorrhagy, we never observe any detriment to ensue even from the obliteration of the largest external veins; for the anastomosing branches so readily admit of dilatation, that they soon become suffi-

sufficient for carrying on the circulation beyond the parts affected.

We commonly find, that a longitudinal cut in a vein heals with ease when it is slightly covered with a piece of dry lint or soft old linen: When this fails, the hemorrhagy may be always stopped by the application of a piece of dry sponge or of agaric to the bleeding orifice, and securing it with moderate pressure. But in transverse cuts in the large veins, or when any of them are cut entirely across, it may sometimes happen either that pressure cannot be properly applied to the wound, or that it does not prove sufficient for stopping the discharge: In such cases escharotic applications are commonly advised, and by some practitioners the actual cautery is employed; but none of these can be depended on; and they are apt to create a good deal of uneasiness. The same remedy therefore should be employed here that we daily use in hemorrhagy from wounds in the arteries, namely, ligatures; which, when properly

perly applied, neither fail in their effects, nor produce any material inconveniency. In the application of ligatures, we have elsewhere shown, that the crooked needle should seldom or never be used, and that the tenaculum alone should be employed.

SECTION VI.

Of Wounds in the Lymphatics.

THE lymphatics are equally liable to injuries with other parts of the body: As they often lie contiguous to veins, they are sometimes wounded in the operation of blood-letting; and they are not unfrequently cut in opening buboes and other glandular collections of matter.

When the smaller branches only of lymphatics are opened, we may readily suppose

suppose that they will heal along with the rest of the wound; but the wounded lymphatic is sometimes so large, that it does not heal so soon as the other parts, but continues to pour out its contents in considerable quantity, giving a good deal of inconveniency, and at the same time weakening the patient: We should never hesitate therefore in putting a stop to the discharge.

Various means have been proposed for effecting this. In some cases it has been done by compression alone: Astringents have been advised, together with the application of dry sponge, agaric, and of common puff-ball; and both the actual and potential cauteries have been used. But when moderate pressure fails, the most effectual remedy is the taking up the injured lymphatic with a ligature, in the same manner as we do wounded arteries. No objection can be made to this; and it answers the purpose in the most certain manner.

SECTION VII.

Of Wounds in the Nerves and Tendons, and of Ruptures of the Tendons.

WHEN treating of blood-letting, as well as in a preceding part of this chapter, I had occasion to speak of the consequences which sometimes ensue from partial divisions of nerves and tendons, and of the means which seem to be best adapted for removing them. At present it might be sufficient to refer to these parts of the Work; but I shall now make a few additional observations.

It must often happen, that nerves and tendons are partially divided along with other parts; but when no pain arises from it, this accident does not particularly come under the observation of practitioners. In such cases they heal along
with

with the other parts of the wound: But in various instances, either from some singular degree of irritability in the injured parts, or from a peculiarity of constitution, which we cannot explain, the slightest puncture of a nerve or of a tendon, will induce very severe pain, inflammation, convulsions, and even death.

Whenever we have reason to suspect, from the violence of the pain, that the other symptoms may supervene, the most effectual means should be immediately used for preventing them: for when once convulsions take place, we are never certain of being able to allay them. In some cases, large doses of opiates answer the purpose: but when they do not very quickly prove successful, no time should be lost in putting the only remedy in practice, on which we can place much dependence; and that is, the complete division of the injured nerve or tendon. By this we may indeed induce a certain degree of insensibility in the parts beneath, or they may even be deprived of

the power of voluntary motion; but any inconvenience which this may occasion will be trifling, when compared with the advantages which result from the operation: For I can from experience assert, that it seldom fails in removing all the symptoms, when it is timeously employed; while, in different instances, wounds of this kind have terminated in death where it has been omitted.

In this manner we may obviate the effects of punctures and partial wounds, either in the nerves or tendons: But it is necessary to mention the method of treatment to be pursued in the healing of wounds or ruptures of the large tendons, when they are completely divided. As a complete division of any of the large tendons is always attended with much retraction, it was long ago inculcated by practitioners, to draw the retracted extremities of the ruptured tendon into contact, and to retain them in this situation by sutures:
and

and this being done, and the limb placed in a favourable situation, the rest of the fore was treated in the usual way.

There is no reason to doubt of cures having been often accomplished in this manner : nay, where tendons have been merely ruptured, without any external wound, as often happens with the tendo Achillis, the retracted ends of the tendon have been laid bare by an incision, for the very purpose of retaining them by futures. This, however, is a very painful operation ; and as the same intention may be accomplished in a much more simple manner, it ought to be laid aside. When it was first proposed to unite ruptured or wounded tendons by means of futures, it was the common opinion, that, in order to insure a reunion of divided parts, it was absolutely necessary to bring them into close contact ; and the same idea prevailed, not merely with respect to tendons, but with regard to bones, as well as other parts.

In the treatment of fractured bones

and of ruptured tendons, it is no doubt a right general rule to endeavour to bring the divided parts as nearly into contact as possible: but we now know that cures may be accomplished where the retraction of parts is so considerable as to render it impossible to draw them together; nay, that it has often been done, even where a portion of a tendon or of a bone has been completely removed. Very considerable portions of bone have been regenerated; and although we are not certain that any part of a tendon has ever been renewed, yet such adhesions always take place between the retracted ends of the divided tendon and the contiguous parts, as tend in a great measure to supply the deficiency. Thus I have known different instances of the tendon of the rotula being ruptured, as well as of the tendo Achillis: and although the ends of the retracted tendons could never be brought within an inch of each other; yet in all of them where proper attention was given, the cures have been so far complete, that the use
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of the limbs has been very perfectly restored. Some degree of stiffness has often indeed remained for a considerable time; but at last even this symptom has very commonly been removed.

Wherever a wounded tendon may be situated, or even where it is only ruptured without any injury being done to the external parts, the limb should be placed in such a manner as will most readily admit of the retracted ends of the tendon being brought nearly together; and when in this situation, the muscles of the whole limb in which the injury has happened must be tied down with a roller in such a way as will prevent them from all kind of exertion during the cure, at the same time that the parts are placed in such a position as will tend most effectually to keep them easy and relaxed. Thus, in a wound or rupture of the tendon of the rectus muscle of the thigh, the patient's leg should be kept as much as possible stretched out during the cure, when the thigh should be in some de-

gree bent, so as to relax the muscle itself, as far as it can be done. While in similar affections of the tendo Achillis, the knee should be kept constantly bent, so as to relax the muscles of the leg as much as possible; at the same time that the foot should be stretched out, so as to admit of the ends of the ruptured tendon being brought nearly into contact. In applying a roller to secure the muscles and tendons in this situation, it should be done with a firmness quite sufficient for the purpose, at the same time that care is taken to prevent it from impeding the circulation; with this view, fine soft flannel should be preferred either to linen or cotton: for being more elastic, it more readily yields to any swelling with which the limb may be attacked.

The late Dr Monro was the first who gave any accurate directions for treating a rupture of the large tendons; and he has probably done it with the more precision, from having himself experienced the effects of this misfortune in the tendo Achillis.

Achillis. As the method which he points out, and the instruments which he recommends, are very simple and judicious, and as they have in various instances been found to answer very completely, a description of them will be considered as a proper addition to this article.

The different instruments used by Dr Monro, with the several parts of each of them, are represented in Plate LXVIII.

Fig. 9. Is a foot-sock or flipper, A, of double quilted ticken; from the heel of which, B, the quilted strap, D, is of such a length as to reach above the calf of the leg.

Fig. 1. A strong quilted calf-piece, E, with pye-holes, FF, on each side, through which a lace, fig. 2. is to be passed, and with a buckle, G, so placed on its back-part, that when the lacing is on the outside of the leg, the buckle will be in the middle of the lower part. Two rows of pye-holes are here represented, one on each side; either of which may be used according to the size of the leg.

In

In Dr Monro's case, the foot and leg were first wrapped in soft flannel smoaked with fumes of benzoin, when he put on, as in fig. 3. the foot-sock A and calf-piece E; and bringing the strap H thro' the buckle G, he could by it extend the foot, and pull down the calf to what degree might be judged proper, and there it was secured with the buckle.

This bandage answered the intention perfectly well; and it was wore night and day. It should be drawn tighter during sleep, and relaxed when the patient is awake and on his guard; during which the foot should be placed upon a stool, as at I; and the calf-piece should be frequently stuffed, or made easier by loosening the lace, so as to prevent the foot from swelling, which is apt to happen if this be omitted. To prevent the toes from becoming uneasy, the foot-sock should be left open at the end K.

During the first fortnight the Doctor made no motion nor effort with his foot,
but

but was carried in a chair, running on castors, from one part of his house to another: After this he began to move the foot backwards and forwards, so gently as not to give pain. In a gradual manner these motions were increased; the extension of the leg and flexion of the foot were always stopped on their producing any uneasiness.

On beginning to walk, the affected leg, which was the left, was always put before the right, so that the left foot might be as well extended as possible. To prevent any danger from falling, a cane was used in the right hand.

The void between the two ends of the divided tendon became insensible in a few days, except that a softness was felt there more than any where else; but this part turned gradually thicker and harder, till a knot was formed in it of the size of a middle-sized plum. At first this tumor was equally hard with a piece of cartilage; but it gradually became softer, and

and diminished so much, that at last it was scarcely perceptible.

With a view to strengthen the leg and foot, cold water was poured upon them, and immediately thereafter they were well rubbed. This was first employed some weeks after the accident: but no advantage being derived from it, the parts were afterwards strongly rubbed twice a-day with unguentum altheæ, or some other emollient; and this was continued till the limb could be used with freedom.

In about two weeks from the time of receiving the injury, the Doctor was obliged to go abroad, when he used a pair of shoes with heels two inches high, and applied the machine, which we shall presently describe, through the day, instead of the former bandage; which, however, was always put on at night for a month longer.

This new machine, fig. 8. is a piece of steel, the middle stalk of which, L, is narrow but strong; the ends, MM, are
thin

thin and concave, and must be adapted to the convexity of the foot and fore-part of the leg. Three staples, *a, a, a*, stand up from the fore-part of the steel; one in the middle of each of the broad ends, and the third in the middle of the stalk. All the steel, except the stalk, should be covered with soft leather, and the concavities of *M M* should be well buffed, as the softer rupture-bandages commonly are.

After putting on the shoes and stockings, one end of this machine was put upon the broad part of the foot, nearer the toes than the buckle of the shoe, and the other end was placed upon the fore-part of the leg; then one ribband, or a thong of leather, fig. 5. was put round the foot, and another, fig. 6. round the leg, to pass through the two staples near the ends of the machine, and there secured with straps or buckles, but without being drawn tight. A third strap or ribband, fig. 7. with its middle, *N*, applied to the hollow of the foot, immediately

ately before the heel, had its ends passed on each side of the foot through a noose, *o o*, of a fourth thong of leather, *P*, that came round the quarter-heel of the shoe, to be afterwards put through the middle staple; where, after these ends, *q q*, were drawn as tight as was thought convenient for extending the foot, they were secured with the buckle or with knots. See the application of this machine in figure 4.

This was continued for the space of five months; but those who may find it inconvenient, might use instead of it a thong of leather, sewed at one end to the upper and middle part of the quarter-heel of the shoe, and fastened at the other end to a garter or strap put above the calf of the leg. The high-heeled shoes were continued for a considerable time: two years elapsed before they were thrown aside; by which means, and by treating the injured limb during all that period with great caution, a very complete cure was obtained; while others, who
have

have not been so attentive to the management of matters of this kind; have not been so fortunate; some of them having the tendon ruptured a second, or even a third time, and others remaining stiff and lame for a great length of time.

SECTION VIII.

Of Wounds in the Ligaments.

BY Ligaments we understand those flexible bodies which serve to cover the different articulations, and by which many of the bones are firmly tied to one another. The bones of the pelvis are united by strong ligaments; and we know, that several other bones are chiefly connected by the same means. But as all these ligaments lie deep, they are not much exposed to the effects of external violence; and the same cause puts it out of our power to apply

ply any particular treatment for injuries which may accidentally be done to them. Our observations at present are therefore chiefly applicable to wounds of the ligaments of joints, commonly termed Capsular Ligaments.

As the ligaments are not so plentifully supplied with nerves as some other parts of the body, several anatomists have been induced to believe that they are not possessed of sensibility; by which we might be led to conclude, that injuries done to them would not probably require much attention: But although Nature for obvious reasons has not made the ligaments highly sensible; and altho' in a healthy state they will bear much fatigue without suffering so much as other parts of the body; yet the fact is undoubted, that they are rendered extremely sensible by disease; and that wounds inflicted on them are frequently productive of very alarming consequences. We have often indeed known the ligaments of joints much injured, nay
violently

violently lacerated, by the heads of the bones which they surround being pushed through them, as well as by other causes, without any bad effect being experienced from it; and in some cases the wounds have healed as easily as if the ligaments had not been affected. These, however, are rare occurrences, and are by no means to be depended upon: for in a great proportion of cases where joints are wounded, the symptoms which ensue are severe and hazardous. Affections of this kind, however, are very deceiving: for in general nothing alarming appears at first, nor for several days after the accident; and when the patient is treated with care and attention, I have known a week pass over before any other symptom has been observed than what usually takes place in the most simple wounds. But, at length, the patient begins to feel an uneasy sensation of stiffness over the affected joint, which by degrees turns more severe; when the parts become swelled, tense, and somewhat

VOL. V. L inflamed.

inflamed. In this situation the pain is in general so very severe, that the patient cannot allow the joint to be touched: He complains of a tightness round the whole, as if it was firmly tied or girded; and the inflammation, which at first was confined to the joint itself, is now apt to spread over the whole limb.

If the wound or laceration in the capsular ligament is large, the synovia is often discharged in considerable quantities at first; but the swelling induced by the inflammation gradually puts a stop to it, till at last the wound becomes dry and sloughy. In the course of a few days, however, extensive suppurations begin to form over the joint; and on these being laid open, large quantities of pus are discharged together with synovia. By this the tension and girding pain are immediately removed, and the patient experiences much relief; but successive suppurations often take place, which from time to time excite a renewal of all the symptoms, and by which the patient's health

health is at last very apt to be much injured.

When wounds in the ligaments do not heal quickly, and almost without the formation of matter, this is in general the manner in which they terminate; at least it is the case in the larger joints, and it is in these chiefly that they ever prove alarming.

From this history of the rise and progress of the symptoms, some advantage may be derived in conducting the cure. From this it is evident, that it is not merely the injury done to the ligament which we have to dread; but a secondary train of symptoms, which are very apt to result from it. Altho' none of the lining membranes of cavities, which are naturally shut up from the air, seem to be endowed with much sensibility, it seems to be a very common effect of air finding access to them to give them an exquisite degree of it. Of this we have frequent proofs in wounds which penetrate the cavities of the thorax and abdomen; and

it is evidently to this cause that we are to attribute those consequences which result from wounds in the capsular ligaments of joints.

This points out a very important circumstance in the treatment of such wounds ; namely, the prevention, as far as is in our power, of air finding access to these cavities. In large lacerated wounds this will, for the most part, be impracticable ; but in common incised wounds, it may often be very completely effected.

It ought never to be attempted, till we are certain that any extraneous body that may have been carried in is extracted. This being accomplished, we may very commonly cover the wound in the capsular ligament entirely, by pulling the skin so far over it, that the wound in the one may not correspond with that in the other ; and as the skin about the joints is sufficiently lax to admit of this, it may always be easily done. We are now to fix the skin in such a manner that it may

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not retract, either by futures or adhesive plasters: but in general the latter will prove sufficient, if they be assisted by the application of a proper bandage; and they are preferable to futures, which in this situation are apt to excite inflammation. After the plasters are applied, the skin and cellular substance should be supported in their situation by passing a flannel roller spirally round the joint, so as to produce an equal degree of compression over the whole of it, of a tightness sufficient for supporting the parts to which it is applied without interrupting the circulation. The patient should be in bed while the dressings are applied, so that they may not afterwards be liable to be moved; and the limb should be put upon a pillow, and placed in such a situation as admits of the skin and other teguments being most completely relaxed, which will be found to be different in different parts even of the same joint. Thus, in treating a wound of this kind in the anterior part of the

knee, the leg should be kept extended during the whole progress of the cure; for in this situation the skin which covers the fore part of the joint is most effectually relaxed; while, for a similar reason, in penetrating wounds entering from the ham, the leg should be kept bent.

In the mean time, in order to prevent the accession of inflammation, the patient should be put upon a low diet; his bowels should be kept lax; a moderate perspiration should be excited; and he should lose a quantity of blood suited to his age and strength.

By treating wounds of the joints with this strict attention, I have known many of them terminate easily, which might otherwise have been productive of much distress: But when these means do not prove effectual, or when they have been too long neglected, so as that the application of them is no longer admissible, and which will always be the case when inflammation has taken place, other remedies must of course be employed.

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In this situation, our principal object is to remove the inflammation; and if it be not speedily accomplished, it will in all probability spread over the whole joint, when it very commonly terminates in extensive suppurations. Every practitioner will know, that such an occurrence is necessarily attended with much hazard; so that nothing should be omitted by which it can probably be prevented. The most effectual remedy which I have ever employed, is local blood-letting; but, in order to prove useful, it must be carried to a considerable length. In strong robust patients, eighteen or twenty leeches should be applied as near to the part affected as they will bite; to be repeated daily as long as the continuance of the inflammation may render it necessary. Any of the simple ointments may be applied to the wound itself; but one of the best applications to the joint is the steams of warm vinegar, which have often appeared to prove useful in preventing the formation of matter.

ter. And as the pain in wounds of the joints is in general severe, large doses of opiates must be given to allay it. In a few cases, I have known the pain much relieved by the external application of a strong decoction of white popy-heads by way of fomentation: but for the most part, nothing proves effectual but the internal use of opium.

By due attention to these means they will commonly prove effectual, if they have not been either too long neglected or too sparingly administered. From either of these causes, however; from the violence of the injury; or from some constitutional affection; the inflammation will, in some cases, still proceed to increase; and, notwithstanding all our endeavours, will at last terminate in very large collections of matter, which will be partly within the capsular ligament of the joint, partly in the substance of the ligament itself, and in part it will be found to have spread through the cellular substance of the contiguous parts. In
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such circumstances, all that we can do is to give free vent to any matter that may form ; which can only be done by making an opening in the most depending part of the collections as soon as the existence of pus is ascertained. In this manner, and by proper use of emollient poultices and fomentations whenever a new collection appears to be forming, we will sometimes be able to save limbs, which otherwise it would be necessary to amputate ; But whoever has had experience in this branch of practice will know, that when wounds in any of the larger joints terminate in suppuration within the capsular ligaments, that the risk attending them is great ; and that we can never, even under the best management, have any dependence on their terminating favourably. The principal reason, as we have already observed, of their continuing obstinate, is the inflammation becoming violent ; which when not obviated by the means we have advised, is apt to produce such large collections of
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matter ; and one abscess is so apt to succeed to another, that the patient is at last exhausted, when we are often under the necessity of removing the limb in order to save his life. In such circumstances indeed, there is no room to hesitate ; for when the strength is much impaired by the frequent formation of abscesses, if the same disposition continues, and especially if any degree of hectic fever has taken place, the risk attending any attempt to save the limb will now be considerable, while the chance of succeeding will be so small, that it should never be advised.

But although I am decidedly of opinion, in circumstances such as we are considering, that it is the safest course to amputate the limb ; yet I by no means agree with those who say, that almost every case of a wounded joint requires the same remedy. By many it has been asserted that wounds in any of the larger joints almost universally terminate so unfavourably, that, in order to save much pain and trouble, as well as risk to
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the patient, it would be the most advisable practice to amputate immediately after the accident, before there could be any chance of inflammation taking place. I am convinced, however, that this opinion is founded in error; and my reasons for it are these:

Although it will not often happen that complete cures are obtained where the capsular ligaments of any of the larger joints are extensively wounded, yet in some cases it is otherwise. Of this I have met with different instances: And altho' such injuries will not often be so effectually cured as to prevent a considerable degree of stiffness and immobility in the joints in which they are seated; yet even a complete ankylosis is an inconvenience to which a patient should submit, rather than to the pain and hazard which uniformly attend the amputation of any of the extremities.

As it must be admitted, however, that the proportion of limbs which are saved by this practice, is extremely small when
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the injury done to the capsular ligaments of joints are extensive, this argument would not deserve our attention, if the delay which it occasions were to be attended with any additional hazard, or if it should preclude amputation, if at any future period of the fore it might be judged adviseable. This indeed has been alledged by practitioners: but there is much cause to suspect that they are wrong; for many who have been accustomed to amputate in the late stages of such fores, have had more success than generally attends the practice when advised immediately after the injury is inflicted. And this, in the course of my experience, has been so uniformly the case, that scarcely any have died who were not previously so very much reduced as to render their chance of recovering very small indeed; a situation which we have it always in our power to guard against, by advising the measure before matters are so far advanced.

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Where the capsular ligament of a joint has not only been wounded, but much lacerated and contused, it may in a few cases be proper to advise immediate amputation. But such instances are extremely rare ; so much so indeed, that I have never met with any, excepting where the ends of bones have been perhaps much broke, and even splintered at the same time. Where this has not been the case, I have uniformly been in the practice of attempting to save the limb ; and as in several instances I have succeeded, without adding to the risk of the patient where the trials have failed, I shall certainly think it right to continue it.

SECTION

SECTION IX.

Of Wounds in the Face.

IN the third volume of this Work, we entered into a full consideration of wounds of the head, which either primarily or eventually, may affect the brain: and in it, and in the fourth volume, we treated of the Diseases of the Eyes, Nose, and Mouth; we shall now therefore refer to what was then said upon these parts of our subject.

In the treatment of wounds in any part of the face, one important object is to prevent deformity. This is indeed an object in every part of the body; but in the face it is so essential, that the slightest injuries done to it require particular attention.

As every cicatrix produces some degree of deformity, we should endeavour,
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in every wound of the face, to have the divided parts laid as exactly and neatly together as possible, and to retain them by those means which will be productive of the least mark. In all superficial wounds in the face, as well as in those which run deep, when of a longitudinal direction with respect to the fibres of the injured part, we should trust to adhesive plasters alone for retaining them. But wherever the edges of a wound retract much from each other, as we will not be able in any other manner to retain them, sutures ought without hesitation to be employed; and of these the twisted suture, described in Chap. I. Sect. V. Vol. I. ought in general to be preferred; for it prevents retraction with more certainty than the others, at the same time that it is not productive of more pain or uneasiness. In this manner it is more especially necessary to treat all wounds of the lips, which cannot indeed in any other way be prevented from leaving much deformity: we shall refer, however, to the last volume

volume of this Work for what was farther said upon this point when treating of the operation for the Hare Lip.

Wounds in the cheeks are apt to penetrate the salivary ducts leading from the parotid glands ; and as this is frequently productive of much inconvenience, by the divided duct continuing to pour out the saliva long after the rest of the wound is healed, it becomes an important object in many instances to accomplish a cure. But as we entered into a particular consideration of this point in the fourth volume of this Work, chapter XXX. Sect. XIV. we must now refer to what was then said upon it.

In the fore-head, wounds are sometimes attended with hemorrhagies, which prove troublesome from our not being able in the usual manner to apply ligatures upon the arteries from whence the blood is discharged, owing to their running in a groove of bone ; which is the case with a small branch which passes out on each side from the internal carotid

carotid immediately above the eyebrows. In all such cases, we should, in the first place, employ sponge, agaric, or any mild astringent, along with gentle compression; and when this fails, we may endeavour to pull out the bleeding vessel by means of the tenaculum, and in this manner may tie it with a ligature. I once succeeded in this way with perfect ease, when every other method had been tried in vain.

It may sometimes happen, however, that even this will fail. In such cases, when the hemorrhagy continues so profuse as to endanger the patient, it may be proper even to remove that portion of the skull in which the vessel is incased; or, in the hands of a nice operator, the intention may be answered by taking away the outer table of the skull only: for, in some cases, these arteries run for a considerable space between the two lamina of the bone; and in such instances our object may be accomplished by the

removal of one of them; and thus the risk of exposing the brain will be avoided.

SECTION X.

Of Wounds in the Trachea and Oesophagus.

IT is necessary in some cases to make openings into the trachea and œsophagus, for allowing food and air to pass to the stomach and lungs when these passages are obstructed. We must refer, however, for the method of effecting this, to Chapters XXIII. and XXIV. Vol. II. where these operations are particularly described: At present we are to consider the method of treating wounds in the trachea and œsophagus, inflicted in some cases by accident, but more frequently by design; as often happens where suicide is attempted.

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The trachea is seldom divided longitudinally. Transverse wounds running between two of the cartilages, of which it is composed, are more frequent. In some cases these wounds are superficial, and only penetrate the anterior part of the tube; in others, they run so deep as to divide it entirely.

In all longitudinal wounds of the trachea, a cure may be obtained by the use of adhesive plasters alone: the lips of the wound will be easily brought together; and as the retraction will never be considerable, a proper application of adhesive plaster will prove sufficient for retaining them. In such cases, therefore, they should be preferred to sutures; and bandages are here inadmissible, as they cannot be applied with such tightness as to have any effect upon the wound, without compressing the trachea so much as to impede respiration.

Even in slight transverse wounds of this part, a cure may often be effected with adhesive plasters; and this especially, if

they be assisted by a proper posture of the head, which in every wound of this nature should be kept as much as possible bent down upon the breast. Indeed, if this be not duly attended to, it will often be impossible to produce a right reunion of the divided parts either with plasters or any other means: It ought not therefore to be left in the power of the patient. The head should be fixed with a bandage; and the most simple, as well as the most effectual, method of doing it, is by putting a common night-cap upon the head, and a piece of broad-tape or ribbon being sewed on each side of it above the ear, it may now be pulled down and fixed as low as is necessary, by tying the tapes to a circular roller put round the chest. In this situation the head should be kept for several days, till there is reason to imagine that the parts are firmly united.

But in transverse wounds of the trachea, which penetrate deep, we should not trust to adhesive plasters; the interrupted
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ed future made with broad ligatures will answer better. I am doubtful, however, if the ligatures should ever be passed into the trachea, as some have advised; for the irritation and cough which they excite is very apt to do mischief, by tearing asunder the very parts they are meant to unite; at least this has been the case in two instances where I have known this method practised. A troublesome cough was induced in each of them; the stitches were tore out; and much perplexity was thus given both to the patient and surgeon.

Instead of passing the ligatures round any of the cartilages of the trachea, and thus carrying them into the cavity of the tube, I have in different instances succeeded, merely by external stitches done in the following manner: The surgeon being provided with a number of needles and ligatures, according to the extent of the wound, and the patient being properly placed, one of the needles should be inserted at one side of the wound, and

being passed slowly up for the space of an inch between the trachea and skin, so as to include all the cellular substance and muscular fibres which lie between them ; it is now to be pushed out along with one end of the ligature ; and the other extremity of the thread being likewise armed with a needle, must in like manner be passed through the teguments of the opposite side. None of the ligatures should be tied till they are all introduced ; when this is done, and the divided edges of the cut are properly supported by an assistant, they should be secured with running knots, so as to admit of their being easily untied if this should be found necessary ; adhesive plasters should be applied over the whole ; and the head should be firmly secured in the manner we have mentioned.

In passing the ligatures, care should be taken to run the needles as close to the cartilages of the trachea as possible, so as to include whatever may afford them any support : For which purpose flat needles should

should be employed, with a slight degree of curvature, as is represented in Plate II. fig. 5.

Whether or not this method will succeed where the trachea is completely divided, I cannot as yet determine, having had no opportunity in such a case of putting it in practice: but as it has succeeded where all the anterior part of the tube was divided, there is reason to imagine that it would not often fail. At any rate, it should always be proposed in the first place; for even when it does not succeed, we are not prevented from employing other means of relief. In such instances we are reduced to the necessity of passing the ligatures round one or more of the cartilages of the trachea, which, with a curved needle, may be easily done: Care should be taken, however, to enter both ends of the ligature from the inside of the trachea, when by pushing the point of the needle outward, all risk of doing mischief will be avoided.

To give the practice as much chance as possible of succeeding, there should be as many ligatures introduced as may seem in any degree necessary for retaining the divided ends of the trachea together: In general, three stitches will be found sufficient; one in the middle of the prominent part of the trachea, and another on each side, towards the extremities of the cartilaginous rings.

Wounds of the œsophagus are to be managed nearly in the same manner with wounds in the trachea: but they are more dangerous, on account of the difficulty of reaching the œsophagus from its deep situation; from the under part of it, when entirely separated from the rest, being apt to fall altogether within the sternum; and from the difficulty of supporting the patient with proper nourishment.

These wounds are likewise to be considered as dangerous, from their vicinity to large arteries and nerves. If the recurrent nerves are divided, the voice may
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be much impaired ; and if any of the large branches of the carotid arteries are wounded, the patient may die from loss of blood before assistance is procured.

In wounds of the trachea and œsophagus, our first object should be to put a stop to the hemorrhagy, not only to prevent the loss of blood, but to obviate the cough and sickness, which greatly aggravate the injury, and which are the consequence of blood finding access to the stomach and lungs. Every vessel therefore that pours out blood, whether artery or vein, should be immediately tied with a ligature. When the wound is not extensive, but is confined nearly to the boundaries of the trachea and œsophagus, the artery which goes to the thyroid gland will probably be the largest vessel that is cut ; for it is commonly in this situation, immediately below the thyroid cartilage, that attempts are made upon the throat. But in wounds of greater extent, the jugular veins, and even the carotid arteries, are sometimes divided.

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For the most part, a wound in either of these arteries proves immediately fatal; but when one of the carotids is only partially hurt, there may be a possibility of saving the patient by securing the bleeding vessel with a ligature both above and below the cut: at least, it should always be attempted; and it is probable, when one artery only is cut, that the attempt would succeed. There is no reason to doubt of its proving successful in wounds of the jugular veins: but where these veins are only wounded, without being cut entirely across, we may with propriety endeavour to effect a cure by compression. When slight compression only is necessary, it may be accomplished by a circular roller put round the neck; but when any considerable degree of pressure is required, as this cannot be employed without impeding respiration, we are under the necessity of using a machine for protecting the trachea. In Plate LXIX. an instrument is delineated, which answers this purpose very effectually.

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As soon as the hemorrhagy is stopped, we should proceed to unite those parts of the œsophagus which have been divided ; and in doing it, if the wound be not very extensive, it will be of much importance, both to the operator and patient, to have it enlarged in every direction that may be necessary for bringing the injured parts easily and completely into view, by which the ligatures will be introduced with much more exactness than can otherwise be done. In passing the threads, the needles should be entered from within, and pushed outwards, in the manner we directed for wounds of the trachea : and in both cases, the ends of them should be left of a sufficient length to admit of their hanging freely out of the external wound in the teguments. The interrupted suture appears to be best adapted for this operation.

In longitudinal wounds of the œsophagus there is reason to imagine, from the result of different cases, that cures might frequently be accomplished without the
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assistance of ligatures. But in transverse wounds of this part, it is the safest practice to employ one or more stitches, according to the extent of the injury, by which the food will be prevented from escaping during the cure, and by which a reunion of the divided parts will be more readily accomplished.

SECTION XI.

Of Wounds in the Thorax.

§ 1. *General Remarks on Wounds in the Thorax.*

TO the consideration of wounds of the Thorax, it will be proper to premise a short account of the boundaries of this cavity, and of the viscera which it contains.

The thorax is an extensive cavity, of an irregular oval figure, bounded anteriorly by the sternum, laterally by the ribs, behind by the vertebræ of the back,

back, above by the clavicles, and below by the diaphragm, a firm muscular expansion, which serves as a partition between it and the cavity of the abdomen.

The diaphragm does not pass in a direct line from one side of the chest to the other; on the contrary, it falls considerably lower in some parts than in others, by which the extent of this cavity is in different parts very unequal. On cutting the thorax directly across about the middle of the sternum, and looking down upon the diaphragm, we find it round and prominent about the middle, with its edges stretching down to its several attachments. In its highest and most anterior point, it is fixed to the cartilago ensiformis; from whence it descends obliquely, and is attached as it goes along to the seventh, eighth, and all the inferior ribs; while, behind, it is fixed to the upper vertebræ of the loins. From this it is evident that the back part of the thorax is much more deep

deep and capacious than the anterior part of it: a point with which practitioners should be very exactly acquainted, otherwise their ideas of wounds in these parts will often be very erroneous. Thus, without this information, we would be apt to imagine that no injury would be done to the lungs by wounds running directly across the body, after entering any part of the cavity of the abdomen: whereas it is certain, that no instrument can pass in this direction even at the distance of several inches beneath the upper part of the abdomen, without penetrating the cavity of the thorax; and, for the same reason, all wounds which pass directly across the body from the inferior and back part of the thorax, must necessarily pass through the abdomen.

The whole cavity of the thorax is lined by a firm membrane termed the Pleura, which adheres every where to the sternum, to the ribs, intercostal muscles, and diaphragm. Each side of
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the chest has a distinct pleura; which uniting together near the middle of the breast, and running transversely from the sternum to the vertebræ, form two cavities which have no communication with each other. This membranous partition is termed the Mediastinum. It adheres firmly, as one membrane, to the sternum through its whole length; but the two pleuræ recede from each other near to the vertebræ, to admit of a passage for the aorta and œsophagus. The heart, inclosed in the pericardium, occupies a considerable part of the left cavity of the thorax: the rest of this division, with all the right side of the chest, is chiefly filled with the lungs. The only other parts lodged in the thorax are, the aorta, œsophagus, the thoracic duct, thymus, and large blood-vessels about the heart. In a state of health, the lungs do not adhere to the pleura; but it often happens, after inflammatory affections of these parts, that very firm and extensive adhesions take place between them.

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The thorax is exposed to all the variety of wounds; but the chief distinction we have to attend to, is that which takes place from their degree of depth. Superficial wounds, which do not run deeper than the common teguments, if they are rightly treated, will seldom be productive of any important consequences; while even the slightest injury which penetrates the chest will, in some instances, be attended with the most alarming symptoms; and these again will be of a more dangerous nature when any of the viscera lodged in the thorax are wounded.

Wounds of the thorax may therefore be divided into three kinds: Those which affect the common teguments only; such as merely penetrate the cavity, without doing any further injury; and those by which some of the viscera are likewise hurt.

Our first object in wounds of this kind is, to discover whether they have penetrated the cavity of the chest or not; which

which in general we may do by attending to the following circumstances: By the patient being put into that situation in which the wound was inflicted, and in this state making a particular examination with the fingers, or probe, of the direction and depth of the wound; by the form of the instrument, and the length to which it seemed to be pushed; by any mild liquid which may be injected returning immediately or lodging in the wound; by air being discharged in considerable quantities during respiration; by an emphysematous swelling appearing over the contiguous teguments; by the quantity of blood discharged from the wound being considerable or otherwise; by the appearance of the blood; by blood being discharged from the mouth; and by the state of the pulse and respiration.

Each of these circumstances we shall consider in the order they are mentioned.

It is obvious that it is of importance

to pay attention to the posture of the patient during the examination of every wound ; but it is in none more so than in wounds of the thorax, where, from the variety of muscles which may be injured, and from the mobility of the ribs, wounds may in one posture appear to be quite superficial, which in others are found to penetrate to a great depth ; for if any part of a rib, of a muscle, or even of the cellular substance, be forced by the posture of the patient into the course of a wound, neither the finger, probe, nor injections, will pass with that ease which the free examination of such injuries requires. In all such cases, therefore, before we proceed to examine the direction and depth of the wound, the patient should be placed as nearly as possible in the posture he was in at the time of receiving it.

In some cases, the opening is so large, that we distinguish with the eye whether a wound has penetrated to the depth of the cavity or not ; or we introduce one
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of the fingers, which is better than any probe, when it can be passed forward without lacerating the contiguous parts; but when the opening is too small to admit of this, we are under the necessity of using a probe; and the best substance for this purpose is a common bougie. When we mean by probing a fore to discover whether there is any extraneous body lodged or not, or whether the bones beneath are carious or in a sound state, a metallic probe is to be preferred: but for examining the depth and direction of a wound, nothing answers so well as a firm and tolerably thick bougie; which neither gives so much pain to the patient, nor is it so apt to be pushed beyond the depth of the wound into the contiguous soft parts, as the common small probe when used with freedom. This will not often indeed occur with practitioners of experience, as they will not only use this instrument in every case with caution, but will be sensible that it is often unnecessarily employed: For even in

wounds of the thorax, we should not search for their depth with too much anxiety; as, by doing so, more harm may be done than could be compensated by any advantage to be derived from the discovery. It is highly proper to examine, in a cautious way, into the direction and depth of such wounds; but the younger part of the profession should know, that much harm has been done by researches of this kind being carried too far: and they should likewise know, that it is perhaps of more importance to be acquainted with the direction of an external punctured wound, which does not run deeper than the cellular substance above the ribs, or perhaps to the intercostal muscles, than to know, by means of the probe, whether a wound reaches to the cavity of the chest or not: for even where we find, in the most evident manner, that a wound goes to the depth of this cavity, if no bad symptoms occur, little or no advantage is obtained from the discovery; and where such
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symptoms take place as are known to proceed from a penetrating wound, and of which we shall afterwards treat, we are thus rendered equally certain of the nature of the case as if a probe had passed easily into the thorax.

Some advantage may be procured in inquiries of this kind, from our attending to the size and figure of the instrument; the direction it seemed to take; and the depth to which it was pushed: These are points of which we cannot always receive exact information; but it is sometimes otherwise, particularly in duels, where a surgeon is frequently attending, and where the by-standers are often so much interested, as to be able to give distinct intelligence upon this and every other point of importance.

When we are rendered certain, by either of these modes of enquiry, of the depth of a wound, it would be unnecessary as well as improper to carry our researches farther: but when the point remains in doubt, it may be sometimes

determined by throwing in injections of any mild liquid. If the liquor returns immediately, there will be reason to conclude that the wound is superficial, or at least that it does not pass into the thorax; but when it lodges either altogether, or in any considerable part, without raising any outward tumefaction, there will be no cause to doubt of its having reached the cavity. In throwing in liquids for this purpose, either the common syringe, Plate LXIV. fig. 4. may be employed, or a bag of the elastic gum, mounted with a pipe as in Plate XXIX. fig. 3. but it should never be done with much force, as in this manner parts might be tore asunder which were not previously hurt; and the mildest liquor only should be used, as it might prove dangerous to apply any thing possessed of stimulating powers to the surface of an irritable part. Honey and water are commonly used for this purpose; but warm water alone is less irritating, and should therefore be preferred.

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When air is discharged by the wound during inspiration, there will be cause to suspect that the lungs are wounded. But although this is usually considered as one of the most certain proofs of a wound having penetrated the chest, yet it is proper to remark, that it is far from being decisive. Wherever the lungs adhere to the pleura, a wound may penetrate to a considerable depth; nay, it may pass entirely across the body, without entering what is properly termed the Cavity of the Chest; and we know that air is frequently discharged at wounds in the thorax where there is no reason to suspect that the lungs are hurt; for when no adhesions take place between the pleura and lungs, the external air, if it gets access by a penetrating wound, will pass between them, and will necessarily be forced out at every inspiration; a circumstance which invalidates the certainty of this test. In judging, therefore, of the weight which is due to it, we should, in the first place, cause the patient make se-

veral full inspirations, in order to discharge any of the external air that may be collected; and at the end of each, the contiguous skin should be so drawn over the wound, as to prevent any more from finding access. In this manner the whole will soon be evacuated; when, if we still find that air rushes out during inspiration, we may with certainty conclude that the lungs are injured.

Emphysematous swellings sometimes appear, in consequence of wounds of the thorax, by the air from the lungs finding access to the surrounding cellular membrane. This, however, will seldom happen in extensive wounds; as in these the air from the lungs will readily be discharged outwardly: but it is by no means unfrequent in punctured wounds, especially in such as have an oblique direction. It is obvious, however, that although this is a certain proof of the lungs being injured, that it may sometimes happen without any communication with the
cavity

cavity of the chest, for the reason mentioned in the last paragraph.

When the quantity of blood discharged from these wounds is considerable, we may with much certainty conclude, that they have not merely passed into the chest, but that some of the contained viscera are wounded; for, excepting the intercostal arteries, which run upon the inferior border of each rib, all the other blood-vessels of the external parts are here very small; and as we can by compression easily put a stop to hemorrhagies from the intercostal vessels, we may in almost every instance discover immediately whether the blood be evacuated from the chest or not.

Even the appearance of blood discharged from these wounds may lead to a knowledge of their depth. It is a known fact, that blood coming directly from a wound in the lungs, has a more red, and particularly a more frothy appearance, than blood from any other part, owing probably to its being mixed with the air
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in the bronchiæ; so that when blood assumes this appearance, we have much cause to conclude that the lungs are injured.

When blood is spit up by the mouth immediately after a wound in the thorax, there will be no reason to doubt of the lungs being hurt. For although we ought not to conclude from the absence of this symptom, that the lungs have not suffered, as they are often wounded without any blood being discharged by the mouth; yet we may be convinced, that some injury is done to them when blood is actually discharged from them.

In our inquiries into the nature of such wounds, the state of the pulse and of respiration should be particularly attended to. In wounds which do not penetrate deeper than the common teguments, neither the pulse nor breathing are at first affected, nor do they produce any other consequences for the first two or three days than wounds in any other part of the body: but wounds which go

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to the depth of the thoracic cavity, and more especially when they affect the lungs or any other parts contained in it, may often be distinguished by their producing an immediate effect both upon the pulse and breathing. When the lungs are injured in a part where they adhere to the pleura, the wound may pass to a considerable depth without any extravasation taking place into the cavity of the chest; in which case no immediate effect may ensue: but when either blood or air finds access to this cavity, the lungs are immediately compressed, by which the breathing becomes difficult, and the pulse feeble, oppressed, and intermitting; so that when these symptoms take place, we may at once give a decided opinion of the nature of the case.

By due attention to these circumstances, we may, in almost every case of this kind, determine with much certainty whether a wound has reached the cavity of the thorax or not: and this being fixed, we are next to proceed to the method
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of treatment. We shall first attend to those wounds which do not go deeper than the common teguments or muscles, and shall afterwards treat of such as penetrate deeper.

§ 2. *Of Wounds in the external Teguments of the Thorax.*

WHEN wounds of the thorax do not go deeper than the skin and cellular substance they do not give any cause for anxiety, as they heal with the same ease, and are to be treated in the same way, with similar wounds in other parts of the body: but when they reach the muscular substance between the ribs, and especially when they run among these parts for a considerable way like sinuses, there is always reason to fear that at last they may penetrate the cavity of the thorax; for when sores in this situation are not in every respect properly treated, and if any matter that forms in them be not regularly

larly discharged, it is very apt to pass deeper and deeper, till at last it make its way through the pleura itself. In all such cases, therefore, it should be the first object with practitioners to give a free vent to the matter. In open incised wounds, all that is necessary is, by means of soft easy dressings, to preserve their lips or edges from adhering till they fill with granulations from the bottom: but punctured wounds should either be laid open through their whole extent, or a seton should be passed from one end of the sinus to the other. When they are not very extensive, the shortest and easiest method is to lay them freely open with a scalpel and director, and then to heal them from the bottom like incised wounds from any other cause: but when a puncture runs to any considerable length, the method of cure by a seton answers better. By passing a seton along the course of the sinus, it is not allowed to heal outwardly till the whole be equally filled up; and this being accom-
plished

plished, if the cord be gradually diminished, when it is at last removed, a moderate degree of pressure continued upon the parts for a few days longer, will seldom fail to effect a cure. Some, indeed, advise us to attempt the cure of all such sores with pressure alone. But although this practice will often prove successful in other parts of the body, particularly in the extremities, where pressure can be applied with exactness along the whole course of a sinus, and be continued for a sufficient length of time without risk; yet in wounds of the thorax, the same advantages are not to be expected from it: for here the constant motion of the ribs prevents us from applying a continued equal pressure without impeding respiration in a very disagreeable manner. When a cure is to be attempted by pressure alone, it must be done with a roller passed firmly round the thorax, supported by what is termed a Scapulary, put over the shoulders: But when a seton has been previously used, any pressure

sure that is necessary may be applied with slips of adhesive plaster laid along the course of the wound, and fixed upon the contiguous skin.

This method of cure, by laying the sinuses open, or by the insertion of a seton, to those not much versant in this branch of practice, may appear to be unnecessarily severe; for by many of the older writers we are told, that our object may be accomplished in a much more easy manner, namely, by keeping the external openings of the fores pervious by the use of tents till they are firmly healed from the bottom. In wounds which penetrate to the cavity of the thorax, tents, especially those of the hollow kind, prove often useful; and as they may be used with perfect safety, they should not be so generally condemned as some modern practitioners have affected to do. But in punctured wounds which do not go to this depth, as our great object is to avoid every risk of the matter finding access to the thorax, whatever can
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tend to impede the discharge of it, should by all means be avoided. So that in such cases tents should never be used; they would frequently do much mischief in the manner we have mentioned: in many cases they would fail entirely; and if they should ever succeed, the cure would prove much more tedious, and often more painful, than the mode of treatment we have advised.

In every wound of any importance, it is proper to pay particular attention to the regimen of the patient; a point upon which the event of the case very often depends: For we frequently observe injuries of this kind treated in every other respect with propriety; and yet the practitioner fails, from the patient being allowed too much freedom in food, drink, and exercise. In wounds of the thorax, attention to these points is still more necessary than in similar affections of any other part: for as the contained parts are highly necessary to life, and as they are very liable to inflammation, even from injuries that do not penetrate

netrate deep, every precaution should be employed that can probably tend to prevent it. Hence, for several days at least, or even till there does not appear to be any farther chance of the parts becoming inflamed, the patient should be kept upon a low, cooling diet; animal-food and strong liquors of every kind should be avoided; the bowels should be kept open with mild laxatives; and when the pulse requires it, a due proportion of blood should be evacuated. Rest of body and perfect quietness is of much importance in these wounds; for they are affected by the least degree of motion; even coughing, laughing, or much speaking, is apt to hurt them, and should therefore be as much as possible avoided.

§ 3. *Of Wounds which penetrate the Cavity of the Thorax.*

WOUNDS penetrating the thorax are always to be considered as hazardous, and therefore merit the utmost attention:

Even such as merely penetrate the chest are often attended with the most important consequences; but the contiguity of the lungs and other viscera adds much to the danger. At present, we are to treat of simple penetrating wounds, not connected with any injury done to the contained parts.

It is now known, that in a state of health the lungs fill the spaces allotted for them in the two sides of the thorax so completely, that they are every where in contact with the pleura both in the state of inspiration and expiration: And it is also known, that great distress in breathing is induced by air, blood, or any extraneous matter being admitted between them. Now, in penetrating wounds of the thorax, excepting where the lungs morbidly adhere to the pleura, and which we do not here suppose to be the case, it is scarcely possible to prevent both air and blood from being admitted: The external air rushing in at the wound soon spreads over the whole corresponding cavity; and when

when the intercostal artery or any other blood-vessel is divided, if the external opening be not sufficiently large, any blood that is evacuated is very apt to fall down between the pleura and lungs to the very bottom of the chest; by which difficulty of breathing immediately takes place, along with all the other symptoms which usually attend a compressed state of the lungs.

In Volume II. Chapter XXII. we have entered into a full consideration, not only of the symptoms induced by the collection of fluids in the chest, but of the method of relieving them by the operation of the paracentesis: To avoid repetitions, we should now refer to what was then said upon this part of our subject, and at present shall offer a few observations upon the means of preventing such collections as may require the assistance of that operation.

In wounds which do not penetrate to the depth of any of the viscera, but which merely pierce the pleura, almost the on-

ly artery which can be cut, that can afford any quantity of blood, is the intercostal; and as it is of a considerable size, no time should be lost in securing it whenever it is found to be wounded. As it runs in a groove in the inferior edge of the rib, it is difficult to put a ligature about it; but with attention this may always be accomplished.

In free incised wounds, the bleeding orifice will be brought clearly into view; but in small punctured wounds, as the artery cannot be distinctly seen, there is a necessity for laying the parts sufficiently open with the scalpel. When the artery is thus laid bare, various means have been proposed for securing it. For the reason just mentioned, a crooked needle cannot be passed round it. We are therefore told by some, that the only method of doing it is to pass a firm broad ligature altogether round the rib, and by means of it to tie a dossil of lint upon the orifice in the artery; while others condemn this practice, from the injury which
it

it must necessarily do to the pleura; for this membrane can scarcely be separated from the rib, so as not to be included in the ligature; and different instruments have therefore been proposed for obviating this inconveniency. The intention of all of them is to compress the intercostal artery, without hurting the pleura; but as none of them I have met with answer this purpose, I do not think it necessary to delineate them; those who wish to see them may look into the second volume of *Memoirs of the Royal Academy of Surgery at Paris.*

It is luckily, however, in our power to secure this artery in a much more simple manner. By dilating the wound sufficiently, we may with a tenaculum, somewhat more bent at the point than usual, draw the bleeding vessel out of its groove, so as to tie it in the ordinary way; at least in thin people it may be easily done: and where it is found, either from the ribs being deeply covered with fat, or from any other cause, that

it cannot be secured in this manner, it may always be done in the manner we have mentioned, by passing a firm broad ligature round the rib, and by means of it tying a small dossil of lint upon the bleeding artery. In this way a portion of the pleura will no doubt be included in the ligature; but it does not appear from experience, that this is productive of any thing bad; and with sufficient caution we may always with certainty avoid the lungs. When the lungs do not adhere to the pleura, they collapse in some degree immediately on the external air finding access through the wound to the cavity of the chest. And even when they do adhere, we may easily separate as much of them with the point of the finger as will admit of the passage of the ligature.

When a practitioner is called immediately, he may in this manner prevent any quantity of blood from being emptied into the thorax; and as soon as the hemorrhagy is stopped, he should endeavour

your to expel all the air that has found access by the wound to the surface of the lungs; for till this is accomplished, the breathing will remain oppressed, nor will the patient be able to bear the application of the necessary dressings. In the chapter above alluded to, we have mentioned different methods of expelling air from the surface of the lungs; but the simplest and easiest is this: While the wound yet remains open, let the patient, in a slow gradual manner, make a full inspiration, by which a considerable part of the collected air will be discharged. This being done, the skin must be instantly drawn over the fore, so as to cover it completely during expiration; and if the wound be moderately opened during inspiration, the whole quantity will thus be soon expelled. After which the lips of the wound should be drawn exactly together, and in this situation should be secured by different slips of adhesive plaster, care being taken to support the whole by a proper

application of the napkin and scapulary bandage.

In this manner wounds of the thorax will frequently heal, which, if left to themselves, or if treated in the usual way by allowing them to remain open, might be productive of much distress: But in some cases, either from a considerable quantity of blood having been thrown out from the intercostal artery before the ligature was applied; from the oozing of blood from the smaller ramifications of the intercostal arteries; or perhaps from a subsequent formation of pus; oppressed breathing will supervene, notwithstanding all that can be done to prevent it.

When this takes place as a consequence of a wound in the chest, from the formation of matter, an opening should be made to discharge it in the manner we have advised in the chapter on Empyema; and in this case the opening should be made in the most depending part of the thorax. But when it occurs immediately
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after a wound, and while the blood yet remains in a fluid state, we may often be able to discharge it at the wound itself: and when this can be done, it should always be preferred; for we are not to imagine that the thorax can in any part be laid open without some risk of harm being done by it. When symptoms, however, of oppressed breathing occur from a wound in the upper part of the thorax, as we will not be able to discharge the blood by it, we are under the necessity of making a perforation in the under part of the chest as soon as they become in any degree formidable. It is proper, however, to observe, that this operation should never be advised while the symptoms are moderate: for we have daily instances of small quantities, not only of blood but of other fluids, being absorbed; and as the risk attending a perforation in this place is probably greater than that which occurs from small quantities of blood being allowed to remain, it should not be attempted as long.

long as the breathing continues tolerably free.

§ 4. *Of Wounds of the Lungs.*

We have already, in the course of this section, enumerated the symptoms which indicate a wound in the thorax to have penetrated the lungs: And although the danger in this case is greater than in wounds which merely penetrate the pleura, yet the method of cure suited to the one is so nearly the same with what we have advised for the other, that it is scarcely necessary to enlarge farther upon it.

It is proper, however, to observe, that as the risk attending wounds in the lungs is considerable, the caution with which they are treated should be proportionally great. Instances indeed have occurred of their healing with ease and safety; but these are so rare, that we do not hesitate in saying, that every injury done
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to them is to be considered as hazardous.

The danger which attends them originates, in the first place, from the hemorrhagy being apt to proceed farther than the strength of the patient will bear; and, afterwards, from abscesses forming in the lungs, which are apt to terminate in pthifical affections.

The hemorrhagy is most readily checked by plentiful venesection, which in such cases should at once be carried so far as to induce fainting; by the patient being kept in a cool apartment and at perfect rest; by the use of cooling laxative medicines; and by a low regimen. Besides rest of body, it is of the utmost importance to keep the lungs as free from action as possible. Hence coughing, laughing, and even much speaking or deep inspirations, should be rigidly guarded against. Attention to this point is necessary in every wound of the thorax, but it is more particularly so in those which affect the lungs; for when
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this viscus is wounded, it can never be fully distended with air without stretching every blood-vessel that has been hurt.

Notwithstanding, however, of our utmost attention, the patient will sometimes sink under the loss of blood; in other cases, blood will be collected in considerable quantities betwixt the pleura and lungs, so as to impede respiration; or abscesses will form, as we have observed above, in the substance of the lungs.

We have already considered the method of treatment in collections of blood seated between the pleura and lungs: at present we shall offer a few remarks on the management of abscesses in the lungs.

Matter collected in the substance of the lungs from a wound, may be discharged in three different ways. It may be spit up by the mouth; it may be discharged by the abscess bursting into the wound itself; or it may be emptied into one or other of the cavities of the chest between the lungs and pleura.

When an abscess in this situation opens
into

into the bronchiæ, there may often be some risk at first of immediate suffocation; but when this danger is over, by a considerable quantity of the matter being discharged, if there is no constitutional or hereditary pthifical tendency, a cure will often be accomplished by the means usually advised in such cases, namely, by a diet that is light and of easy digestion, and at the same time sufficiently nourishing; and by daily moderate exercise, by which any matter collected in such abscesses is brought up with more ease than by any other means. A sea-voyage too answers particularly well for this purpose, at the same time that it tends to brace and invigorate the constitution; but when this cannot be obtained, we advise riding on horseback.—When pus collected in the lungs is discharged in this manner, the business of a surgeon becomes altogether unnecessary; but when the abscess either empties itself into one of the cavities of the chest, or points outwardly at the wound, we
have

have it often in our power to save the patient by an operation, when otherwise he would inevitably die.

When an abscess bursts into one of the cavities of the chest, the matter should be discharged in the manner we have mentioned in the XXIII. Chapter above alluded to: But when the wound by which the collection is produced remains open, so as to admit of the matter to point towards it, as soon as this is discovered, either by a small oozing of pus taking place, or by the introduction of the finger between two of the ribs, we should at once determine on treating it on the same principles and in the same manner with abscesses in any other part of the body, namely, by making an opening into it of a sufficient size for discharging the matter. The delicate nature of the part in which the matter is seated may be a means of deterring some from adopting this practice; but it does not require much argument to show, that a patient in such circumstances runs much more

more risk of suffering by the matter being allowed to remain, than by making an opening into the abscess. By the last measure he avoids the hazard of immediate death, which often happens from large abscesses bursting into the bronchiæ; at the same time that it prevents the matter from passing into the cavity of the chest, between the pleura and surface of the lungs; and thus obviates the necessity of a second operation. Nay, in cases of this perilous nature, I would even go farther: When from a previous discharge of matter we are certain that an abscess has formed in the lungs as a consequence of a wound; when a stoppage of this discharge takes place, and is succeeded by all the usual symptoms of a fresh collection of matter, such as an increased difficulty in breathing; difficulty in lying on the sound side; frequent shivering fits; and a hectic pulse; as in such a situation there will be no reason to doubt of matter being collected, and as the patient must remain in the
utmost

utmost hazard till it be discharged, I should think it adviseable to enlarge the external wound not only of the common teguments, but of the intercostal muscles, and to extend the opening for the space of two or three inches ; by which more freedom will be given for searching with the finger for the seat of the abscess : and whenever it is discovered, I would not hesitate, at whatever depth it may be, to open it, by running a bistoury along the finger, and pushing it slowly into it. In the course of my own experience I have had two cases of this kind ; in which, by this decisive practice, I had the satisfaction of saving two lives, which otherwise must in all probability have been lost. This was the opinion of other practitioners who attended along with me ; and I was so much convinced, in both cases, of matter being collected internally which produced the danger, and of nothing being able to save the patient but the discharge of it, that after warning the patient of his situation, and receiving

ceiving his approbation, I was resolved to carry the opening into the substance of the lungs to the full depth of my finger, rather than to leave him to his fate. In both instances I found it necessary to go to nearly the length of my finger; and at this depth I was so fortunate as to reach an abscess containing at least half an English pint of matter. The patients in both cases were instantly relieved; and although they were previously supposed to be in the utmost danger, with scarcely a possibility of recovering, they are now, after several years have elapsed, in perfect health.

In making an opening into such a deep-seated abscess, the incision should be carried forward in the most gradual manner, so that no more of the lungs may be injured than is altogether necessary: But when once the matter appears, the abscess should be laid as freely open as may be proper for an entire discharge of it.

In the subsequent treatment of an ab-

cesses of this kind, much attention is required in preserving a proper aperture for the discharge of any matter that may afterwards form in it : for if this be neglected before the abscess is filled up from the bottom, a new collection will soon take place, and the patient will be reduced to the same state of uncertainty and danger he was in before. In wounds which do not penetrate deeper than the teguments or muscles of the thorax, we have observed above, that no kind of tents should be employed ; and have rather advised them to be laid open thro' their whole length, or to be treated by means of a seton, as we do fores of a similar nature in other parts of the body. But as this is impracticable in penetrating wounds, we are in these under the necessity of inserting a tube into the opening, and of continuing it of a sufficient size and length during the whole course of the cure : it ought indeed to be continued as long as any matter is discharged. Tubes of lead being more
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soft and pliable than those of any other metal, are therefore to be preferred: They should be broad, and of a round oval form rather than altogether round; and they should always be furnished with a brim considerably broader than the opening of the sore, to obviate every possibility of their falling into the chest. By inattention to this point, a tube of four inches in length, and of a corresponding thickness, passed altogether into the cavity of the breast of a gentleman who had used it for some time; and notwithstanding various attempts to extract it, it still remains lodged. It was fixed in the usual way, by a thread, to a bandage going round the body; but the thread breaking, it immediately slipped in. This happened upwards of a year ago. The patient does not indeed experience much uneasiness from it; but it had an evident effect in increasing the quantity of matter discharged from the wound.

I have met with some cases of wounds in the chest, where solid tents have an-

swered the purpose equally well with tubes; and they may always be used when the parts do not contract so closely round them as to prevent the matter from being freely discharged: But whenever they stop up the passage so much as to produce any collection of matter from one dressing to another, they should undoubtedly be laid aside, and tubes used instead of them.

As tents had been used for a great length of time in almost every wound which penetrated beyond the common teguments, Belloste, and some other surgeons of observation, ventured at last to lay them in a great measure aside. We have already had occasion to observe, that this, to a certain length, was highly proper; but I cannot agree with some modern practitioners who assert, that tents and tubes do mischief in every case, and that they should never be employed. Where the discharge from a wound or abscess will continue free and uninterrupted, till a cure is affected by the parts
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filling up from the bottom, I would never advise either a tent or a tube to be used. But when we find that the external opening of a wound heals up long before the parts beneath are united, and that matter collects and bursts out again, as in different instances has happened in the course of my experience in penetrating wounds of the chest, it must be from want of experience only, or from a desire of appearing singular, that we refuse to employ the only certain method with which we are acquainted of obviating this inconvenience, and of saving the patient a great deal of pain, trouble, and danger.

In extensive wounds of the thorax, where any portion of the sternum or of the ribs have been removed, a portion of the lungs sometimes protrudes, and does not readily recede. When a practitioner is called soon after the accident, the protruded part should be replaced as quickly as possible: but when a portion of the lungs has been long exposed to the air,

and especially if it has been much lacerated by the accident, we should, in the first place, see whether or not it be in a state of mortification; and all that is clearly and completely mortified should certainly be cut off before the remaining sound parts are replaced. If the incision be confined to a part that is entirely gangrenous, there will be no risk of inducing either hemorrhagies or any other symptom; and by removing parts which are in this state of disease, we will prevent all the bad consequences which might ensue from their being returned into the thorax.

§ 5. *Of Wounds of the Heart and large Vessels connected with it, and of Wounds of the Thoracic Duct.*

IN wounds of the heart and large blood-vessels connected with it, as these parts lie very deep, and as a sound state of them is so immediately necessary for life, the utmost danger is always to be dreaded,

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ed, nor is the greatest exertion of practitioners able to lessen it. Of such a hazardous nature indeed is every injury of this kind, that we may with propriety consider every wound of these parts as mortal: For although we are told in books, of the heart itself having been wounded without any fatal consequences ensuing, there is much cause to suspect that these accounts are founded on fallacy or error. We can however conceive that the heart may be slightly injured without proving instantly fatal; but even the slightest wound in it must probably at last end in death: For the weakness induced in this manner upon a particular part, will render it very liable to yield to the strong and constant action of this organ. And when once an aneurism is formed in it, it will be apt to proceed with rapidity to a fatal termination.

The most probable method of preventing this, or at least of delaying it, is to lessen the action of the heart by copious blood-letting, by low diet, keeping the

bowels moderately open, and avoiding every kind of fatigue: If in such circumstances it is possible to save a patient, these will be the most certain means of doing it; at any rate they will tend to prolong life, which in some cases is of so much moment, that a few days or even a few hours may be of the utmost importance.

The same observations are applicable to wounds in the large blood-vessels about the heart. They are to be considered as of equal importance and danger, and to be treated by the same means with wounds of the heart itself.

There is still another organ of importance seated in the chest, which it is proper to mention here, viz. the thoracic duct; for although wounds in this canal will in most instances terminate in death, yet some advantage may, in particular circumstances, be derived from an attentive treatment of them. The thoracic duct, after leaving the receptaculum chyli, runs along the spine near to the aorta: and at the fifth or sixth vertebra
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of the back, it passes behind the aorta; and ascending to the left subclavian vein, it there empties the chyle.

We judge of the thoracic duct being wounded, from the part at which the wounding instrument entered; from the discharge being either altogether white like chyle, or mixed with a considerable proportion of it; and from the patient becoming daily weaker than he ought to do from a wound of the same size in any other part, owing to the nutritive part of his food being carried off before any advantage is derived from it.

With a view to prevent the diameter of this canal from being distended, which at the same time will tend to lessen the extent of the wound, the patient should be kept upon a cooling and very spare diet: any food which he takes should not be at regular meals, but in small quantities frequently repeated; nor should he be permitted to take a large draught even of the weakest liquor. The bowels should be kept lax; bodily exertion

tion of every kind, and much speaking, or whatever tends to quicken respiration, should be avoided.

§ 6. *Of Wounds of the Diaphragm, Mediastinum, and Pericardium.*

WE judge of the Diaphragm being injured from the situation of the wound, and from the nature of the attending symptoms. As this muscle is in constant action during respiration, any injury done to it is necessarily attended with difficulty in breathing; with much pain during inspiration, not merely in the wound itself, but over all those parts of the chest to which the diaphragm is attached: The patient complains of pain over all the region of the stomach; sickness, vomiting, and a troublesome degree of hickup take place; pains in the shoulders sometimes occur, together with cough, delirium, a quick hard pulse, and other symptoms indicating inflammation

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tion and fever. Involuntary laughter is mentioned too as a symptom which injuries done to the diaphragm sometimes produce.

It is a common idea among practitioners, that wounds in the tendinous part of the diaphragm will in every case prove mortal, but that injuries done to the muscular parts of it do not so readily prove dangerous. There is much reason, however, to believe, that few wounds in the diaphragm are ever cured, whether they be situated in the tendinous or muscular parts of it; nor is it evident from observation, that there is more danger to be dreaded in the one case than in the other.

The symptoms of which we have most reason to be afraid, are those which proceed either from inflammation or irritation. With a view to prevent their accession, or to moderate them when they have already appeared, blood-letting is to be chiefly depended on; together with gentle laxatives; large doses of opiates
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conjoined with musk ; warm fomentations over the abdomen and thorax ; quietness ; and low diet.

By these means strictly pursued, a patient, in such circumstances, will have perhaps a better chance of doing well than by any other mode of treatment ; but his recovery will by no means be certain. A strict antiphlogistic course, and large doses of opium, may probably obviate all the primary symptoms. But however small a wound may at first be in the diaphragm, the constant action and tension of this muscle will be apt to render it daily wider ; and we know from various histories of wounds in this part, that they seldom arrive at any magnitude, without admitting a portion of the stomach, of the colon, or some other part of the bowels, to pass from the abdomen into the thorax ; by which the most violent pain is produced, together with some of the other symptoms which usually accompany a strangulated gut in cases of
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hernia: In such circumstances, a strangulated gut is much more dangerous than a hernia in its more ordinary form; for even although we should be able to remove the stricture, by making an incision into the cavity of the abdomen, as the passage into the thorax would still remain pervious, a return of the strangulation might very soon be expected.

Wounds in the mediastinum require no peculiarity of treatment. The circumstances which we have most cause to dread are, a lodgement of blood in one or both cavities of the chest, inflammation and suppuration, with its usual consequences. But the observations we have already made, respecting the management of penetrating wounds in other parts of the chest, apply with equal propriety to these; so that we need not at present enlarge upon them.

Nor is it necessary to enter minutely on the consideration of wounds in the pericardium. As this bag contains a fluid which we suppose to be necessary

fary for the easy motion of the heart, wounds in it may prove dangerous, from their tendency to prevent this fluid from being collected, as well as from their allowing it to spread through the cavity of the chest. It appears, however, from various observations, that wounds in it do not prove so hazardous as might at first be expected. They require the same general method of treatment with penetrating wounds of the thorax, which we have already considered.

In every variety of penetrating wounds of the thorax, where the cure is not accomplished without the formation of matter, they are apt to heal slowly ; and in some cases, especially where abscesses have formed, a stillicidium of matter will continue for many years, nay, in some cases, for life, notwithstanding all our endeavours to prevent it. As this is an inconveniency which patients are at all times anxious to be free from, practitioners become necessarily much interested

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ed in the method of treating it: and, with a view to lessen the discharge, and even to heal the sore through its whole extent, astringent, and what are usually termed Vulnerary Injections, have been advised. But although I have known them frequently employed even by surgeons of reputation, and under the best and most cautious management, I have seldom seen them used without some mischief accruing from them; and I do not recollect a single instance of their being productive of any advantage. They are apt to irritate and inflame the lungs and contiguous parts; and, instead of healing the sore or abscess, they are apt to extend it, by tearing open the surrounding cellular substance.

For this reason, in wounds penetrating the thorax, I do not hesitate to say, that injections should be laid entirely aside: and, however disagreeable a tedious discharge in this situation may prove, that we should trust entirely to the means we have already advised for
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preventing the matter from lodging, by preserving as free and depending an opening as the nature of the case will admit.

SECTION XII.

Of Wounds in the Abdomen.

§ 1. *Anatomical Description of the Abdomen and Parts contained in it.*

THE Abdomen, or lower belly, is the largest cavity in the body; above, it is bounded by the diaphragm, which divides it from the thorax; behind, it is supported by the vertebræ; the upper part of both sides is covered by the inferior ribs; the rest of it is all bounded by the abdominal muscles, excepting the most depending part of it, which terminates in the pelvis; from the contents of which it is only separated by the

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the peritoneum; a firm extensive membrane, which not only lines all the cavity, but affords a coat to all the viscera contained within it, being reflected in a very singular manner over them.

Anatomists divide this cavity into different regions. The middle and upper part of it, reaching from the xiphoid cartilage to within a small space of the umbilicus, is termed the Epigastrium; the hypochondria are the spaces on each side of this; the umbilical region extends from three inches or so above the navel, to the same distance beneath it; and all the parts between this and the pubes are termed the Hypogastric Region.

In the treatment of wounds in the abdomen, a minute acquaintance with the parts contained in it, and of their relative situations with respect to each other, and to the divisions or regions which we have just described, is a point of the utmost importance. We shall here give a general description of the different vis-

cera: a more particular knowledge of them is best acquired from dissection.

The parts contained in the abdomen are, the stomach and intestines; the mesentery, omentum, liver, gall-bladder, and ducts; pancreas, receptaculum chyli, spleen, kidneys, ureters, and upper part of the urinary bladder; the aorta, vena-cava, and other large blood-vessels and nerves.

The stomach is a large membranous bag, placed in the upper part of the abdomen, immediately below the diaphragm: It stretches from the left hypochondrium, where the most capacious end of it is seated, obliquely across the epigastrium, and terminates before it reaches the right hypochondrium. The stomach has two openings; one termed the Superior Orifice or Cardia, where the œsophagus terminates; and the other the Pylorus, or Inferior Orifice, where the duodenum, the first of the small intestines, begins. The cardia lies nearly opposite to the eleventh vertebra of the
back,

back, the large extremity of the stomach stretching considerably to the left; and the pylorus lies somewhat lower, and nearly two inches to the right of the vertebræ. It is proper, however, to observe, that the situation of the stomach and of these two openings is considerably affected by the quantity of food contained in it: So that a wound of the stomach, when it is full, may be directly opposite to an external wound in the teguments, and yet be several inches lower when it is empty.

The intestines commence, as we have just observed, at the pylorus, and are continued by many turnings or convolutions to the anus. This canal is in different parts of it distinguished by different names: The upper part of the canal is termed the Small Intestines; and the under part of it the Larger, from the diameter of the tube being larger in the one than in the other.

Even different parts of these great di-

vifions of the inteflines have received different names: The upper part of the fmall guts, extending about a foot in length from the pylorus, is termed the Duodenum: the next portion of the canal, from being commonly found empty, is termed the Jejunum. This, in an adult of full growth, is fupposed in general to be about four feet and a half in length: it is chiefly fituated in the umbilical region. All the under part of the fmall inteflines is diftinguifhed by the name of Ileum, from its lying almoft entirely within the cavity formed by the offa ilea on oppofite fides of the abdomen. After making feveral convolutions from one fide to another, it at laft terminates in the cæcum, the firft of the great inteflines fituated under the right kidney. From the cæcum, which is a round fhort fac with a fmall vermiform procefs, the colon originates: This is the largeft of all the inteflines; and as it occupies a confiderable part of the abdominal cavity, the courfe of it merits par-

particular attention. After leaving the right kidney, to which it is attached, it rises and passes under the liver, so as to be in contact with the gall-bladder, by which it is tinged of a deep yellow: From this it is continued in the form of an arch over the duodenum to the under part of the stomach; and passing into the left hypochondrium, it is there attached to the spleen and to the left kidney. This curvature is termed the Great Arch of the Colon. It now runs downward and backward; and again turning up, so as to form the figure of S, it terminates at the top of the os sacrum in the last of the great guts, termed the Rectum, from its running nearly in a straight line till it terminates in the anus.

The intestines being very pliable, and of a great length, they have necessarily much freedom of motion; but as they would be apt to be entangled in each other, Nature has provided a thin membranous web, termed the Mesentery, which run-

ning along the course of the intestinal tube, serves to connect it with sufficient firmness to the vertebræ. The mesentery is evidently a production of the peritonæum: In its duplicature there are a number of small glands, which often become so enlarged by disease as to be felt outwardly through the abdominal muscles; and it serves as a support to the lacteals, blood-vessels, and nerves of the intestines. The omentum is a fine thin membrane, which comes into view on laying open the muscles of the abdomen and the peritonæum. In general, it does not pass beneath the umbilicus: but in corpulent people, when it is much filled with fat, it sometimes descends to the very bottom of the belly; and in cases of hernia, it is frequently met with in the scrotum.

This membrane is evidently intended as a protection to the bowels; to afford them an additional warmth; and probably by the fat which it contains to lubricate their external surfaces, so as to admit.

nit of their playing with more freedom on each other.

The liver is a large glandular body, situated on the right side immediately under the diaphragm : It is divided into two lobes ; one termed the Great and the other the Small Lobe. The great lobe lies in the right hypochondrium, which it fills almost entirely : it rests on the right kidney, and covers a portion of the great arch of the colon : a considerable part of the small lobe lies in the epigastrium ; the rest of it passes over the stomach towards the left hypochondrium.

The liver is of a very irregular figure ; its outer surface is arched, corresponding to the figure and size of the arch of the diaphragm. On the other side, it is in some parts flat, and in others concave, according to the figure of the parts with which it is in contact. It is of a considerable size and thickness on the right side ; but towards the left its thickness

decreases so, that at last it terminates in a thin edge.

The liver is kept in its situation by several ligaments attached to the diaphragm and contiguous parts.

The gall-bladder is a pyriform bag, seated in the concave side of the liver. The bile, after being secreted by the liver, is lodged in this bag, from whence it is conveyed into the intestines thro' the ductus choledochus, which enters the duodenum by piercing its coats in an oblique direction, about five inches below the pylorus.

The pancreas is a conglomerate gland, lying in a transverse direction between the liver and spleen, immediately under the stomach. The liquor secreted by this gland is carried into the duodenum by a small duct, which in some cases terminates in the gut itself, and in others near to the extremity of the ductus choledochus.

The receptaculum chyli is a small membranous bag, through which the chyle passes from the intestines to the
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left subclavian vein by means of the thoracic duct. This bag, or sac, lies upon the first vertebra of the loins, a little to the right of the aorta.

The spleen is a large spongy body, seated in the left hypochondrium, between the stomach and the false ribs, under the diaphragm, and immediately above and contiguous to the left kidney.

In Chap. XI. Sect. II. we gave a description of the kidneys, ureters, and bladder; so that at present we need not enter upon it. But, besides the several viscera which we have mentioned, the aorta, vena-cava, and the large blood-vessels and nerves which supply the bowels, lie all within the abdominal cavity.

We may distinguish wounds of the abdomen in the same manner as we have done wounds of the thorax. They may either be confined to the common teguments and muscles, or they may penetrate the cavity; or a penetrating wound
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may be complicated with wounds of one or more of the viscera.

§ 2. *Of Wounds of the Teguments and Muscles of the Abdomen.*

IN one point of view, wounds of the teguments and muscles of the abdomen do not merit more attention than similar injuries in other parts of the body; but they become highly important from the contiguity of the abdominal viscera, and from the danger of these being ultimately injured by the neglect or mismanagement of the external wound.

Our first object is to discover, Whether a wound has penetrated the abdomen or not; and whether any of the viscera are injured. When the wound is extensive, and any portion of the viscera protrudes, the nature of the injury is evident; but in smaller wounds where no part of the bowels appear, it is often difficult to judge whether they penetrate the abdomen or not. In general, however, this
point

point may be determined by attention to the following circumstances: by a proper examination with the fingers or probe, after putting the patient as nearly as possible into the posture in which he received the wound: by the form and size of the instrument, the depth to which it run, and the direction it appeared to take; by the quantity of blood discharged at the wound being considerable or not; by the state of the pulse and other attending symptoms; and by the discharge of fæces, bile, or any other of the abdominal secretions.

When the wound is of such a size as to admit the finger, we may always determine with certainty whether it reaches the cavity of the abdomen or not; as in this case the finger will come into contact with the viscera: but probes should be used with much caution; and unless the instrument passes easily in, without force, in a direct line, and to such a depth as to convince us that it has reached the cavity, little or no dependence

ence should be placed upon it : For the parts here are so soft, and of such a yielding nature, that a probe with very little force will pass among them almost in every direction to a considerable depth. It is scarcely necessary to observe, that it is particularly proper, in every inquiry of this kind, to put the patient as nearly as possible into that posture in which he received the wound. And the loose texture of the parts should prevent us from using injections, as is frequently done with a view to determine this question. In wounds of the thorax, where the parts are firmer and more intimately connected, injections may be used for this purpose more safely ; but in the abdomen they are apt to spread among the muscles and cellular substance, by which the test is rendered uncertain, at the same time that mischief is apt to ensue from the pain and inflammation which are induced.

The depth to which the instrument has passed, or the direction which it took, cannot be often ascertained ; but
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when this information can be obtained, it will assist us in judging of the nature of the wound. By comparing the size of the external opening with the size of the instrument, we may be led to determine the depth to which it has passed.

When the quantity of blood discharged from a wound in the abdomen is considerable, we may conclude almost with certainty, that some of the large internal vessels have been injured; for excepting the epigastric artery, which runs in the anterior part of the abdomen in the course of the rectus muscle, none of the teguments or muscles of these parts have arteries of such a size as to afford much blood. It is proper, however, to observe, that even the largest artery in the abdomen may be wounded without any blood being discharged externally; for if the outward opening be not considerable, and especially if the wound runs in an oblique direction, the blood, instead of being evacuated at the opening, will be extravasated into the
cavity

cavity of the belly, where large quantities of it may be collected, even without any remarkable degree of tension taking place.

In such cases, however, we are soon led to suspect what has happened by the symptoms which ensue. The patient complains of debility and faintness; his pulse becomes low; he is seized with cold sweats; and if the discharge of blood be not stopped, every other symptom of approaching death soon make their appearance.

It sometimes happens again that we are at once rendered certain that a wound has penetrated the cavity of the abdomen, by the discharge of fæces; of bile; of the pancreatic juice, or even of chyle: and in some cases, the same certainty is obtained by large quantities of blood being thrown up from the stomach, or discharged by the rectum. Urine may be discharged by a wound which does not penetrate the belly; for the kidneys and ureters may with pro-

propriety be said to lie behind the peritonæum, as well as a considerable portion of the bladder; but they are in general to be treated in the same manner with penetrating wounds in the abdomen.

When, again, none of these symptoms take place; when neither the finger nor probe can be easily introduced; when there is no discharge from the wound that leads to suspect the viscera to be wounded; when the pulse remains natural; and when the pain is moderate; there will be much cause to hope that it has not passed to a greater depth than the common teguments or muscles.

In the treatment of these wounds, we are to be entirely directed by the depth to which they penetrate, and by the symptoms which take place.

When it is discovered that a wound in the abdomen does not run deeper than the common teguments or muscles, if none of these parts have been removed, we will seldom meet with any symptoms of importance, at least where the habit
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of body is good, except where they are the consequence of neglect or mismanagement. Our views here should be nearly the same with what we have advised in wounds of the thorax. The principal object is to prevent inflammation and the lodgement of matter, which is done by blood-letting; a low diet; the use of laxatives; rest of the body; and proper attention to the wound. But for a more particular detail of the proper treatment of such a wound, we shall refer to the last section.

It is proper, however, to remark, that wounds in the boundaries of the abdomen, in one circumstance, differ materially from similar injuries of the thorax. As the muscles and other soft parts of the chest are every where supported by bone, the lungs and other viscera contained in the breast do not readily push out at the wound: but as the coverings of the abdomen are of a soft yielding nature, having anteriorly no bone to support them, and many of the contain-

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ed parts having no very close attachments, they are apt to push forward and protrude wherever any unusual degree of weakness occurs. In all wounds therefore of the abdomen, even where they do not penetrate, some caution is necessary from this consideration alone; and more especially so when any portion of the teguments or muscles has been removed. The patient should be kept as much as possible in a horizontal posture during the whole cure; and when he attempts to sit or walk, the weakened parts should be supported by a proper compress, and a firm, somewhat elastic, bandage of flannel passed two or three times round the body; a caution which ought to be persisted in for a considerable time after the cure of the sore is completed. By want of attention to this point, very troublesome cases of herniæ have occurred which with ease might have been prevented.

§ 3. *Of Wounds which penetrate the Cavity of the Abdomen, but which do not injure any of the contained parts.*

ALTHOUGH an instrument may have penetrated to a considerable depth, we have much reason to hope that none of the viscera are wounded, as long as the abdomen remains free from much pain and tension, the pulse soft, and the skin of a natural heat: But even in this state of such a wound, we are not to conclude that there is no hazard; for it often happens, that wounds in these parts, which at first exhibit no appearance of danger, at last terminate fatally.

It is proper, however, to observe, that this may often be traced as an effect of improper management, and that practitioners have it frequently in their power to prevent it: For although some instances

stances will occur of wounds of this kind ending fatally, where no symptoms appeared of the viscera being wounded, and where after death no immediate injury was found to be done to them, yet this will not usually happen in such wounds that are properly treated from the first.

The danger which occurs here arises chiefly from two causes; from the access of air to the cavity of the abdomen, by which the different viscera are apt to become inflamed; and from the subsequent formation of matter, which, not finding an opening, will necessarily collect within the peritonæum.

In every wound therefore of this kind, after securing any blood-vessel of the teguments or muscles that may have been cut, and which we should always do by ligature immediately on its being discovered, our next object should be to prevent, with as much certainty as possible, all manner of access to the air. In small wounds of these parts, this will be done

with most ease and certainty merely by the lips of the cut being drawn together, and secured with several plies of adhesive plaster: and as a farther security, a compress and flannel roller, such as we have mentioned above, may be put over the whole: The same precautions with respect to blood-letting; a strict antiphlogistic regimen, and rest of body, which we recommended in more superficial wounds of the abdomen, should be here carefully observed where the danger is more considerable.

By this management these wounds, when small, will often heal by the first intention; but when they continue open for some time, they should be dressed as seldom as possible, and the dressing should be renewed with as much expedition as the nature of the case will admit, so that the unnecessary admission of air may be avoided as much as possible.

It will sometimes happen, however, even that the most exact attention will
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not prevent the accession of bad symptoms: At first they will most readily be of the inflammatory kind, which will be removed by farther evacuations of blood, and attention to the other circumstances we have enumerated; or they will prove fatal, by ending in mortification; or they may terminate, as we have mentioned above, in the formation of matter. It is this last occurrence which we have now to advert to.

In such circumstances, we would advise an opening to be made in any other part of the body immediately for the discharge of the matter: But in these dispositions in the abdomen, we can never discover with certainty, whether any collection has taken place or not, till it has continued for a considerable time: for the matter here lies so deep, that a small quantity cannot be distinguished; nor would it be proper for the discharge of a small quantity of matter to incur that danger which always attends the free admission of air to the abdomen;

and in small collections this could not be avoided, as there would be a necessity of opening them in a slow gradual manner with a scalpel, as in such cases the trocar could not be plunged in without much risk of hurting the viscera. Instead of such an attempt, therefore, we should do nothing as long as the quantity of matter continues moderate, and while no bad symptoms have yet taken place. Indeed this is a good general rule in all wounds of the abdomen, never to inquire with much anxiety either for collections of matter, or for such parts as from the nature of the wound there might be cause to suspect should be injured, till the appearance of symptoms renders it probable that the one or the other has taken place : for by much handling we often do mischief; while frequently no danger ensues from wounds which at first were attended with very alarming symptoms. Nay we know, that in different instances a person has been run through the body with a small sword
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without any of the viscera being injured, and the patient has done well without any bad symptom taking place. And we likewise know, that violent inflammation will sometimes terminate favourably without the formation of matter; and even when matter is formed, that it will sometimes be carried off by absorption, so as to leave no vestige of its having ever existed. It is the actual presence therefore of bad symptoms produced by such collections of matter, or the quantity of matter becoming so considerable as to prove inconvenient to the patient, that should indicate the propriety of making an opening for discharging it: But as soon as we find this to be the case, we should not hesitate; and whenever there is such a quantity collected as to admit of the trocar being employed, we may draw it off with ease and safety: For by inserting the instrument in an oblique direction, no air will be admitted; by which the only risk which attends this operation will be avoided. I have been the

more particular upon this subject, from having observed two cases of this kind terminate fatally where there was not previously any appearance of danger.— As it was evident in both cases that matter was collected, it was determined to discharge it; and, as it was supposed to be seated either in a particular cyst, or in the substance of the muscles, and not in the cavity of the abdomen, it was done by making a small opening into it with a scalpel. But in both, the most violent symptoms of inflammation occurred in the course of the first two days; and the patients soon died. And I conclude that it was by the free admission of air to the cavity of the abdomen that these symptoms were induced; for after death the matter was found to be lodged in that cavity; and I have since that time, in two similar cases, drawn large quantities of purulent matter off with a trocar, where it was evidently seated in the abdomen, without any bad consequences ensuing.

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In drawing off matter from the abdomen, the same precautions are necessary in doing it that are now so universally admitted in discharging serum by the usual operation of the paracentesis. But as we gave a particular account of this in Volume II. Chapter XXI. we must now refer to what was then said upon it.

Penetrating wounds of the abdomen may prove dangerous from another cause. Considerable portions of the bowels are sometimes protruded, without any other injury being done to them; and this may be productive of fatal consequences.

The most certain method of preventing danger in all such cases, is to return the protruded parts as quickly into the belly as can be done with propriety.—Almost every writer upon this subject desires us in the first place to foment them with warm emollient decoctions, or to cover them for some time with the web or omentum of some new-killed animal: but they do not recollect, that during the time lost in making these preparations,

rations, the protruded parts will probably suffer more than can be gained by the application of them ; and that the most natural, as well as the most proper fomentation for them, is the heat and moisture of the patient's belly. In recommending these applications, it is said, that they not only remove the dry parched state of the parts which exposure to the air is apt to induce ; but by means of them we are enabled to judge with more certainty whether or not they are in a state that admits of their being returned with safety : for it is alledged, even by some writers of reputation, that parts which are apparently in a state of incipient gangrene, and which otherwise we might be afraid of pushing into the abdomen, may, by a proper use of these fomentations, be so far recovered as to render it highly proper to return them.

But although this opinion has been very generally received, and the practice followed which it inculcates, it appears to me to be so fraught with impropriety

propriety and danger, that I cannot pass it over without mentioning in the strongest manner the idea I entertain of it.— Much mischief may be produced by it, and I see no advantage that can accrue from it.

By many it is said, that no part of the intestines should be returned into the abdomen that have once acquired any tendency to gangrene, on account of the risk of the fæces bursting into the belly, by which the patient would necessarily die. Wherever there is a certainty of such an occurrence, by the parts being actually in a state of gangrene, to return them to the abdomen would no doubt be highly improper, as it would be depriving the patient of the only chance which he can have of a recovery, that of securing the ends of the sound parts of the gut at the mouth of the wound, by which there may be some possibility of their uniting afterwards, as has happened in different instances; and by which he will at least
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be certain of having at all times a free discharge for the fæces. But although in this situation the practice we allude to is to be considered as highly proper, yet when gangrene has not actually taken place, as there will still be some cause to hope that the natural heat of the belly may prevent it, the parts should be instantly returned.

When parts protruded from the abdomen are covered with sand, dust, or any other extraneous matter, it will no doubt be proper to clear them of it before they are replaced; and with this view, bathing them in warm milk, or in milk and water, may answer better than any other method. But this is perhaps the only cause that can render the practice necessary.

Some address is necessary in returning any part of the intestines which have been protruded in the easiest manner. The patient should be put into that posture which will most effectually relax the parts in which the wound is seated, with

with his head and chest somewhat lower than the abdomen and buttocks, so that the weight of the bowels may have some effect in dragging in the protruded parts. When in this situation, the surgeon having his fingers dipped in warm oil, or covered with soft oiled linen, should endeavour to replace the parts by beginning his pressure at one of the ends of the gut, and continuing it along the doubling or curvature to the other. In this manner any portion of the bowels will be easily replaced without any farther enlargement of the wound, when the opening is not very small: And when any part of the omentum, or any others of the viscera, are protruded, there will be still less difficulty in returning them. But considerable parts of the intestines are frequently pushed out at such small puncturès, that they cannot be returned but with much more pressure than should ever be applied to them. In this case, our object will be more easily accomplished, and with less hazard to the patient,

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tient, by enlarging the opening, than by the application of so much force as is generally required in pushing any considerable portion of gut through a small aperture. Some dexterity, however, is necessary in enlarging an opening in this situation. When the aperture is of such a size as to admit the finger of the surgeon, it may be done with ease and safety: but in some cases it is so completely filled with the parts which pass thro' it, that this is impracticable. In this situation, we are advised by authors to insert a director between the bowels and the parts to be divided, and to enlarge the opening by cutting upon it either with a scalpel or bistoury. This, however, must be attended with much hazard; for we can never distinguish with certainty whether some plies of the bowels be elevated by the director or not, as this will sometimes happen notwithstanding all our care to prevent it. Instead of following this method, I have in different cases enlarged the opening, by
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making an incision through the integuments and muscles with a scalpel, in the same gradual manner that we operate in cases of hernia ; taking care, as soon as the peritonæum is laid bare, to introduce the end of a probe-pointed bistoury between it and the cut, and dividing it as far as may be necessary, which now may be done with entire safety. If in this manner the opening be enlarged so as to receive the point of the finger, it may afterwards be increased at pleasure, by inserting the finger so as to act as a conductor for a bistoury or scalpel : But till it can be done in this way, no cutting instrument should ever be passed into the abdomen ; for although much ingenuity has been shown in the invention of instruments with wings to protect the bowels in this part of the operation, yet none of them answer any other purpose than to render the business more complex.

In enlarging a wound in this situation, it should be done as much as possible in
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the direction of the muscular fibres of the parts; and, for an obvious reason, the incision should commence at the bottom of the wound, and be carried downwards, and not at the top.

We may thus enlarge the opening to any necessary extent, always taking care not to make it larger than the nature of the case may require. And this being accomplished, the protruded parts should be replaced with as much expedition as possible in the manner we have advised. In returning bowels to the abdomen, it has sometimes happened, through confusion or mistake in the operator, that they have been pushed in between the layers of the abdominal muscles. This should be guarded against with the utmost attention; for when left in this situation, the patient will be nearly in the same danger as at first. Indeed this will be the case if they be not placed altogether within the peritonæum.

The accident we allude to may happen in any part of the belly, when a surgeon is not sufficiently accurate and attentive:

attentive: but it is most likely to occur in wounds that pass through either of the recti muscles, owing to the sheaths of these muscles being particularly loose and flaccid; and it will more readily happen in corpulent people than in others, owing to the great depth of fat and cellular substance, which, in subjects of this description, lie above and between the different muscles of the abdomen.

Instead of enlarging the opening in the abdomen, it has been proposed to discharge the air contained in the protruded portion of the bowels, by making holes in it with a needle, by which the bulk of it may be so much diminished as to admit of its being easily replaced at the same opening. As this has been mentioned by writers of experience, I think it right to speak of it; but it is chiefly with a view to caution the younger part of the profession against it. It may indeed be done with more ease to the operator; but this appears to be the only ar-

gument in its favour: For although some may have recovered on whom it has been practised, yet surely the smallest opening made into the gut must be attended with much more danger than can probably arise from the external opening in the teguments and muscles being somewhat enlarged. And besides, in reducing protruded bowels, however distended they may be with air, we may often render them perfectly flaccid by pressing the air contained in them into that part which remains in the abdomen. And if this be cautiously done, it may at all times be attempted with safety. Indeed no trial should ever be made for the reduction of a portion of intestine that is much inflated, till we have endeavoured in this manner to reduce the size of it.

After the bowels are replaced, our next object is to preserve them in their situation till the wound is so firmly consolidated as to prevent them from falling out. When the opening is small, this
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may be effectually done by laying the patient in a proper posture, with his head and buttocks elevated; by preventing costiveness; and by a firm roller of flannel passed several times round the body, so as to support the injured parts till they are united. But in extensive wounds of the abdomen, it is found, even when they are treated with every possible attention, that it is difficult, and in some cases impossible, to prevent the bowels from prolapsing by the ordinary dressings and bandages. In such cases, we are under the necessity of drawing the sides of the wound together by sutures; an operation commonly termed *Gastroraphy*.

Various methods have been proposed for making this suture; but the common interrupted suture, or the quilled suture, which is merely a variety of the other, answers the purpose better than any of them. Much care and attention, however, is necessary in passing it, particularly in avoiding the bowels, which every

where lie contiguous to the parts to be united.

The surgeon being provided with a number of broad flat ligatures, sufficient for the extent of the wound, and of a strength that will retain the parts together, each ligature should be armed with two large curved needles, one towards each end; and the patient being laid in a posture that is most easy for himself, at the same time that it relaxes the injured parts most effectually, the surgeon should now insert the fore-finger of his left hand into the wound, and being sure that it is in contact with the peritonæum, without any of the bowels lying between them, he should now pass the point of one of the needles along his finger to the distance of an inch at least from the edge of the wound; and having secured the other end of it with the thumb and palm of his hand, he must now push it outward, so as to make it pierce the skin at a similar distance from the external wound in the teguments. In this he
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will be much assisted by pressing the muscles and skin down upon the needle with his right hand: and one of the needles being passed, the other must in like manner be pushed through the opposite side of the wound, by carrying it also from within outward. It might indeed be done by entering the needle outwardly, and carrying it in upon the finger: but we could not in this manner avoid the bowels with such certainty; a point of the utmost importance, and requiring the nicest attention.

The first needles should be passed within half an inch of the upper part of the opening; and the others should be continued to within an equal distance of the bottom, at the distance of three quarters of an inch from each other; for as the retraction of parts divided in this manner is more to be dreaded than any other occurrence, it ought in a particular manner to be guarded against. The ligatures being all inserted, the parts should now be supported by an assistant; and a

proper knot being tied upon each of them, the whole extent of the wound should be covered with a pledgit of lint spread with any unctuous substance, for preventing access to the air. After this, the parts should be supported with a roller: The patient should now be put to bed, and should be treated in the manner we have directed above, with blood-letting, and a low regimen, in proportion to the violence of the symptoms which supervene.

In performing this operation, I have said that the ligatures should be continued to within half an inch of the bottom of the wound; which is contrary to the usual practice. In general an opening is left beneath, with a view to discharge any matter that may form in the course of the cure; but there is no sufficient reason for doing so. Instead of proving serviceable, it is probable that it must often do harm, by giving free access to the air, which in every wound of the abdomen should be particularly guarded against. The opening
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could not be preserved without the assistance of a tent, by which much irritation and pain might be induced : nor would it ever answer the purpose of discharging the matter, excepting it be accidentally situated near to the under part of the abdomen. I am clear, therefore, that the whole extent of the wound should be treated in the same manner ; and if matter should afterwards form, that it will be better to trust to its being absorbed, or even evacuated by the trocar in the manner we have already mentioned, than to trust to this precarious method of treatment.

When any practitioner prefers what is usually termed the Quilled Suture, the one we have described may be easily converted into it, by introducing each of the ligatures double. After all the ligatures are passed, a small roll of plaster, or a piece of a large bougie; should be passed through the different loops, which ought all to be on one side of the wound ; and a similar roll being placed on the

opposite side between each of the ligatures, they must now be tied upon it with running or bow knots, of such a tightness as may appear to be necessary; care being taken during this part of the operation to have the sides of the wound properly supported by an assistant.

If the parts are properly and equally drawn together, we will seldom find it necessary to remove the ligatures till the parts are united, which they will always be in six or seven days, if they have been kept in close contact, and if no unusual cause has occurred to prevent it. But when the ligatures give much pain, and especially when the patient complains of much tension over the abdomen, the knots should always be untied and kept perfectly loose, till by blood-letting, fomentations, and gentle laxatives, these symptoms are removed, when the parts may be again drawn together and secured as before.

We have hitherto been supposing that the protruded part consists of a portion
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of the alimentary canal only, this being the part which in wounds of the abdomen is most frequently pushed out: but it is proper to remark, that the other viscera are also liable to be protruded, particularly the stomach and omentum. This, however, does not vary the method of treatment, which ought to be nearly the same, whichever of the viscera be pushed out. The parts should in every instance be replaced as quickly as possible, and retained in the manner we have already pointed out.

We are now to consider the treatment of those wounds in the abdomen which are attended with injuries done to one or other of the viscera. And in the first place, wounds of the alimentary canal require our attention, as being most frequent.

§ 4. *Of Wounds of the Alimentary Canal.*

IN a former part of this section we have observed, that wounds of the intestines may be discovered by the discharge of blood from the mouth and by the anus, as well as by the discharge of fæces from the wound in the teguments: We likewise judge of this point by the discharge of fetid air from the wound, and from the depth and direction in which the instrument appeared to run.

By attending to these circumstances, and to the symptoms with which wounds in the intestines are commonly attended, such as nausea, sickness, violent gripes, or pains through the abdomen, cold sweats, and faintings, we may in general determine with much certainty whether they are injured or not. But unless the wounded part be brought into view, little or no advantage is gained by the discovery: for while it remains

mains undiscovered, our method of treatment must be nearly what we have recommended for wounds which merely penetrate the cavity. Authors indeed direct us to search for the wounded part of the gut: But as the danger from the extent of the wound, which in this case would be requisite, as well as from the exposure of the contents of the abdomen, would probably be greater than from allowing the wounded part to remain, this attempt ought never to be made; the more especially as we know that wounds in the intestines have been healed, although the injured part has not been discovered.

When we find, however, that a wound is inflicted on a portion of protruded gut, we ought by no means to replace it till we endeavour to prevent its contents from being effused into the cavity of the abdomen; which can only be done by sewing up the opening.

There are different methods proposed for securing openings of this kind. Le
Dran

Dran thinks that it may be done with most safety by what he terms the Looped Suture; while the generality of practitioners effect it by the Glover's Suture. The looped suture is performed in the following manner: One end of the wound is to be held by an assistant, while the surgeon does the same with the other; and the needles, which should be round, straight, and small, carrying each of them a thread a foot long, must be equal to the number of stitches intended to be made. As many of the ligatures are now to be passed through both lips of the wound as appear to be necessary, taking care that they are nearly a quarter of an inch distant from each other. The threads being all passed, and the needles removed, all those on one side of the cut must be tied together with a knot at their ends, and those on the opposite side must afterwards be secured in the same manner. They are now to be joined together, and to be twisted two or three times round, so as to form a kind of
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of a cord: By this means the divided parts of the intestine are puckered together, so that the stitches, which before were distant about a quarter of an inch, are now brought close to each other. The suture being thus finished, an assistant must hold the two ends of the twisted threads, whilst the surgeon replaces the intestine in the manner we have already directed. The threads are to be secured to the bandage, which is put over the dressings; and after remaining till the wound in the gut may be supposed to be healed, they are to be untwisted; and one side of each of them being cut off close to the external wound, they must now be drawn cautiously and separately away.

The principal objection to this method of stitching these wounds is, that in some degree it must contract the diameter of the gut, by which dangerous obstructions might afterwards be produced. Instead of it, the Glover's Suture, as it is termed, is commonly practised.

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In making this suture, a small, fine, round needle should be used, armed with a thread of silk. The surgeon laying the lips of the wound exactly together, must perforate both at the same time; and carrying the needle to the same side at which it entered, he must now make a second stitch at a small distance, perhaps at the eighth part of an inch from the first; and in the same manner must continue, by a proper number of stitches, to draw the whole extent of the wound together. This being done, a sufficient length of the thread is to be left out at the external wound, for the purpose of drawing it away when we suppose the wound in the gut may be united.

Even this method of treatment, however, must evidently tend to lessen the diameter of the gut; and I think the operation may be performed with the same degree of security, and in a manner that will obviate this difficulty, by entering the needle always from the in-
side

side of the gut, and pushing it outward. The operation should commence near to one end of the wound : the needle being pushed through one side of the gut, the ligature should be drawn forward and retained by a knot formed on the end remaining in the inside. The needle must now be carried straight across and entered in a similar manner, so as to pierce the opposite side of the wound also from within ; but the following and every succeeding stitch will not be opposite to each other. When the operation is rightly performed, the needle will be carried from one side of the wound in a diagonal line to the other, and will enter the gut at the distance of two-tenths of an inch from the point which it came from on the opposite side. In this manner the sides of the wound may be drawn closely and exactly together, without lessening the diameter of the gut in any degree ; and the end of the ligature may at last be secured and cut off close to the other extremity of the wound, if the gut is to

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be put freely into the abdomen; or it may be left of a sufficient length to hang out at the wound in the teguments, if it is the meaning of the operator to retain the wounded part of the intestine in contact with the external opening. This indeed is usually done, that we may have it in our power, as it is said, to draw away the ligature on the wound of the gut being cured. It is probable, however, whatever future may be employed, if more than one or two stitches have been passed, that it will be very difficult, and even uncertain, to get the ligature away, without hurting the intestines more than we ought to do. I would never advise, therefore, with any view of this kind, that the ligature should be left out at the wound; less danger will arise from cutting it entirely away, and allowing the stitches to remain: a considerable part of it will fall into the cavity of the gut; and in such circumstances the danger of the patient from other causes is so great, that any addi-

additional risk that can occur from the remaining part of it, must be so trifling as not to deserve notice. But in extensive wounds of the intestines, where there may be much cause to fear that the operation will not prove successful, with a view to prevent the fæces from being emptied into the abdomen, it may be proper, by means of the thread used for the ligature, to retain the injured part in contact with the wound in the peritonæum. But of this we shall presently speak more particularly.

This is the method of treatment which we would advise when the gut is not cut entirely across; and, however small a wound of the intestines may be, it ought always to be secured with a ligature: for although it is alledged by some authors, that we should rather trust to nature for the cure of a small opening here than to insert a ligature; to me it appears that their opinion is by no means well founded; insomuch that I would not leave even the smallest

opening that could admit either fæces or chyle to pass without stitching it up. But where any part of the alimentary tube is cut completely through, some difference will be necessary in the method of management.

When both ends of the divided gut protrude at the wound, it ought to be our object to bring them into contact in such a manner as to admit of their uniting.—There are different modes of effecting this. It has been done by stitching the two ends of the gut to the peritonæum and abdominal muscles, exactly opposite and contiguous to each other; and although the fæces must in this manner be evacuated for some time by the wound, yet different instances have occurred of the two ends of the gut adhering firmly together, and being completely united in the course of a very short time: Of this two cases have fallen within my own observation.

In such circumstances, we are commonly advised to plug up the opening in
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the end of the upper extremity of the gut, not only with a view to keep the patient clean and comfortable, by preventing the fæces from being at all times pushed out, but to prevent, as we are told, the gut from contracting and from being diminished in its diameter. I am convinced from experience, however, that this precaution is very unnecessary; and I know that it proves hurtful. Instead of introducing tents or dossils of any kind, the outward sore should be dressed as lightly as possible; and if care be taken to keep the patient clean, the rest should be trusted entirely to nature.

This is, perhaps, the best method of managing this variety of wound; but the same intention may be answered by inserting the upper extremity of the divided gut into the end of the other, and stitching them together. In this situation it would be difficult to draw the divided parts together with a needle and ligature, without hurting the opposite

sides of the gut, in any other way than by keeping it extended by means of some round body inserted into it. For this purpose it has been proposed to make use of a tube of thin pasteboard or paper; but as this might be laid hold of and kept firm by the ligature, a small roll of tallow is preferable, as it will afterwards melt and pass easily off with the fæces. A piece of it, nearly equal to the diameter of the intestine, should be inserted into the end of the upper portion of the gut; and being afterwards passed into the other, so as to carry the one, to the extent of an inch or thereby, fairly into the other, the two portions should now be stitched together with a small needle armed with a fine thread. The stitches should be carried completely round the gut: and in order to give them as great a chance as possible of succeeding, they might even go twice round; first at the edge of the under portion of gut, and afterwards about an
inch

inch beneath, near to where the upper part of it terminates. †

In the insertion of one extremity of the gut within the other, we have desired, for an obvious reason, that the end of the upper portion should be put into the other ; but it requires some attention to make the distinction. The peristaltic motion will be observed to be more remarkable in the upper division than in the under : But the most certain method of judging, is to observe at which of the ends the fæces or chyle are evacuated. An inversion of the usual motion of the bowels might indeed produce a deception ; but as this is not a common occurrence, we are not to suppose that at this particular time it is likely to happen.

In wounds of these parts, a portion of divided gut sometimes hangs out at the wound, while the other end of it has slipped into the abdomen. In such circumstances, authors in general advise the end of the gut to be stitched to the perito-

næum, and other parts contiguous to the wound. If it proves to be the upper part of the gut, the patient, it is said, may live under the inconvenience of an artificial anus; and if it be not near to the upper part of the smaller intestines, that a sufficient quantity of chyle may be carried into the blood for his support and nourishment. But in the event of this proving to be the under part of the gut, although death would certainly ensue were we to rest satisfied with this, it has scarcely been supposed that we ought to proceed farther.

I am clear, however, that this will not prove satisfactory to the feelings of any practitioner possessed of that degree of fortitude which our art requires, and who has that regard for the safety of his patient which every surgeon ought to possess. And although I have advised, in wounds of the intestines, when no part of them protrude, where we cannot therefore know whether the wound be large or only a small puncture, and
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where the injured part may be so situated, that it could not be reached without opening the greatest part of the abdomen, and turning out perhaps the whole alimentary canal, that we had better allow the patient to have the chance of recovering without any attempt to make a discovery, and which he may do if the wound is small, than to propose a measure, which of itself might be attended with more hazard than the injury for which it was meant to be a remedy.— Yet, when we are rendered certain of the gut being completely divided by one end of it hanging out of the wound, as this will give much cause to imagine that the other is at no great distance, I think it ought by all means to be searched for, by enlarging the external wound so as to admit of the fingers of the operator being freely inserted. Even where the upper part of the gut is protruded, it is worth while to submit to this inquiry, merely in order to have at least some chance of avoiding the loathsome incon-

venience of an artificial opening for the fæces: And where the upper part of the gut has slipped in, the patient can have no chance for farther existence if it be not discovered. In such a situation, therefore, we should not hesitate as to the measures.

In wounds of the abdomen, the intestines, besides being protruded and wounded, are sometimes mortified; and they are sometimes mortified without being wounded. But whether mortification be combined with a wound or not, the method of treatment should be nearly the same.

Where there is only a tendency to gangrene from the parts being much inflamed, they should be returned immediately into the abdomen, for the reasons we have given in a preceding part of this section. But whenever they are entirely mortified, the black dead spot will soon fall out; and the remainder being thus reduced nearly to the state of a sore
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from any other cause, the same method of cure will become applicable.

Authors, in general, have treated of wounds of the small and great intestines separately : but no necessity appears for this ; they are nearly of the same nature, and require the same method of treatment. The smallest injury done to the bowels is always hazardous, and in every instance of it our prognosis should be doubtful. But it is said, that wounds in the smaller intestines are more particularly dangerous than in the others ; from their being more apt to induce violent degrees of inflammation : I have not observed, however, that this is confirmed by experience.

§ 5. *Of Wounds in the Stomach.*

IN wounds of the abdomen, we conclude that the stomach is injured, from the part at which the instrument entered, and from the depth and direction in
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which it appeared to run ; from the patient being seized with a vomiting of blood ; from his complaining of a great and unusual degree of sickness ; of languor and singultus ; and from the food and drink being evacuated at the wound soon after they are swallowed.

All wounds in the upper part of the left hypochondrium which pass to any considerable depth, as likewise those of the epigastrium, will necessarily enter the stomach ; but wounds of any part of the abdomen may reach it when they run in an oblique direction : And it ought to be noticed, as we have elsewhere observed, that wounds may penetrate this viscus when it is full, which would not touch it when empty.

Wounds of the stomach must always be considered as dangerous, and a doubtful prognosis only should be given ; for although there are many instances on record of their being cured, yet this is by no means so common as to warrant our expecting it.

The same plan of treatment which we
have

have advised in wounds of the intestines applies with equal propriety to wounds of the stomach. When the wounded portion protrudes, it should be stitched up and replaced as quickly as possible. But, even where it does not protrude, it ought to be searched for; and when the anterior part of the stomach only has suffered, it will not be difficult to discover it. We should not, however, be deterred from the inquiry by the seat of the wound; for we may be able to reach it wherever it may be, excepting in the posterior part of the stomach.

It is to be observed, that wounds of the stomach are more readily discovered than wounds of the intestines; for these last are more concealed by convolutions of themselves, as well as by other viscera.

In all wounds of the stomach and bowels, the patient should be put upon as strict a regimen as his strength will bear: not only with a view to prevent the accession of inflammation, which, as
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we have formerly observed, is the most dangerous symptom that can occur, but to prevent the injured parts from being distended, by which they might be very materially hurt. Instead of regular meals, a spoonful or two only should be allowed at once; and no more given even in this way than is merely necessary to support life. In wounds of the stomach and upper part of the smaller intestines, we might venture in a great measure, and at least for several days together, to trust to nourishing glysters: but this should be carefully avoided in wounds of the great guts; as the injected liquor might more readily be forced in this way into the cavity of the abdomen than if it had been taken by the mouth.

§ 6. *Of Wounds of the Omentum and Mesentery.*

WE have already mentioned the situation of these parts. But we have no means

means of judging whether they have suffered by wounds of the abdomen or not, if they be not protruded.

When it is found that a protruded portion of omentum is injured, we ought to see whether any part of it be nearly separated from the rest or not: for whatever part of it is in this state should be immediately removed; or when it has become cold, with much reason to dread that it will mortify, it will likewise be proper to remove it. But when no appearance of this kind takes place, we should advise it to be immediately returned into the abdomen.

In the First Volume of this Work, we found it necessary to enter upon the consideration of this subject when treating of *Herniæ*: It will therefore be proper to refer to what we had then occasion to say upon it.

In wounds of the mesentery, what we have most to dread is the discharge of blood or chyle into the cavity of the abdomen; for as the lacteals, together
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with a great number of arteries and veins, run in the duplicature of this membrane, it can scarcely be injured without some of them suffering. Whenever any portion of it, ther fore, is protruded, it ought to be examined with accuracy: and when any of its vessels are found to be divided, they should be immediately tied with ligatures; the ends of which being left out at the wound, will admit of their being taken away as soon as they are thoroughly separated.

§ 7. *Of Wounds of the Liver and Gall-bladder.*

FROM the anatomical description we have given of the contents of the abdomen, it appears that the liver will be very apt to be hurt by all wounds that penetrate either the right hypochondrium or epigastrium.

The liver does not appear to be possessed of much sensibility; for many instances have occurred where superficial wounds

wounds in it have healed with the same ease, and have not induced any more alarming symptoms than what usually occur from wounds of the same extent in any other part of the body. But wounds of this viscus, which pass to any considerable depth, are always to be considered as dangerous, from the great quantity of blood which is sent to it, as well as from the interruption which they may give to the formation of bile, one of the most important secretions in the body: And they are apt to prove particularly hazardous, from their allowing the bile, which is very soon rendered putrid, to be poured into the cavity of the abdomen.

We judge of the liver being injured, from the situation and depth of a wound; from the quantity of blood that is discharged being more considerable than could probably be afforded by any blood-vessels of the integuments or muscles; from bile being discharged along with the blood: from bile tinged with blood
being

being carried into the bowels, and discharged both by the stomach and anus; from the abdomen being apt to swell and become tense; and from pain being felt on the top of the shoulder, an usual symptom in different affections of the liver.

All that we can do in wounds of this viscus, is to guard as much as possible against excessive hemorrhagies, and to discharge any collections of blood or of bile that may form in the abdomen, when they become so considerable as to render it necessary. We endeavour to prevent or put a stop to the hemorrhagy by blood-letting, gentle laxatives, keeping the patient cool, and at perfect rest both in body and mind. And we discharge collections of this kind, by making an opening in the most depending part of the abdomen, or wherever they may happen to form.

Wounds of the gall-bladder are by experience found to prove more dangerous than wounds of the liver; for they are
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still more difficult to heal, at the same time that they are more certainly productive of extravasation of bile into the abdomen. Instances indeed have happened of the bile being so completely obstructed in its passage from the gall-bladder to the duodenum, that the bladder has swelled so as to produce much external tumefaction: And, in some cases, these swellings, after bursting or being opened, have continued to discharge bile for a considerable time; and at last have been known to heal without producing any extravasation into the abdomen, or any other alarming symptom. This, however, proceeds from the previous distention of the bladder having produced an adhesion between it and the neighbouring parts; by which, when an opening is made into it, the bile is prevented from spreading. But few instances have occurred of wounds in this viscus having a favourable termination. To procure as free a vent for the bile as possible, and to discharge it by an opening such as we

have mentioned, when it collects in the abdomen, is perhaps all that we ought to attempt.

§ 3. *Of Wounds of the Spleen, Pancreas, and Receptaculum Chyli.*

WHEN the spleen is laid bare, we easily discover whether it be injured or not: but as it does not afford any particular secretions by the appearance of which we might be determined, and as wounds of it do not excite any remarkable set of symptoms, it is difficult to judge merely from the depth or direction of a wound whether it be hurt or not. It is observed indeed, that the blood discharged immediately from the spleen is of a peculiar deep red colour; but this test is not to be depended on: Nor are we to conclude from the quantity of blood being considerable, which a wound in the region of the spleen may discharge, that this viscus is certainly injured; for it
lies

lies so near to large blood-vessels belonging to other viscera, particularly to the emulgent arteries and veins, that no certain judgment can be formed from this circumstance.

The same observations which we have made upon wounds of the liver will apply with propriety to wounds of the spleen; only we may suppose, that the danger attending the latter will not be so considerable, as no material secretion will be interrupted by them.

As the pancreas lies deeply covered with the other viscera, wounds of it can seldom be discovered: But as a division of the duct of this gland will prevent the secretion which it affords from being carried to the bowels, this may, by interrupting or impeding digestion, do much injury to the constitution; and, as the liquor will be effused into the cavity of the abdomen, it may thus be productive of collections, the removal of which may ultimately require the assistance of surgery.

Wounds of the receptaculum chyli will be distinguished from their situation, and from the discharge being a thin milky kind of liquor. They must necessarily be attended with much danger, as they will deprive the patient of the greatest part, or even of all the nourishment which he ought to derive from his food. They can never in any way become the object of surgery, but by producing collections in the abdomen which may require to be discharged.

§ 9. *Of Wounds of the Kidneys and Ureters.*

IN a preceding part of this Work *, we have mentioned the situation of the kidneys; an accurate knowledge of which is an object of much importance in judging whether penetrating wounds in these parts may have injured them or not. But in general we may be determined by the symptoms which take place.

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The external coverings of the kidney may be hurt without any symptom of importance being induced; but neither the pelvis of the kidney, nor the ureters, can be penetrated without some or perhaps all of the following symptoms taking place: The patient complains of violent pain, not merely in the part itself, but over the whole loins, in the groin, yard, and even in the testicles; he is liable to much sickness and vomiting; the urine is passed with pain and difficulty, and along with it more or less blood is usually discharged; and altho' the greatest part of the wound may heal, it commonly happens that a fistulous opening remains during life.

When the kidney is pierced by a wound entering from the belly, the urine is apt to be extravasated into the cavity of the abdomen: But when it is wounded from the back, or even from the side, the urine will either pass directly out at the opening, or it will spread through the contiguous cellular substance; for as it is si-

tuated behind the peritonæum, it will not in this case find access to the belly. The risk, therefore, with which wounds of this organ are attended, will depend in a great measure on this circumstance. When the urine passes into the abdomen, the danger will be very great; but when this does not happen, if the patient survives the hemorrhagy with which the wound is at first attended, he may have a tolerable chance to escape, with the inconvenience of a fistulous opening, at which the urine will continue to be discharged. Instances indeed have occurred even of this being at last cured; but they are so rare, that they are scarcely to be looked for. All that art can with propriety attempt, is to prevent the urine from lodging; and, if the sides of the opening become callous, to render them raw from time to time, either with the scalpel or lunar caustic, by which they may at last be made to unite.

§ 10. *Of Wounds of the Bladder.*

THE bladder when empty lies altogether within the bones of the pelvis ; but when filled with urine, it rises considerably higher, insomuch that, when the urine is long obstructed, there are instances of its reaching to the umbilicus. In judging, therefore, whether injuries done to these parts have penetrated the bladder or not, we must know whether it was empty or full. But for the most part this point is easily determined ; as in general the urine comes away by the wound, and even that which passes by the urethra is at first always tinged with blood.

The danger from wounds of the bladder is always more or less according to the situation of the injury. As the upper part of this viscus lies within the cavity of the abdomen, being covered with the peritonæum, punctures in this part

are apt to produce an extravasation of urine into the belly, by which the most dangerous symptoms are commonly induced: while the under part of it, not being covered with this membrane, is often wounded, without any symptom of importance taking place, as we daily observe in the operation of lithotomy as it is now practised in the lateral method.

In wounds of the under part of the bladder, all that we have to do is to dress them in the usual way with simple easy applications; while by blood-letting in proportion to the strength of the patient, by the use of gentle laxatives, and a low diet, we endeavour to prevent inflammation, the most dangerous symptom that attends injuries of this viscus. And when inflammation has already taken place, we try to remove it by farther evacuations of blood, by doses of opiates proportioned to the degree of pain, by warm fomentations to the belly, and by the semicupium. Indeed warmth applied in this manner seems to have a
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more certain effect in removing the pain and tension of the abdomen, which these wounds are very apt to induce, than almost any other remedy.

When again the upper part of the bladder is injured, together with the risk which occurs from inflammation, we have the additional hazard arising from extravasation of urine.

As the danger with which this is attended is always considerable, especially when the urine passes into the abdomen, it might give the patient some farther chance of recovering, to treat wounds of this kind in the bladder upon the same principles, and in the same manner, that we have advised for wounds of the intestines; that is, by stitching up the wounded part either with the glover's suture, or in the manner we have advised in a preceding part of this section, as may be seen in § 4. The glover's suture might answer equally well with the other; and here it might be used with more freedom than in the intestines, as the bladder

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der can more readily admit of being somewhat diminished in its capacity.

To prevent the inconvenience and danger arising from urine being extravasated into the abdomen, it has been proposed to draw the opening in the bladder forward to the external wound, and to stitch it to the peritonæum and contiguous parts. This may be easily done when the anterior part of the bladder is wounded; but when the opening lies behind, to draw it forward and retain it at the wound would be productive of much pain, and might ultimately be attended with more danger than it was meant to prevent. In such circumstances, I would rather trust to the wound being neatly stitched up, when the parts should be immediately replaced, and the patient treated in the manner we have advised for similar injuries done to the intestines.

§ 11. *Of Wounds of the Uterus and its appendages.*

THE uterus is a strong muscular bag peculiar to the female sex, being solely intended for the foetus. It is of a triangular figure, and is situated between the bladder and rectum. In an unimpregnated state, it lies altogether within the bones of the pelvis: but during pregnancy, it rises so high in the abdomen as to touch the umbilicus and even the stomach; while the inferior point of it, termed the *Os Tincæ*, terminates in the vagina, a smooth membranous sheath which runs contiguous to, and terminates below the urethra.

The uterus is firmly attached by different ligaments to the contiguous parts: by the *ligamenta lata* on each side, which appear to be doublings of the *peritonæum*; and by the *ligamenta rotunda*, which arise from the upper corners of
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the fundus uteri, and passing down thro' the openings in the external oblique muscle, are lost in the upper part of the thigh. By the tubæ Fallopiæ, which arise near to the ligamenta rotunda, the uterus communicates with the ovaria, two small round bodies placed within an inch and a half of its fundus.

From the uterus stretching, and occupying different parts in the different periods of gestation, it is evident that wounds, which in one state might injure it, in others will pass considerably above it: so that in judging from the situation and direction of a wound in these parts, this circumstance requires particular attention. In extensive wounds we may be determined at once by examination with the fingers, whether the uterus be injured or not: But in others, where this is not admissible, we must be directed intirely by the symptoms which take place.

In an unimpregnated state, a wound of the uterus will not be productive of
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symptoms very different from those which occur from wounds of the contiguous parts. But during pregnancy, wounds of this organ will either induce symptoms of an approaching abortion; or the quantity of blood discharged outwardly by the wound, or that is extravasated into the cavity of the abdomen, will be very considerable. At least this will in all probability happen when the injury done to it is material: for during pregnancy, the quantity of blood sent to the uterus is considerable; and we know from experience, that hæmorrhagies which occur from it in this state, seldom stop till delivery is effected; by which the uterus is allowed to contract, so as to compress and support the injured vessels.

In every injury therefore of this kind where symptoms of abortion occur, nothing should be done to prevent it; and where they do not take place, and whenever there is reason to suspect that the patient may suffer from loss of blood, if the
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delivery cannot be accomplished in the usual way, the child should be taken out by the Cæsarian operation. In a subsequent part of this Work we shall have occasion to describe the method of performing this operation; but in such cases as we are now treating of, the easiest, and perhaps best, method of doing it, will be to enlarge both the external opening and the wound in the uterus to a size that will admit of the extraction of the child. In other circumstances, wounds of the uterus must be managed nearly in the same manner with other penetrating wounds of the abdomen.

Besides the several viscera in the abdomen and pelvis, which we have now treated of, there are large blood-vessels and nerves which pass through them, which are also liable to be wounded: But as no remedies with which we are acquainted can afford any relief in divisions of the nerves; and as the large blood-vessels here lie too deep for any
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chirurgical assistance, they very universally end fatally. A patient may indeed linger long under the paralytic symptoms which always succeed to injuries done to these nerves; but a division of the large blood-vessels of the abdomen in every instance proves quickly fatal.

We have thus finished the consideration of wounds of the thorax and abdomen; and it will be observed, that we have entered minutely into it. To this I was induced, not merely by the importance of the subject, which I consider, however, as one of the most material that practitioners meet with, but with a view to excite the attention of beginners to an intimate acquaintance with the most useful part of anatomy, that of the thoracic and abdominal viscera.

In the preceding sections we have treated separately of all those wounds, which, from the situation, or any other peculiarity of the injured parts, may require any variety in the method of treatment. The extremities indeed are liable

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able to wounds which require a mode of management that has not yet been attended to, namely, those wounds which are complicated with fractures of the contiguous bones: These, however, will fall to be considered in the Chapter on Compound Fractures. The only other varieties of wounds which we have now to speak of, are poisoned or venomous wounds, and gunshot wounds.

SECTION XIII.

Poisoned Wounds.

WOUNDS may be poisoned in various ways: The bites of several animals, particularly those of the viper, afford examples of poisoned wounds; and the stings of the tarantula, of wasps and bees, are of the same nature. It is evident too, that poison is conveyed to
wounds

wounds by the bites of mad or enraged animals, particularly by the bites of mad dogs: And they may be poisoned by the matter or secretion of various kinds of fores, as well as by the juices of different vegetables.

The stings of wasps and bees, and other insects of this climate, although they may be productive of a good deal of pain, yet seldom terminate in any symptom of importance: The application of vinegar or spirit of wine to the part affected immediately after the injury, will often prevent that pain, tension, and inflammation, which would otherwise supervene: and when once these symptoms take place, they will for the most part be more effectually relieved by washing with cold water, or by immersing the parts in it, than by any other remedy. For the sting of a scorpion, we are advised to kill the animal and apply it to the injured part, or to cover the part with a dead toad or some other animal supposed to be of a poisonous nature. There is much cause, however, to imagine, that

this practice is founded in prejudice ; and we are told, that of late the same remedies have been found to prove useful in the stings of insects in warm climates, that we have just mentioned for the stings of bees and other insects of this country.

As the bite of a viper proves sometimes formidable, at all times it deserves particular attention. It is true indeed, that it often heals easily without any symptom of importance taking place ; for the poison of this animal being contained in a small bag at the root of each tooth, which it can discharge or retain at pleasure, it would appear that it does not throw it out if it be not much irritated. But as we can never judge with certainty whether the wound be poisoned or not, we ought in every case to be upon our guard. To prevent the poison from entering the system is the object we should have in view. This, however, can only be accomplished when the assistance of practitioners is procured immediately :

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for although there is reason to suppose that some other kinds of poisons, even when applied to recent wounds, do not for several days enter the circulation; yet we know from various occurrences, that this is by no means the case with the poison of the viper, which commonly begins to operate upon the system in the space of twelve or fourteen hours. The patient complains of a violent burning pain in the injured part, which soon begins to swell. Tension and inflammation take place, not merely over the affected limb, but often over the whole body. The patient becomes faint and languid, the pulse low and feeble; he complains of giddiness, nausea, and vomiting; of a fixed pain in the region of the heart; the whole surface of the body becomes yellow like the skin of a jaundiced patient; the urine appears of a deep yellow, and is evidently strongly impregnated with bile; cold sweats take place, along with convulsive twitchings in different parts

of the body ; and if relief be not quickly obtained, death soon closes the scene.

With a view to prevent the accession of these symptoms, the injured part should either be cut out immediately, or should be destroyed with the actual or potential cautery. The sooner this is done, the more effectual it will probably prove ; but it should always be advised as long as no bad symptom has appeared. In former times suction was much employed for the removal of every kind of poison in wounds ; in some cases by instruments kept for the purpose, but most frequently by the mouth ; and it was found, where the skin of the mouth was entire, that it might be done with safety. This might frequently prove successful ; but where the life of a patient is so nearly concerned, that remedy only should be trusted which will with certainty prevent the poison from entering the blood. We should not hesitate therefore to advise an immediate removal of the injured part ; and with a view to render the
prac-

practice as effectual as possible, we should endeavour to excite a plentiful suppuration over the surface of the sore; by the application of stimulating ointments, when the patient does not complain of pain and tension; and by the use of emollient poultices, when much inflammation takes place.

But when it appears that the poison has already entered the system, this local treatment of the sore is not to be depended on. In such circumstances, the application of warm oil, not merely to the sore, but over the whole body, has been much recommended; and it is said that some advantage has been derived from the internal exhibition of it: two spoonfuls of fine olive oil, given every hour, is said to have allayed the most violent symptoms which the bite of a viper ever excites. From some late observations, however, the efficacy of this remedy is much to be doubted; and it would appear that a plentiful sweat, kept up for a considerable time, is the most

certain method yet discovered, not merely of mitigating all the symptoms, but of removing them entirely. By whatever means a sweat is induced, it is found to prove useful: but experience shows, that small doses of the volatile alkali, frequently repeated, is to be more depended on for this purpose than any other remedy. A particular preparation of this kind, eau de luce, has been much recommended; twenty drops of it to be given every hour. But there is reason to suppose, that any other form of the volatile alkali will prove equally effectual.

All the varieties of theriac, as well as many other remedies, are recommended for the bites of vipers; nay, different remedies are advised for the bite of every variety of this animal. But as we do not find that any of them are to be trusted, it is not necessary to enumerate them.

The most formidable wound of a poisoned nature which we meet with in this country, is the bite of a mad animal: for although instances daily happen of these
wounds

wounds healing without any symptom of importance ensuing, yet whenever they terminate in the hydrophobia, the utmost danger is to be dreaded. Indeed the instances of patients recovering from this dreadful symptom are so extremely rare, that we despair in every case of any of our remedies proving effectual. A variety of nostrums have been held forth to the public, by which we are told the hydrophobia may not only be prevented, but even cured when it has actually taken place. I have not heard, however, of any well attested fact of any of them proving useful.

As a preventative of the hydrophobia, nothing with which we are acquainted can be depended on, but an immediate removal of the injured part, either with the scalpel, or with the actual or potential cautery; which, together with a plentiful suppuration being excited upon the fore, has, in different instances, appeared to answer the purpose effectually: That is, patients who have been treated in this

manner have escaped, while others bit at the same time by the same animal have suffered.

The sooner that the part affected is removed after the accident, the more effectual the operation will probably prove: but it had better be done, even at the distance of several days, than that the patient should be deprived entirely of the chance which it affords; and this especially as there is reason to imagine that this poison does not enter the system so quickly as a variety of others are observed to do; at least this must be the case if we can judge from the time at which it begins to operate. For we know, that in most instances none of the symptoms induced by the bites of mad animals appear till a considerable time after the accident: It almost always happens that several weeks intervene; and it has been known that a person has remained perfectly well after the bite for the space of six months, and at last has been suddenly seized with hydrophobia. When-
ever

ever we are certain, therefore, that a person has been bit by an enraged animal, we should advise the part to be cut out at whatever period this may be, provided no symptom has appeared of the poison having entered the system : And the fore should be kept open for a considerable time by the daily application of some irritating ointment.

While we place most confidence in this treatment, we should not neglect entirely any advantages which we are told may be derived from other remedies.—Sea-bathing has been much famed in all ages as a preventative of these symptoms : we have few well attested cases, however, of any benefit being procured from it. By many practitioners, mercury is much depended upon, particularly frictions with mercurial ointment, and the application of it to the fore ; and as this may be employed along with any other plan of treatment that may be adopted, it may be right in every case to advise it.

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It will often happen, however, that neither these nor any other means we can employ will prove effectual; and as the province of surgery affords no remedy for the symptoms which accompany the hydrophobia, as soon as they take place, the unhappy sufferer should immediately receive all the assistance which physicians of experience and observation can give.

When wounds are poisoned by the matter of diseases, as sometimes happens to surgeons in the treatment of sores, particularly of those of the venereal and cancerous kinds, the best practice would be to remove the virus immediately, in the manner we have just mentioned in cases of poisoned bites, by cutting out the part affected, or burning it with a hot iron. With respect to the venereal poison, a timid patient may indeed hesitate in the use of such a formidable remedy, when he knows that we are possessed of an antidote which seldom fails: Many, however, would en-
dure

dure the momentary pain of a burn or a cut, in preference to the slow operation of a mercurial course. And in cases of sores coming into contact with the matter of a cancer, we should not hesitate in adopting the practice immediately; for hitherto we are not possessed of any remedy upon which any dependence can be placed for the cure of this disease.

This would likewise be the most eligible practice in wounds infected with any of the vegetable poisons. We are told, however, that in those parts of the world where alone it can be necessary, antidotes are universally known for every poison of this kind; and that the Indians, when they are wounded, can discover immediately whether the instruments with which they are hurt have been poisoned or not.

With respect to the metallic poisons, they do not at present fall within our consideration; for however deleterious they prove when taken into the stomach, they do not appear to prove otherwise
hurtful

hurtful when applied to wounds, than by irritating or corroding the parts with which they come in contact. We are told, indeed, that instances have occurred of these poisons entering the system even when applied to wounds ; and this is mentioned as a reason for our not using the different preparations of lead with such freedom as is now universally done. But although remedies of this class are daily employed by almost every practitioner, we have not heard of a single well marked case of their proving in any degree noxious : Nay, it is to be doubted, whether even the salt or sugar of lead, as it is termed, proves hurtful, even when taken in considerable quantities into the stomach. We know that in small doses it may be used with perfect safety ; and I have much reason to think that it may be taken even in large quantities with more freedom than is commonly imagined, from its having happened in different instances with patients of my own, who by mistake have
swallowed

swallowed and retained a large cupful of a strong solution of saccharum saturni, without any bad symptom ensuing.

S E C T I O N XIV.

Of Gunshot Wounds.

AS wounds made by fire arms are supposed to be very different from every other kind of wound, they are usually treated of in separate chapters. We think it right in some measure to adhere to a custom which has long prevailed: but at the same time we must observe, that this difference consists chiefly in the symptoms being for the most part more severe and violent in gunshot wounds than in others. Till of late, most of the symptoms induced by gunshot wounds were supposed to originate from poison carried

carried in with the ball ; and it was also imagined, that the ball cauterized or burned the parts as it passed along. We now know, however, that these opinions are both ill founded ; that the injured parts do not suffer either by poison or from the immediate application of heat ; and that all the phenomena in any respect peculiar to wounds of this kind, proceed from the violent contusion produced by the passage of the ball. Of this we are rendered certain, from there being no poison contained either in gunpowder or in any of the articles of which bullets are usually made ; and from observing that symptoms of a similar nature are often induced by contused wounds produced by very different causes.

I would therefore conclude, that gunshot wounds are altogether of the contused kind ; an idea consonant to the method of cure, and which will tend to do away that mystery which has hitherto overshadowed this branch of practice.

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It has been a prevailing opinion, that there is something so singular in the nature of these wounds, as to render it improper for any practitioners to take the charge of them, but such as have had opportunities of attending fleets and armies, and of serving as 'it were an apprenticeship to this branch of practice. There is no good foundation, however, for this opinion; and I have no hesitation in saying, that gunshot wounds should be managed upon the same principles, and in the same manner, with wounds of any other kind attended with an equal degree of contusion.

In gunshot wounds, the symptoms we have most reason to dread are, inflammation, gangrene, and a suppuration so abundant as to exhaust the strength of the patient. These are therefore to be chiefly kept in view, and our practice will be more or less successful in proportion to their mildness or severity. In some cases the contusion is so violent and extensive, that the patient suffers from the injured parts being immediately attacked with gangrene.

grene. But, for the most part, inflammation is the symptom from which the greatest danger arises; for if it be not kept moderate from the first, it is apt to terminate either in gangrene or in extensive collections of matter.

To prevent or remove inflammation should therefore be considered as our first object in every case of gunshot wound: and as nothing tends with such certainty to accomplish this as local blood-letting, any veins or arteries that have been divided by the injury should be allowed to discharge freely before they are tied: Excepting indeed where some of the larger arteries have suffered, I believe it would be a good general rule for practitioners not to interfere in checking any hemorrhagy that may take place. In this they would be warranted, not merely by the known powerful effects of local blood-letting in preventing inflammation in general, but by many well attested facts, which tend to show that it proves still more particularly use-

useful in cases of gunshot wounds. Among other proofs of this it may be mentioned, what almost every army surgeon has observed, that some of the most remarkable cures have occurred among those patients who from necessity have been left for a considerable time upon the field of battle; by which much more blood is in general lost than usually happens with such as either from their rank or other circumstances are more early taken care of. In every case, therefore, of gunshot wound, we should at once determine to take as much blood as the strength of the patient will permit; and where the parts are so much contused, that the vessels which have been divided do not afford a sufficient quantity, (a circumstance which frequently happens,) instead of taking it from the arm or any distant part of the body, it should be drawn off by the application of a proper number of leeches to the injured parts; or when these are wanting, by cupping and scarifying the contiguous sound

parts. In general, if this practice be carried a proper length at first, the accession of inflammation will be prevented; but when it proves otherwise, and when the parts afterwards swell and inflame, the operation should be repeated once and again according to circumstances.

Our next object is to remove any extraneous body that may be lodged in the wound, as far as this can with propriety be done. When a ball has not penetrated deep, and especially when the wound is left entirely open, by a portion of skin and teguments being completely removed, there will be little difficulty in clearing away whatever might prove hurtful. But when a wound is found to run to a considerable depth, and especially if a counter opening has not been made by the ball passing out at the opposite side, any search that is made for extraneous bodies, should be done with much care and circumspection. When treating of Punctured Wounds in Section III. of this Chap-

Chapter, we entered upon the consideration of this point. We must now refer therefore to what was then said ; and at present shall confine ourselves to this observation, that when extraneous bodies lodged in gunshot wounds can be taken away without fretting or injuring the contiguous parts considerably, they ought always to be removed immediately : but when much pain is excited, or a high degree of inflammation endangered by the attempt, we ought to desist. In such circumstances, it will be better to trust to the extraneous bodies being afterwards discharged along with the matter of the sore ; to nature pressing them out ; or to the parts in which they are lodged being accustomed to their residence. From much experience we know, that in almost every instance bullets should be allowed to remain in whatever part they are lodged, rather than that much force should be employed in extracting them. A ball lodged in the substance of a bone, is perhaps the only exception to this ge-

neral rule: It cannot indeed be extracted from this situation but with much difficulty; and therefore it is in general allowed to remain. I have known several instances of this; but in all of them much pain and danger to the patient, as well as trouble and perplexity to the practitioner, were the consequences. The unyielding nature of bone, occasions, upon the lodgement of a foreign body in its substance, great pain, tension, and swelling over all the contiguous parts. To prevent these, the extraction of the ball, when it can be done without hazard of the patient's life, should be attempted, as soon after the accident as possible, and before the parts become swelled and pained.

Different forceps have been invented for extracting bullets from wounds, and some have proposed screws for this purpose: Scarcely any of these instruments, however, have answered the purpose for which they are intended; and excepting where a bullet can be easily laid hold

of with common forceps, no instrument of this kind should ever be employed: for, besides tearing and irritating the injured parts, they are apt to catch the contiguous muscles, or other soft parts, by which much mischief must necessarily be done. There must always be a risk of this when the wound runs deep; but it ought to be more particularly avoided in wounds of the thorax and abdomen, where laying hold of any of the contiguous parts would necessarily be productive of danger. When a ball is not deeply lodged, but lies near to the mouth of the wound, so that the surgeon can see it, the forceps may with safety be employed; but whenever it lies deeper than this, if it be judged proper to extract it, a Counter Opening, as it is termed, should be made upon it, so as to admit of its being taken out with the fingers. It will commonly happen, indeed, that balls may be extracted with much more ease both to the patient and surgeon, by judicious openings of this

kind, than by the use of forceps or any other instrument. The pain and terror which the making of these openings are supposed to excite, are the principal objections to them; but it should be remembered, that in such circumstances, it is not the present ease and conveniency of the patient that so particularly merit our attention, as his future advantage and safety. Nor will the pain induced by cutting directly upon a bullet be so considerable, as by tearing it out from a deep wound with forceps.

Where the course of a ball is of a considerable length, this will always be the easiest method of taking it out, when the practice is not forbid by the contiguity of large blood-vessels and nerves: But when the wound is only of a short extent, instead of cutting upon the ball, by making a small opening into it, it answers better to lay the wound open thro' its whole length; by which the ball is not only more easily extracted, but the cure is afterwards much more readily accomplished.

plished. Indeed this practice should be adopted in all such cases, even when the ball is not lodged. When the two openings made by the entrance and exit of a ball are not very distant from each other, and when with safety they can be laid into one, it should always be done as soon as possible after the accident; by which the vessels which have been injured will be more freely unloaded than they could possibly be in any other manner; every kind of extraneous matter that the ball may have carried in, will be brought into view; and the sides of the sinus being allowed to collapse, the size of the fore will thus be diminished.

This being done, the parts affected should be covered with a pledgit of any emollient ointment formed merely of wax and oil, and a poultice of bread and milk should be laid over the whole: a practice which proves much more successful, as well as more agreeable, than the application of warm stimulating dressings; which, till of late, were uni-

versally used in every case of gunshot wound. The pain and irritability which almost uniformly attend injuries of this kind, point out the propriety of the most soothing applications. For the most part those we have mentioned answer the purpose : but in some cases the preparations of lead answer better ; particularly Goulard's cerate, or the common wax ointment, impregnated with a small proportion of Saccharum Saturni. An opiate should now be administered ; and the part affected being placed in the easiest and most convenient posture, the patient should be laid to rest.

The formation of matter in every sore attended with contusion, is an object of the first importance ; for till this takes place, there is often reason to suspect that gangrene may supervene. With a view to hasten it, the warm poultices should be frequently renewed : and they should be continued till the tension and swelling with which wounds of this kind are usually attended, be removed, and till the sore
has

has acquired a red healthy granulating appearance ; when it will fall to be treated in the manner we have already advised for sores proceeding from any other cause.

Gunshot wounds are commonly described as being covered from the first with deep sloughs or escars ; and various remedies are advised for removing them. Every appearance, however, of this kind with which they are attended, proceeds entirely from contusion ; and excepting the injury be large and extensive, the slough covering the wound is not often perceptible ; or it is so thin and inconsiderable, that it dissolves and comes away with the matter of the first or second dressing. In such cases, therefore, it requires no particular attention. And even when it runs to a greater depth, it commonly separates, so as to be easily removed as soon as a free formation of matter has taken place : for every slough of this kind is a real mortified spot ; and we have elsewhere shown that
nothing

nothing tends to separate mortified parts with such certainty from those that are sound, as a free suppuration being induced upon them.

In the early stages of gunshot wounds, emollient poultices prove more useful than perhaps any other remedy: But it is necessary to remark, that they should not be continued after the effects we have mentioned are produced: for when they are too long persisted in, they not only tend to relax the parts too much, and to render them soft and spongy, but are apt to induce too copious a formation of matter; from which the patient is now in greater danger than from any other circumstances attending his situation: For although it is a point of the utmost importance, in every gunshot wound, to encourage the formation of pus to a certain extent; yet we find universally, that in great quantities it proves very prejudicial, and when once excited, that it is with much difficulty checked. We think it also right to observe, that
this

this superabundance of matter is very apt to proceed from a different cause, from the inflammation being allowed to run too high, by which extensive effusions and consequent abscesses take place among the contiguous muscles. This cannot in any way be so effectually prevented as by very copious bleedings immediately after the injury is inflicted: It is chiefly with a view indeed to prevent this distressful occurrence, that we have advised the practice of early and copious blood-letting in every case of this kind; and with those who have had opportunities of seeing the inconveniences which arise from those extensive suppurations that ensue from neglecting it, no other argument will be required to show the propriety of adopting it.

In whatever manner a too copious flow of matter has been induced, the practice to be adopted must be the same. Every collection that appears must be discharged by a depending opening; the limb should be laid in that posture which will
will

will most readily admit of its running off; the patient should be supported by a light nourishing diet; and the bark should be plentifully exhibited. It is in this state indeed of gunshot wounds that bark acts with most advantage; when the inflammatory symptoms are mostly gone, and when the patient is suffering from too copious a discharge. In this situation it often proves highly serviceable; but in order to act with advantage, it should be given in considerable quantities. Elixir of vitriol proves in such cases a powerful addition to bark.

When, notwithstanding a liberal use of these medicines, and a proper attention to the other circumstances we have mentioned, the discharge still continues copious, we will often find that it is kept up by detached pieces of bone, or by pieces of cloth, or some other extraneous body having been carried in with the bullet. In such circumstances, nothing will tend to lessen the quantity of matter till the extraneous body be removed;
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for w^hile it remains, it will irritate and inflame the contiguous parts, and effusion and suppuration will be the consequence. The sore ought therefore to be again examined; and any loose body or detached pieces of bone that are discovered, should be immediately removed. When the irritation is kept up by pieces of cloth, as they are too soft to be discovered by the probe, they are apt to pass unnoticed. When there is therefore reason to suspect that any article of this kind is lodged in a sore, some other method is necessary for extracting it: And when the parts are so situated that a cord or seton can be introduced along the passage made by the ball, nothing will more readily prove successful. I have met with different instances of pieces of cloth being brought out with the daily drawing of a cord, which were not suspected to be lodged; and in consequence of which the sores were soon cured, after various attempts to heal them had been made in vain.

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We have already advised opium as an useful medicine in the early stages of gunshot wounds ; and by tending more effectually than any other remedy to abate irritation, it proves often serviceable in lessening the discharge of these fores, even when they have been of long duration, and when various other medicines have been employed without any advantage. It ought therefore to be prescribed with freedom whenever the discharge appears to be kept up by pain or irritation.

Although in gunshot wounds hemorrhagies of importance do not always succeed the accident immediately, yet they sometimes take place afterwards. This seems to proceed from the arteries being left open and exposed, when the mortified slough which contusions usually produce falls off. About this time, therefore, practitioners should be much on their guard against such an occurrence, and this especially when the injury is extensive, or seated near to any
large

large artery. The hemorrhagy is often preceded by a great heat in the injured parts, and with a throbbing pulsatory pain. At this period it may frequently be prevented by plentiful blood-letting, and especially by the application of leeches to the contiguous parts; but when once the hemorrhagy appears, nothing will prove successful, if the vessels are of any considerable size, but a proper application of ligatures. As the discharge in these cases is often so sudden and violent as to induce much hazard, before the assistance of a practitioner can be procured, patients in such circumstances should be furnished with a tourniquet, with directions to the servant in attendance to apply it immediately on the first appearance of blood.

Hitherto we have not mentioned the scarifying of gunshot wounds; a practice which we find recommended by almost every writer upon this subject, and which till of late prevailed very universally. By scarifying the fores, it was expected that

that the sloughs with which they are sometimes covered would sooner separate, and that the cure would thereby be hastened. Later experience, however, shows that this reasoning is fallacious; and instead of proving useful, that scari-fying very commonly does harm: It creates additional pain and inflammation, at the same time that it evidently extends the surface of the sore, while it does not appear to be productive of any advantage. It should therefore be laid altogether aside. Even the dilatation of gunshot wounds, so much recommended of late, ought to be employed with caution. When the passage of a ball is not extensive, and when the parts through which it has gone can with safety be laid open, I believe it would be right in every case to do it with freedom from one end of the sinus to the other: no harm could accrue from it; and there is reason to imagine, as we have observed above, that it would tend much to forward the cure: But I have never been able to discover what
advan-

advantages could probably be derived from the mere dilatation of the external opening of a gunshot wound: It is proposed with a view to give a more free discharge to the matter than it would otherwise have: But in deep narrow wounds, formed by pistol or musket bullets, increasing the diameter of one part of the sinus will have no effect whatever upon the rest of it; and as it must evidently do harm, by enlarging the wound, while no benefit can probably accrue from it, I do not hesitate in saying that the practice should not be continued. In such cases, where the wound is either so situated that it would be dangerous to lay it open from one end to the other, or where it is of too great extent for this practice to be adopted, the passing a cord, as we have already advised, along the sinus, will often answer our purpose. This, however, should never be attempted till the first or inflammatory stage of the wound is over: for while any degree of pain or tension remains, the irrita-

tion produced by the cord is very apt to do harm.

But it sometimes happens even that a cord cannot be employed, owing to the situation and direction of the wound. In such cases, after the pain, tension, and other symptoms of inflammation are removed, and a free suppuration is induced; the sore must be treated in the manner we have already advised when speaking of punctured wounds: a proper application of pressure along the course of the sinus will, in such a situation, often effect a cure when it cannot be obtained in any other manner.

It might be expected, that something should be said of the method of managing mortification when it occurs in gunshot wounds; but it appears to be unnecessary, as we have elsewhere treated fully of this symptom as a consequence of inflammation*. I think it right, however, to remark, that in gunshot wounds nothing in general proves so effectual in preventing mortification as plentiful evacuations

* *Vide* Treatise on Ulcers, &c. Part I.

cuations of blood. It will not indeed prevent those parts from mortifying which have been severely contused by the ball coming immediately into contact with them : but this is not what in such cases we have most reason to dread ; for the gangrene which occurs from the contusion produced by the ball, is commonly circumscribed, and it is not apt to spread. It is that variety of gangrene which succeeds to the inflammatory stage of gunshot wounds, of which we have most cause to be afraid. But when blood-letting is freely practised, it seldom takes place ; or if it does appear, the same remedy will often prevent it from spreading.

As bark is found useful in many cases of mortification, it is almost universally employed in gangrene arising from gunshot wounds. I am satisfied, however, that the practice is often founded in error, and that much mischief has been done by it. When gangrene occurs in a weak debilitated habit, bark may always be given with safety ; and in such circum-

stances it will often prove to be the most effectual remedy. But mortification which takes place from gunshot wounds happens most frequently in strong plethoric patients, where tonics of every kind prove prejudicial, and where blood-letting and other evacuations are particularly useful. In the subsequent stages even of this variety of gangrene, if the disease appears to spread after all the symptoms of plethora and inflammation are removed, bark may be employed with propriety ; and in such circumstances it should be exhibited with freedom ; but it should never be given while the inflammatory tension and pain continue.

In offering these observations upon gunshot wounds, we have hitherto been supposing that the injury is in some degree circumscribed, or at least that it is not so extensive as to preclude hopes of saving the limb in which it may be situated ; and it is proper to remark, that by due care and attention, wounds of this kind may be often cured, and limbs saved,

saved, where the first appearances were even very alarming. But when a limb is injured in such a manner that there is no reasonable hope of saving it, it would be improper to persist long either in these or any other means of cure that have yet been proposed. By doing so, the patient must suffer unnecessary pain and trouble, while at the same time his constitution may be so much injured as to deprive him even of a chance of recovery upon the removal of the limb. But the attempt to save limbs which have suffered much by gunshot wounds, gives rise to a question of importance, which merits particular discussion.

In the various battles which occurred in the last German war, the number of wounded men was often surprisingly great; of course the amputation of limbs became frequently necessary. By many it was imagined that the practice was carried much farther than it ought to have been; and it was even alledged, that limbs were often wantonly removed,

which with much ease and safety might have been saved. Among others who were of this opinion, Mr Bilguer, surgeon to the armies of his Prussian Majesty, wrote a treatise, in which he endeavours to prove, that amputation of limbs is very rarely necessary, as almost every injury for which it is usually advised will admit, he thinks, of a cure, by more gentle means.

As the removal of a limb should never be attempted but in cases of real necessity, the public at large were much indebted to Mr Bilguer for endeavouring to prevent a too general practice of it. There is much cause, however, to imagine, that the zeal with which he appears to be animated has made him carry his restrictions too far; and that numbers would suffer much unnecessary pain, trouble, and hazard, were they to be generally adopted.

Mr Bilguer thinks, that scarcely any case of gunshot wound can be so bad as to require amputation. Even where the
softer

softer parts are much lacerated, and the bones and the joints much injured, we ought always, he thinks, to attempt to save the limb: and he asserts, that by this practice more lives will be preserved than by the usual method of proceeding immediately to amputate. After all the attention, however, that I have been able to give to a subject of such importance, in the course of my own practice, and after much information obtained from others of experience and observation, I am of opinion, that a great deal of mischief would be done by admitting this as an universal rule. I would advise in every case where the fleshy parts of a limb only are merely divided, to make some trials for saving it; and they will often prove successful. Where all the muscular parts of a limb are much contused and lacerated, it would no doubt be in vain to attempt the cure of it; on the contrary, it should be removed at once. But when any considerable portion of soft parts re-

mains unhurt, although the others should be injured in the severest manner, if none of the large joints have suffered, we should never despair of being able to save the limb. The contused parts may indeed mortify and throw off, and thus an extensive fore will be produced: but we know from daily experience, that the largest fores will heal; and if in this we should be disappointed, we still have it in our power to advise amputation, while both the patient and surgeon have the satisfaction to think that nothing has been omitted that could probably have prevented the necessity of employing a remedy of such a disagreeable nature. And on the subject of Amputation we shall afterwards have occasion to show, that in such a situation the operation proves usually more successful when a fore has been of some duration, than when employed immediately after the accident.

But when any of the larger joints have been much injured by the ends of the
bones

bones which compose them being shattered or splintered, immediate amputation should always be advised: for the inflammation which succeeds to these wounds comes on quickly; and when once it takes place, the operation can never be employed till it be altogether removed. The height to which inflammation is in such cases apt to proceed, is a powerful argument in favour of early amputation: for when the large joints are materially hurt, the parts soon become highly inflamed, notwithstanding of all that we can do to prevent it; so that no time should be lost in putting the operation in practice. It must indeed be allowed, that out of a great number of patients, some few might in such circumstances have their limbs saved, even where the joints have suffered in the worst manner: But we cannot allow, with Mr Bilguer, that this is a sufficient reason for the practice which he recommends being generally admitted. It is not the success which may attend

a few cafes, by which practitioners fhould be directed, but that which enfues from a general courfe of practice. And this I think may be confidered as certain, that in fuch circumftances as we are now confidering, more lives would be loft by attempting to fave the limbs of patients, than by removing them as quickly as poffible after the injuries have been received; at the fame time that the practice would be attended with much lefs trouble and pain to the patient: for the fore which remains after the removal of a limb is trifling indeed, when compared with extenfive lacerated wounds of the large joints. In the prefent improved method of operating, the former often heals in the courfe of two or three weeks; whereas wounds in the joints, even when they terminate moft favourably, often continue obftinate, and produce much perplexity and diftrefs for feveral months, or even for years.

With refpect to fractured bones in cafes of gunshot wounds, when a large bone
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is fractured or splintered through its whole extent, and when this is accompanied with much laceration of the corresponding soft parts, immediate amputation of the limb will be the safest practice, and ought therefore to be advised without hesitation. But where a gunshot wound that is not very extensive is merely accompanied with a simple fracture of a contiguous bone, or even where the bone is fractured in different places, if the injury does not extend to the joint, we ought in perhaps every instance to endeavour to save the limb. By removing the detached pieces of bone, and treating the sore with attention, we will often have the satisfaction of accomplishing a cure, and of restoring patients to the use of their limbs, who otherwise might have remained lame for life, or who might have been deprived of them intirely.

It is proper, however, to remark, that although this should always be attempted where a patient is to remain in a fixed

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ed situation, and where the regular attendance of a practitioner can be procured, yet after engagements, whether at sea or land, where the wounded must be frequently moved about, and where there is commonly a deficiency of surgeons, I believe it would be a good general rule to proceed to immediate amputation in every case of gunshot wound accompanied with a fracture of any of the contiguous large bones. By doing so, a few limbs would possibly be removed, which with great care and attention might have been preserved; but I am convinced that more lives would be saved by it than by attempting in such circumstances to pursue any other method of treatment. We shall have occasion, however, to enter more fully upon the consideration of this subject in the Chapter upon Amputation.

CHAP.

C H A P. XXXVII.

Of Burns.

BURNS assume different appearances according to their degrees of violence, and to the manner in which they are produced. Thus, burns which merely irritate the surface of the skin differ materially from those which corrode or destroy it; while those again have a different aspect from such as affect the more deep seated parts, as the muscles, tendons, ligaments, &c.: And we know that such as occur from the application of boiling water, or any other liquid, differ materially from those which are
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produced by the direct contact of hot metallic bodies, or of burning combustible materials.

Burns which do not destroy the cuticle, and which irritate the skin only, act nearly in the same manner with cantharides and other vesicantia. The irritation which they excite produces an increased action in the exhaling vessels of the affected part, by which vesications are formed in extent and number proportioned to the violence of the cause. But when the skin or subjacent parts are destroyed, no vesicles take place. A black mortified slough is first observed; and when this separates and is thrown off, an ulcer is left of a depth corresponding to the degree of heat by which it was produced.

In every case of burn the pain is severe; but in general it may be observed, that it is more considerable where the skin has been merely much fretted or irritated, than where such a degree of heat is applied as to destroy it entirely.

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In deep extensive burns mortification sometimes takes place to an alarming degree very soon after the injury is inflicted ; but for the most part the symptom we have most cause to dread is inflammation. The pain and irritation which burns excite, are in some instances so violent, that all our efforts are apt to fail in preventing them from inducing the very highest degree of inflammation : And when the surface of a burned part is extensive, the effects of this inflammation are not confined to the spot which has more immediately suffered ; they are apt to excite fever ; and in many cases such a degree of torpor is induced, as at last ends in death.

In the treatment of every variety of burn, our first object should be to procure ease as quickly as possible. Where the skin is not destroyed, but seems to suffer merely from irritation, an abatement of pain may be procured by the application of remedies of very different,
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and even of very opposite natures: By dipping the part affected in very cold water, and keeping it for some time immersed in it, the pain will often be rendered very supportable; while on the other hand, a considerable degree of ease may be procured by plunging the injured part suddenly into boiling water, or any other fluid of nearly an equal degree of heat. Emollients are often employed, and in some cases they procure immediate relief; but, in general, astringent applications prove much more successful. One of the best applications to every burn of this kind, is strong brandy, or any other ardent spirits: it seems to induce a momentary additional pain; but this soon subsides, and is succeeded by an agreeable soothing sensation. It proves most effectual when the parts can be kept immersed in it; but when this cannot be done, they should be kept constantly moist with pieces of soft old linen soaked in spirits. The *Acetum Lythargyrites*, a strong solution of *Saccharum Saturni*,
or

or Goulard's saturnine water make useful applications for the same purpose; and as a proof that it is the astringency of the remedy which the effects result from, the same benefit is derived from a strong solution of alum, or even from common ink.

It is the common opinion, that remedies of this kind prove chiefly useful by preventing those vesications or serous exsudations which superficial burns are usually attended with: But I do not find that the observation is well founded; for I have always remarked, that they procure an abatement of the pain sooner where these vesications have already appeared, than when they are employed so early as to prevent them from rising, which they frequently do when they are applied immediately after a burn is inflicted.

Whatever remedy we employ, it ought to be persisted in as long as the pain continues; and in extensive burns, where the irritation is great, along with external applications, opium should be prescri-

bed in doses adequate to the degree of pain. Even that stupor with which patients in this situation are sometimes attacked, is more readily removed by opium than by any other remedy. As this symptom is probably induced by some degree of effusion upon the brain, and as we are to consider this as an effect of the irritation which always accompanies burns, we may readily conceive that opiates should prove particularly useful in removing it: And I have found in a variety of instances that they do so.

With respect to the management of the vesications; by some we are advised to open them immediately, while others assert that they should never be meddled with. In judging from my own observation, I would say that they should never be opened till the pain arising from the burn is entirely gone: for during this period, the least access of air is attended with a great deal of uneasiness. But when the irritation produced by the burn is subsided, they may be opened with
safety;

safety: and at this period it ought always to be done; for when the serum is allowed to rest long upon the skin beneath, it is apt to render it tender, and even to induce some degree of ulceration, which might with ease be prevented. Even at this time the vesicles should be opened with small punctures, instead of large incisions, so that as little air may be admitted as possible. And after the serum is discharged, the best application that can be made to the part, is a thin liniment of wax and oil, with a small proportion of *Saccharum Saturni*. Oil by itself is too thin, as it runs quickly off; and ointments of the usual consistence give more pain than a liniment, as their stiffness prevents them either from being applied or removed so easily.

In this manner all such burns as we are now treating of, may in general be cured, excepting where they are so extensive as, by the irritation which they produce, to excite much inflammation and fever. In such circumstances, blood-

letting, and other remedies adapted to the particular symptoms, must be advised; and when the injured part is found to ulcerate, which will often happen in severe burns, even where the skin remained entire for several days, those remedies must be employed which the nature of the sore may appear to render necessary, and for which we must refer to the different sections of a former publication*.

When, again, burns are from the first attended with loss of substance, as usually happens when they are produced by the application of hot metallic bodies, cooling emollient applications prove most effectual, the part being kept constantly moist with a liniment composed of equal parts of lime-water and lintseed-oil often gives immediate ease; and the easiest way of applying it is, to daub the parts frequently over with a soft pencil well soaked in it. The application and removal even of the softest coverings is often
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* Vide Treatise on Ulcers, &c.

productive of much pain ; and I have always found in burns of this kind, that their being exposed to the air does not for the first two or three days do any harm : On the contrary, it often gives relief when no advantage is derived from any application. But as soon as the pain and irritation produced by the burn are removed, the parts should be covered and treated in the same manner as ulcers proceeding from any other cause. The liniment I have mentioned of lime water and lintseed oil, is perhaps the best application that has yet been employed in burns of this kind. In some cases, however, I have found that more immediate ease has been procured from the application of Goulard's Cerate ; or the Unguentum Nutritum ; and a weak solution of Saccharum Saturni has sometimes proved successful.

In burns arising from the explosion of gun-powder, some of the grains of the powder are apt to be forced into the cutis. At first they produce much irri-

tation ; and if they be not removed, they commonly leave marks, which afterwards continue fixed and permanent. They should therefore be picked out with the point of a needle, or any other small instrument, as soon as possible after the accident ; and with a view to prevent inflammation, as well as to dissolve and carry off any particles of the powder which might remain, the parts affected should be kept covered for a day or two with emollient poultices. In other respects, injuries of this kind are to be treated in a similar manner with burns produced in any other way.

When parts which lie contiguous are burnt, they are apt to adhere to each other, if some pains be not taken to prevent them. This is more particularly the case with the fingers and toes, and with the nostrils and palpebræ. The surest method of preventing it, is to keep pledgits covered with any proper dressings inserted between them during the course of the cure.

In the treatment of ulcers arising from burns, it is proper to remark, that the parts are very apt to become soft and fungous, and to rise considerably above their natural level. When this is observed, any emollient applications that may have been previously used should be laid aside: such as are moderately astringent should be employed instead of them; and gentle compression with a roller proves particularly useful. Bathing the parts with a common saturnine wash, or with lime-water, or a solution of alum, often proves serviceable; and one of the best ointments for this purpose is the common *Ceratum e Lapide Calaminare*. By persisting in these means, any fungous excrescences of this kind will, for the most part, be soon removed; but when they prove obstinate, they must be taken down by the application of burnt alum, blue vitriol, or lunar caustic.

C H A P. XXXVIII.

Of TUMORS.

SECTION I.

Of Tumors in general.

EVERY præternatural enlargement, in whatever part of the body it is seated, may be termed a Tumor.

Tumors daily occur in one form or another: They are often followed with important consequences; they frequently give much embarrassment both to patients and surgeons: For these reasons they merit particular attention.

Much

Much variety occurs in the general appearances of tumors, as well as in the method of treatment best suited for their removal: But such varieties only should be mentioned in a work of this kind as require some peculiarity in the method of cure.

Tumors may with propriety be divided into two general classes: Into such as are of an acute or inflammatory nature; and such as are chronic or indolent. Authors have for the most part distinguished them into such as are said to be of a warm nature; and those which they suppose to be cold, from their being destitute of pain and redness, symptoms which we commonly observe to accompany heat. But the terms we have mentioned of Acute or Inflammatory, and Chronic or Indolent, are more scientific; at the same time that they are more expressive of the real nature of the different affections: for it will be found to hold perhaps universally, that tumors are acute or indolent, that is, that

that they are rapid or slow in their progress, nearly in proportion to the degree of inflammation with which they are attended. I mean therefore to rank in the first class of tumors, all such as from their commencement are accompanied with inflammation; and in the second, all those which are not evidently accompanied with this symptom.

It will unavoidably happen, however, that some tumors will be mentioned under one class, which, during some part of their progress, may appear to belong to the other: Thus, a tumor beginning from some inflammatory affection, may terminate in a state of perfect indolence; while others, which at first were evidently chronic or indolent, may at last become highly inflammatory. We shall endeavour, however, to characterize them by those symptoms which appear most obviously at their commencement: A mode of distinction which appears to be the most accurate; for it is not what a tumor may eventually become, but what it

it actually is on its first appearance, that can admit of any description.

CLASS I. *Acute or Inflammatory Tumors:*

Phlegmon, with its consequences, abscess
and mortification.

Erysipelas.

Ophthalmia.

Inflammation of the ear.

Angina, or inflammation of the throat.

Inflammation and abscess of the liver.

of the breasts of women.

of the testes.

of the anus and perinæum.

Venereal buboes.

Lumbar abscesses.

Paronychia or whitloe.

Chilblains.

Sprains and contusions.

CLASS

CLASS II. *Chronic or Indolent Tumors.*

Eⁿcysted tumors, usually so termed.

Ganglions.

Swellings of the bursæ mucosæ.

Concretions and præternatural excre-
scences within the capsular ligaments
of joints.

Aneurisms.

The true, the false, and varicose aneu-
risms.

Varicose veins.

Hemorrhoidal swellings.

Hydropic swellings.

anasarca or œdema.

hydrocephalus.

hydrops pectoris, and

hydrops pericardii.

ascites.

dropsy of the ovaria.

hydrocele.

spina bifida.

Swellings in the sublingual glands.

Tumors containing air.

Gene-

General emphysema produced by air escaping from the lungs into the cellular substance, as sometimes happens from the spiculæ of fractured ribs penetrating the substance of the lungs.

Local emphysematous tumors produced by putrefaction in a particular part. This is a rare occurrence; but cases of it are recorded by different authors.

Tympanitis.

Tumors formed by the displacement of particular parts.

Herniæ:

of the brain.

inguinal and scrotal.

congenital.

crural.

umbilical.

ventral.

at the foramen ovale.

in the perinæum.

of the alimentary canal and mesentery.

of the omentum:

Herniæ

Herniæ of the liver, spleen, and other
abdominal viscera.

of the bladder.

of the intestines in the vagina.

Protrusion of the eye-ball.

Prolapsus uteri.

Prolapsus ani.

Tumors formed by the displacement of
bones in cases of dislocation.

Scrophulous tumors.

Bronchocele.

Sarcomatous tumors.

Sarcocele.

Scirrhus.

Cancer.

Polypous excrescences in the nose and
throat.

Polypi in the ear.

in the uterus.

Condylomatous tumors in the anus.

Excrescences in the urethra.

Nævi materni.

Warts.

Corns.

Tumors from affections of the bones.

Simple

Simple exostoses.

Venereal nodes.

Spina ventosa.

We shall now proceed to consider such of these tumors as have not yet been described, or that will not more properly fall to be mentioned in some other chapter. Of these last, indeed, all that occur are such as are produced by the heads of bones when displaced, which will be considered when we come to the Chapter on Dislocations.

SECTION II.

Of Acute or Inflammatory Tumors.

THE general theory and management of inflammation and its consequences, have already been fully treated of*:

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* *Vide* Treatise on Ulcers, &c. Part I.

We must therefore refer for this part of our subject to what was then said upon it: and in considering those varieties of tumors in which inflammation takes place, such circumstances only will be taken notice of as from peculiarity of situation, or some other cause, require a particular treatment.

In the Treatise on Ulcers, erysipelas was mentioned and described as a variety of inflammation: but as phlegmon, with its consequences, was the only subject which we then meant to discuss, the treatment of erysipelas was not considered; we shall now therefore offer a few observations upon it.

§ 1. *Of Erysipelas.*

IN phlegmon, the inflammation is circumscribed. In general, it is deeply seated in the cellular substance; and any effusion which takes place is for the most part converted into purulent matter:

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But in erysipelas, the tumor is diffused, and not much elevated; it seldom proceeds deeper than the skin; and any effusion with which it is attended is commonly thin and acrid, and is not convertible into pus.

By experience we know, that sores proceeding from erysipelas are in general difficult to cure: It should therefore be our first object to endeavour to prevent that effusion of which these sores are the consequences. By some it is alleged, that this practice must be attended with risk, as erysipelas in general appears to proceed from a constitutional affection; and hence we are advised rather to encourage the discharge of that matter which nature seems inclined to deposite. This observation, however, does not appear to be well founded; for it is found that the discussion of erysipelatous affections may be attempted with the same freedom and safety as inflammation of any other kind.

There is a common prejudice against

the use of unctuous applications, and whatever contains moisture, in every case of erysipelas ; and fine flour, starch, or hair-powder, are almost the only remedies employed externally. These are used with a view to absorb the acrid matter, which affections of this kind often throw out in the form of pustules, and which unctuous and moist applications are rather supposed to encourage. But to me it appears that they prove more useful in preventing the effusion or formation of that matter, than in absorbing it afterwards. By soothing or allaying that uneasy sensation which usually accompanies erysipelas, and which they often do very effectually, they necessarily tend to lessen that preternatural exertion of the affected vessels, which in every case of inflammation we consider as the cause of the subsequent effusion ; and as they usually prove more pleasant in every respect than moist applications, they should therefore in the first stages of the disorder be preferred. It happens

pens indeed, in some cases, that they have little or perhaps no effect in procuring relief. In such instances, I have sometimes found, that by keeping the inflamed part exposed to the air, and wetting it every now and then with a feather soaked in a weak solution of *saccharum Saturni*, immediate ease has been procured, and no disadvantage has afterwards occurred from it. In general, however, the dry farinaceous powders answer better.

Almost an universal prejudice has prevailed against blood-letting and other evacuations in erysipelas. And as it is commonly supposed to be attended with some degree of putrescency, instead of evacuations, bark, wine, and warm stimulating cordials, have been recommended. It appears, however, that the ideas of practitioners upon this point have not been founded on observation: for it is now known, that in every case of erysipelas, blood may to a certain extent be evacuated with safety; and by

doing so, and adhering in every respect to an antiphlogistic regimen, we will in general be almost certain of preventing the disease from terminating in those effusions which we have mentioned, and which at all times we should endeavour to prevent.

It is proper, however, to remark, that local blood-letting, which in other varieties of inflammation proves highly useful, is not here admissible: for the orifices by which it must be drawn off are very apt to degenerate into those troublesome ulcers which erysipelas, when it terminates in effusion, is very apt to produce.

By one or more general blood-lettings, according to the strength of the patient; by the use of gentle laxatives, mild sudorifics, and a cooling diet; and by frequently dusting the part affected with one or other of the powders we have mentioned, almost every erysipelatous tumor may be dissipated: But when effusion is found to have occurred in any
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considerable quantity, it should be discharged immediately by a small opening in the most depending part of it. In this state of the disease, emollient cataplasms are commonly applied, with a view to bring the contents of the swelling to suppuration. This, however, proves always pernicious: for the effusion being of a nature which cannot be converted into pus, poultices can never be of the same use as in cases of phlegmon; and as it is commonly sharp and acrid, it is apt to do mischief, by corroding the skin and other contiguous parts, when it is allowed to remain. The best application in this state of the disease, is any of the saturnine ointments, such as Goulard's cerate, or the common wax ointment, with a small proportion of *Saccharum Saturni*.

§ 2. *Of Inflammation of the Ear.*

THE passage, as well as the bottom of the ear, are entirely membranous; consequently the inflammation which attacks them proves very painful: for we know that inflammation of membranous parts gives more pain than that of parts of a looser texture; as the blood-vessels in the former do not yield so readily as those of the latter, to the distention which always accompanies inflammation.

The remedies to be employed in cases of this kind should be regulated by the stage of the disease. When the inflammation has subsisted so long as to give reason to suspect that it will terminate in suppuration, which it is apt to do very quickly, emollient applications prove most useful: the ear should be frequently fomented with warm emollient steams; and it often proves serviceable to cover
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the affected side of the head with large emollient poultices. But in the commencement of the affection, we should in general attempt to prevent suppuration: for it is often difficult to obviate the effects of it when matter is once formed in the ear; and a long continued discharge is frequently productive of deafness. With this view, nothing proves in general so effectual as the application of a small blister behind the ear: and by pouring a few drops of laudanum into the passage, or of compound spirit of lavender mixed with a small proportion of oil, we very commonly have it in our power to remove or abate the pain; and the irritation being in this manner removed, the risk of suppuration ensuing is thereby much lessened.

Our endeavours, however, for this purpose will often prove abortive: In which event, and when it is evident that matter is formed, we should endeavour to bring it off as freely as possible, by bathing the ear in warm water, and even

by injecting a little warm water into it. By these means we may often put a stop to the discharge: but when it still continues to flow, astringent injections, of lime-water, or of mild saturnine solutions should be employed; which seldom fail when the disease is solely confined to the soft parts of the ear. When the bones of the ear are affected, which in general may be known by the matter having a very offensive smell, and being of a black or dark brown colour, all that art can do, is to keep the passage clear by the use of injections. The cure in these cases must be left to the operation of nature.

§ 3. *Of Angina.*

EVERY inflammatory affection of the throat is termed Angina, or Squinzy.

As abscesses in these parts prove always troublesome, and in some cases dangerous, we should endeavour to cure
every

every inflammation with which they are attacked by resolution.

With this view, one or more general blood-lettings should be prescribed, according to the strength of the patient. Smart purgatives prove particularly useful; and some advantage is often derived from diaphoretics.

None of these remedies, however, can be depended on with such certainty as the local discharge of blood from the part affected, and the application of a blister to that part of the neck which lies most contiguous to it. In Plate LIII. figs. 1. and 3. instruments are delineated for the purpose of drawing blood from the throat by means of scarifications; and when they are employed with freedom on the first appearance of inflammation, it will seldom terminate in suppuration. Fomenting the throat with steams of warm vinegar proves sometimes useful; and considerable advantage has been derived in different instances from astringent gargles, of infusions of oak-bark, of red-rose

rose leaves with a proportion of alum or of the vitriolic acid, and of Saccharum Saturni dissolved in water. A general prejudice prevails against the use of any of the saturnine applications in the form of gargles, from their being supposed to be of a poisonous nature. But although I have often used them, I never knew an instance of any harm occurring from them; and they have frequently proved highly serviceable. In small quantities I believe they might be swallowed with safety; but we all know that gargles may be employed without any part of the liquor being allowed to get over.

It will often happen, however, that these and all other remedies will fail, either from the application of them being too long delayed, or from the violence of the inflammation. When suppuration is evidently to take place, it ought to be promoted by the external application of warm poultices to the throat, and by the patient being made to inspire the warm
steams

steams of milk, or of any emollient decoction, by means of the machine delineated in Plate LIII. fig. 2. When matter is fully formed, it should be discharged by an opening made into it with one of the instruments mentioned above for scarifying the throat.

§ 4. *Inflammation and Abscess of the Liver.*

THE substance of the liver being soft and yielding, we would not *a priori* imagine that it would be liable to inflame. We find, however, that in warm climates, particularly in the East Indies, this viscus becomes more frequently inflamed than perhaps any other part of the body; probably from the bile in these climates being apt to become so acrid as to excite irritation in the parts to which it is applied. In some cases too, inflammation occurs in the liver from external violence.

Inflammation of this part is attended with

with a dull uneasy sensation over all the region of the liver, with cholic pains and sickness at stomach; the patient is liable to frequent cold and hot fits: and for the most part, the colour of his skin, as well as his urine, is tinged yellow.

When suppuration takes place, and especially when the abscess is large, the patient complains of pain extending up the right side to the top of the shoulder. In some cases this symptom occurs even in the inflammatory state of the disorder; but it happens more frequently after the formation of matter, probably from the weight of the abscess acting upon the diaphragm and pleura, with which the liver is connected. The region of the liver becomes daily more tense; and if the convex part of it be chiefly affected, a softness, and even a fluctuation of matter, is often discovered through the teguments of the abdomen.

In the commencement of this affection, the same remedies which are useful in other cases of local inflammation
prove

prove most successful. Blood-letting should be immediately prescribed; the quantity to be determined by the strength of the patient: but instead of taking it from a vein, it should be drawn off by cupping and scarifying the part affected. When the scarifications are made of a sufficient depth, almost any quantity of blood may be got in this manner; and no remedy with which we are acquainted proves so effectual in removing the inflammation. Blistering the pained part is also frequently of service; the bowels should be kept moderately open with mild laxatives; and a gentle perspiration should be encouraged over the whole surface of the body.

In general, this treatment will prove successful when it has been employed early in the disease; but when the symptoms do not soon yield, mercurials should be advised without any farther delay: for in the removal of inflammatory affections of the liver, nothing has hitherto proved so effectual as mercury in one
form

form or another. The common mercurial pill of the Edinburgh Dispensatory answers as well as any other; and it seems to act with more certainty when conjoined with small doses of opium. Frictions with mercurial ointment upon the part affected, are sometimes employed with advantage: But whatever form of the medicine be used, it should be quickly carried so far as to affect the mouth, which should be kept moderately sore for several weeks, unless the disease subsides immediately; in which case a shorter course will answer the purpose.

As it is of much importance in every case of this kind to give a free discharge to the bile, if the patient does not otherwise get regular and easy passage of his bowels, he should, during the mercurial course, have a gentle saline purgative every third or fourth day, by which the discussion of the inflammation is often much promoted.

Suppuration, however, will often take place, notwithstanding all that can be
done

done to prevent it; and when it is known, or even suspected to have happened, an incision should be made into the abscess to discharge the matter. When the abscess is seated on the convex or prominent part of the liver, and when the quantity of matter contained in it is considerable, we will readily discover it by the touch; and in this case there is no room to hesitate. But even where we have not this circumstance for our direction, a little attention will often enable us to discover almost with certainty whether suppuration has occurred or not. If along with the pain in the right shoulder and neck, which we have mentioned, it is observed that the region of the liver is more bulky than it was before, and that the teguments which cover it are become soft and œdematous; and especially if the patient complains of frequent shivering fits, a symptom which very constantly accompanies internal suppuration; we may conclude with much certainty that matter is formed.

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In every situation, matter should be discharged, perhaps as soon as it is known that complete maturation has taken place. But abscesses seated in any of the larger cavities, especially where they lie so deep as the liver or any other of the viscera, should be opened even before there is reason to suppose that all the effused fluids are so completely converted into pus as we might otherwise wish to be the case: Indeed this should be considered as an established maxim in practice; for the chance of these collections bursting inwardly is much greater than of their bursting outwardly, where the teguments which cover them are thick and strong, when compared with the peritonæum, the only membrane which lies between them and the intestines. Abscesses of the liver have been known to burst thro' the diaphragm, so as to be emptied into the thorax: in a few cases the matter has been carried into the duodenum by the common passage of the bile; and sometimes, by the great arch of the colon adhering
to

to the liver, a communication has been formed between them; by which the matter of abscesses in this situation has been very completely evacuated: but for the most part, when it is not discharged by an external opening, the abscess bursts into the cavity of the abdomen.

With a view to prevent such a fatal occurrence, the assistance of surgery should be immediately called in as soon as the appearances and symptoms we have mentioned give cause to suspect that matter is collected: An incision of a sufficient length should be made with a scalpel through the external teguments in the most depending part of the tumor; and on reaching the abscess, it may either be opened with the point of the scalpel or with a lancet; but piercing it with a trocar is preferable, as in this manner we have it in our power to evacuate the matter slowly and gradually, which in large collections is a point of importance, and therefore requires attention. Even this opening into the abscess, however, should

be afterwards enlarged, otherwise there would be some risk of its closing before the cyst containing the matter collapses sufficiently for the prevention of farther collections. This being done, a pledgit of soft lint covered with any emollient ointment, or merely dipped in oil, should be gently insinuated to a sufficient depth between the lips of the wound, to prevent them from uniting till the abscess collapses and fills up from the bottom: a process that will be much hastened by a proper application of pressure upon the tumefied parts, by means of a flannel roller passed two or three times round the body.

When the vacuity produced by the discharge of matter does not soon fill up, it will be proper to introduce a canula to preserve a free passage for any matter that may afterwards form. But this precaution is seldom necessary; for abscesses in the liver heal sooner, and with fewer inconveniences, than similar affections in perhaps any other part of the body. Indeed

deed this is so well ascertained, that I would advise an opening to be made into the abscess in every instance where there is the least cause to suspect that matter has formed in the liver. Many practitioners indeed assert, that no attempt of this kind is admissible unless the abscess be seated in the convex part of the liver. It must be allowed, that abscesses in this situation are much more accessible than such as are seated in the concave part of it. But wherever they are situated, a proper vent should be procured for the matter; for if it be not evacuated by an external opening, we may conclude almost with certainty, that it will be emptied into the abdomen, by which the patient will inevitably die.

In all affections of the liver that occur in warm climates, the bark is commonly employed on the first appearance of any of the symptoms: The putrescent tendency of the bile is the ostensible reason of this. But I believe it will be found that no dependence should be placed

upon the bark during the first or inflammatory stage of this disease. In this period of the disorder it may even do mischief; but when suppuration has taken place, and when the matter is discharged from the abscess, bark will prove equally useful, as it is found to do in similar affections of other parts of the body.

When, by too long delay, it unfortunately happens that an abscess either bursts into the cavity of the chest or into the abdomen, the matter should be drawn off immediately; in the one case, by the operation of the empyema, described in Chapter XXII.; and in the other, by the common operation of the paracentesis, Chapter XXI.

§ 5. *Of Inflammation and Abscesses in the Breasts of Women.*

THE breasts of women are liable to be acted upon by every cause which excites inflammation in other parts of the body: But affections of this kind occur most fre-

frequently in nurses by the gorging or stoppage of the milk, which almost constantly takes place from sudden or imprudent exposure to cold: The breast becomes stiff, swelled, and painful; the milk runs off in small quantities, but not so as to afford any effectual relief; and the patient grows hot and restless, while much thirst prevails, along with a full quick pulse. Practitioners are divided with respect to the method of treating cases of this kind: By some it is said, that discussion of the tumor should always be attempted; while others assert, that when this does not succeed, it often does mischief, by inducing scirrhus affections, which cannot afterwards be dissolved, and which are apt to terminate in cancer.

So far as I can judge from my own observation, there is no room to hesitate. Our practice in inflamed breasts should be the same as in every case of inflammation, wherever it may be seated. In the first stages of the disorder, discussion of the tumor should be always attempted;

while it would be in vain, and highly improper, to advise it when the swelling has been of such duration as to have any tendency to suppurate. The risk of our inducing scirrhus by this practice, seems to be in a great measure imaginary: It rather appears, indeed, that cancer is more apt to occur from the improper management of those sores which ensue from collections of matter in the mamma, than from any means that can be used to prevent the matter forming. We are farther induced to follow the practice, from the great distress which always attends suppuration in the mamma: Indeed, the pain and misery of the patient is in such cases often so great, that no doubt can remain with unprejudiced practitioners of the propriety of endeavouring in every case to prevent it.

It is scarcely necessary to remark, that the same remedies prove useful here that succeed in the discussion of inflammation in other parts: But it is truly surprising, that there should be almost an universal

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prejudice in every inflamed breast against the most powerful of all discutients, blood-letting. Afraid of this evacuation tending to diminish the quantity of milk, we avoid it entirely. In this, however, I am convinced we are wrong. In every case of this kind I have been in the practice of bleeding freely. It has not appeared to diminish the flow of milk; while its effects in preventing suppuration are very great. The quantity of blood to be taken away, must always be determined by the violence of the inflammation, and by the strength of the patient: But, in general, the practice will be more effectual, when as much as the patient can easily bear to lose is taken at once, than when the same, or even a greater quantity, is taken at different times. Purgatives prove particularly useful; and a cooling diet is equally necessary here as in any other case of inflammation.

As nothing tends more to prevent the discussion of inflamed tumors than pain,

nothing should be omitted that can in any degree alleviate this symptom: And as no remedy with which we are acquainted, proves so effectual in removing it as opium, it should always be given in such doses as are found to be sufficient. With a view to remove the tension of the breast, it should be gently rubbed over with althea ointment, or even with oil: but the external applications which are most to be trusted are those of a cooling astringent nature; such as a solution of sal ammoniac in vinegar and water; spiritus Mindereri; and all the saturnine applications. Cloths dipped in any of these should be kept constantly applied to the breast; by which, and by attention to the rest of the treatment advised above, almost every tumor of this kind will be removed, unless the inflammation has been of long continuance before the remedies are employed; in which case, if the pain and tension are considerable, it will always be more advisable to endeavour to bring the tumor to suppurate,
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than to attempt any other method of cure. For this purpose, we rely with most certainty on a frequent renewal of warm fomentations and poultices; and when matter appears to be fully formed, it should be discharged by an opening made in the most depending part of the collection; At least an opening should always be advised, when it is found that the matter is pointing at an improper part where it would not find a free vent.

In the treatment of those cases of tumefied inflamed breasts, which occur in nursing, it is a doubt with many practitioners, whether the milk should be drawn off or not. Indeed many assert, that drawing it off, either by continuing the child or with glasses, does mischief; and therefore they advise it not to be attempted. I have never observed, however, that any inconvenience ensued from it; and as it always procures relief, I advise it in every instance. When the breast is much swelled, the nipple cannot
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be laid hold of by the child: In such cases the glasses represented in Plate LXV. may be used with advantage.

§ 6. *Of Inflammation of the Testes.*

INFLAMMATION of the testes may be induced in various ways: By the application of cold; by external violence; and by every other cause that tends to excite inflammation in other parts of the body. But the most frequent cause of it is a gonorrhœa virulenta. The common opinion respecting this was, that it occurred from the matter in gonorrhœa falling down, as it was termed, upon the testes: And this appeared the more probable from its being observed that the testes were apt to swell upon the discharge being stopped, at the same time that the affection of the testes was commonly relieved by a return of the running.

It is now known, however, that no
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communication subsists between the urethra and testes by which matter can be conveyed from the one to the other: And the most probable opinion is, that in the swelled testes occurring from gonorrhœa, the inflammation is communicated from the urethra, and spreads along the vasa deferentia to the testes.

A sudden stop being put to the discharge, whether by the use of irritating injections or by any other cause, is very commonly attended with an increased degree of inflammation; to abate which, nothing proves more effectual than a return of the running. In this way we account more clearly than in any other manner for the effect produced upon the testes by the state of the running.

Inflammation of the testés very rarely terminates in suppuration: but this should not prevent the most timely application of those remedies which we know to be the most powerful discutients. Blood-letting is perhaps the most effectual remedy; but it always proves most
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serviceable when the blood is taken directly from the part affected by means of leeches. After discharging a sufficient quantity, the swelling should be kept constantly moist with a solution of *Saccharum Saturni*; the scrotum and testes should be properly suspended; the bowels should be kept moderately open; a low diet should be prescribed; and the patient should be strictly confined to a horizontal posture. When there is the least reason to suspect that the constitution is tainted with *lues venerea*, nothing will prove serviceable if a mercurial course be neglected. And when it appears that the disease has been induced by the discharge having been too suddenly checked, we should endeavour to promote a return of it, by bathing the penis in warm water; by injecting warm oil into the urethra; or by the use of bougies.

By due attention to a course of this kind, almost every case of inflamed testicle will terminate favourably; that is,
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the tumor will be discussed. But when the contrary happens, either from the use of the remedies not being persisted in, or from the inflammation being particularly violent, and when suppuration is found to take place, the matter must be discharged by an opening made in the most depending part of the abscess; which in every respect should be treated like collections of pus in other parts of the body.

§ 7. *Of Venereal Buboes.*

SWELLINGS in the lymphatic glands from the absorption of the venereal virus are termed Venereal Buboes. They may appear in any gland seated between a venereal sore and the heart: but they are most frequent in the groin, in consequence of the absorption of venereal matter from sores in the penis. For the most part they are produced by matter absorbed from chancres, and in some cases

cases from the matter of a gonorrhœa : But instances likewise occur of buboes arising without any previous ulceration or discharge from the penis, where the matter appears to be absorbed without any perceptible erosion of the skin.

The most material point to be determined in the treatment of a bubo is, whether we should endeavour to discuss the swelling, or to bring it to suppuration? While it was imagined that buboes were produced by a deposition of venereal matter from the system, it was not surprising to find practitioners advising us in every instance to promote their suppuration: for on this supposition it was probable that nature meant to throw off the infection. But now when we know that buboes arise from matter passing into the system, that the quantity of venereal matter is increased instead of being diminished, by their being brought to suppurate; and that the sores which ensue from them are often extremely difficult to cure; scarcely any
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will doubt of the propriety of endeavouring to remove them by discussion.

With this view the patient should be put upon an antiphlogistic regimen. His bowels should be kept open by the use of purgatives; leeches should be applied to the hardened gland; and it should be kept constantly wet with a strong solution of *Saccharum Saturni*. Along with these, however, mercury should be given in quantities sufficient for eradicating the disease: And as we know from experience that mercury proves most effectual when it is made to pass through the diseased glands, it should always be applied in the form of unction to those parts in which the lymphatics of the affected glands are known to originate: a practice which will almost uniformly be found to prove more effectual than the direct application of the mercury to the glands themselves. Thus in the discussion of a bubo in the groin, friction with mercurial ointment upon the thigh and leg will prove more successful

cessful than rubbing it upon the gland itself. To many this has been long known; and it would appear that the practice could scarcely fail of occurring to any who have paid attention to the discoveries made by the moderns in the anatomy of the lymphatic system*.

When buboes are early noticed, the course we are now recommending will seldom fail in discussing them, if the mercurial frictions be properly applied and continued for a sufficient length of time. It often happens, however, that all our efforts fail, either from the disease being too far advanced before the mercury is applied, or from the tumor not being altogether venereal, but of a mixed nature; a circumstance which is not unfrequent. Thus it, frequently happens that buboes are combined with scrophula and scurvy, and in some cases
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* Farther information may be obtained on this point in a late elaborate publication on the venereal disease, by the very ingenious Mr John Hunter of London.

with erysipelas or with common phlegmon. In such cases we are not surprised at the failure of mercury: and accordingly we sometimes find, that instead of forwarding the discussion of the swelling, it tends evidently to bring it to suppuration. Cases of this kind prove often very perplexing both to the patient and practitioner; so that no point in practice requires more exact attention and discrimination: For by proceeding to throw in great quantities of mercury, as is usually done while buboes continue obstinate, we often do harm, not merely to the local affection, but to the system at large; at the same time that in every instance the safety of the patient requires such a quantity to be exhibited as is sufficient for eradicating the venereal virus. In all such cases, the best practice, I believe, is to desist from the use of mercury as soon as it appears that no advantage is derived from it. In the mean time, by a change of diet and other circumstances, such an

alteration may be effected in the constitution, that a second trial of mercury may prove successful: At least, in different instances this has succeeded with me, where I had much reason to think that persisting longer with mercury at first would have done much harm.

When it is found that a bubo cannot be discussed, and that it will probably suppurate, a frequent renewal of warm emollient poultices and fomentations are the remedies to be most depended upon.

The opening of buboes when suppuration has taken place next demands our attention. Some dissuade us from opening buboes at all, alledging that they heal sooner when allowed to burst of themselves: while a small puncture with a lancet, a longitudinal cut through the whole extent of the swelling, or the application of caustic, have all had their abettors.

When a bubo is altogether venereal, and not connected with any other disorder, any of these methods will succeed,
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provided a sufficient quantity of mercury be exhibited: But when a bubo terminates in a sore difficult of cure, we are too apt to blame the particular method in which it was opened; for in whatever manner it is done, we know that the cure will often prove tedious and perplexing.

The object of practitioners should be nearly the same here as in collections of matter in any other part. Such an opening should be made as affords a free vent to the matter; but there is seldom any necessity for making it larger. In very large buboes, indeed, the teguments are apt to be so loose and flabby, and the texture of the skin so much destroyed, that the cure would be rendered tedious were it allowed to remain. In such cases it is advisable to discharge the matter with caustic applied in such a manner as to destroy any part of the teguments that are superabundant. This, however, is seldom necessary; and for the most part it will be found that an

opening made from the center of the tumor, where the matter commonly points, down to the most depending part of it, will prove sufficient. Even a smaller opening than this would often answer; but it is better to make it of a sufficient size at once, than to be obliged to repeat a very painful operation perhaps once and again, as is often necessary when buboes of a large size are opened by small punctures. In small buboes, a mere puncture will sometimes prove sufficient; nay in these, the matter being allowed to burst, often answers extremely well: but when the collection is large, this should never be depended on.

When buboes come forward to full maturation without much injury being done to the skin, I have in different instances discharged the matter by the introduction of a small cord; and the practice has succeeded. This requires, however, the teguments to be firmer than they commonly are when a bubo is ready to be opened.

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We all know that it is of much importance to prevent the air from finding access to fores; and as we sometimes observe buboes ooze out the matter which they contain by a number of small openings over their surface, and as these commonly heal easily, I conclude that they do so from the openings being so small as to exclude the air entirely. In different cases, I have attempted to imitate nature, by making a number of very small punctures with the point of a lancet over the whole extent of the bubo; and for the most part with success. The matter comes slowly off; the sides of the abscess contract gradually; and when it is completely emptied, we commonly find the whole parts that have been affected sufficiently firm, without any fores or sinuses remaining.

While means are employed to promote the suppuration of a bubo, the patient should still continue the mercurial course, by which no time will be lost; and the fore, which is the consequence of the

opening, will afterwards heal more quickly than if the mercury had been interrupted. The fore, however, often proves tedious, even where we are convinced that a sufficient quantity of mercury has been given, and where there is every reason to suppose that the siphylitic virus is eradicated. The edges become hard and livid; the matter, thin, sharp, and fetid; and instead of healing, the ulceration gradually becomes more extensive; or if it heals in some parts, it breaks out in others, giving a honey-comb appearance to all the under part of the abdomen and upper part of the thigh.

The situation of patients with such fores is truly deplorable. The pain with which they are attended is often intense; the absorption of acrid matter induces hectic fever; they become hot and restless through the night; and almost a total want of appetite renders them soon very emaciated.

As I have happened to be concerned
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in a considerable number of such cases, I can speak with some confidence of the method of treatment. In the first place, we must conclude that the patient has taken a sufficient quantity of mercury, and that no sinuses are left in which matter in any quantity will be allowed to lodge. Cicuta in such circumstances has sometimes proved useful; and I have had different instances of the external application of it healing the sores, when no advantage was derived from any kind of ointment. In such cases it was applied in the form of poultices, by mixing the juice of the fresh herb with the common emollient cataplasin. I have sometimes observed too, that in the internal exhibition of cicuta, the recent expressed juice has proved more effectual than any other form of it. I have given the hyoscyamus and belladonna very complete trials in various instances; but no material advantage has ever ensued from them. I have not seen any evident effects either from sarsaparilla or

guaiac ; but mezereon has in different cases proved useful. In two instances of very extensive fores. of this kind, where the whole groin and contiguous parts were ulcerated, and where none of the remedies mentioned above, nor any of the usual dressings, had any effect, the patients were evidently cured by mezereon alone. A drachm and a half of the rhind of the root, with two drachms of liquorice-root, boiled in three English pints of water into a quart, makes a decoction of a sufficient strength. This quantity may be used daily.

But the most effectual course I have hitherto tried, is the application of caustic round all the edges and hardened parts of the fores, at the same time that opium in considerable quantities is given inwardly. For a considerable time I trusted entirely to dressings of the emollient kind, being afraid of irritating parts already extremely sensible. In some cases a saturnine ointment has proved successful ; and in others the common

mon calamine cerate has answered ; but for the most part, on those days in which caustic is not applied, I have found more advantage from the use of red precipitate than from any other remedy. In some cases it is necessary to sprinkle it over the surface of the sore in the form of a dry powder ; but in others it proves sufficient to add it to any of the common ointments. Instead of creating pain, it commonly removes it ; and it seldom fails to alter the discharge from a thin sharp sanies to a thick well digested pus.

At first the application of lunar caustic sometimes gives pain : but this soon subsides, and especially when opium is used at the same time. Indeed opium of itself proves often useful in sores of this kind. It has been highly extolled of late for the cure of every stage of the venereal disease. I have had no proof of its ever curing any symptom truly venereal ; but I have had several instances of sores remaining after the venereal

venereal disease, even when large quantities of mercury had been given in vain, being completely removed by it. It often appears that sores of this kind, as well as others proceeding from different causes, are kept up by that pain and irritation with which they are uniformly accompanied when the matter is thin and acrid. To me the utility of opium seems to depend entirely on its narcotic or anodyne powers. By removing this state of irritability, it destroys the disposition in the vessels of the sore to form that kind of matter which by its acrimony serves to perpetuate itself: and this being accomplished, if no other interruption takes place, nature alone will seldom fail to complete the cure. If this idea be well founded, there can be no necessity for giving opium in such large quantities as of late have been advised. On the supposition of opium being possessed of some specific powers in the cure of the venereal disease, it has been given in as large doses as the patient could possibly

possibly bear; and by beginning with small doses, and increasing them gradually, there have been some instances of its being taken to the extent of half a drachm or more two or three times a day. I have not heard, however, that any advantage has been derived from giving it in these large quantities, that did not accrue from a more moderate use of it: And in the course of my own experience, I have found it equally effectual when it merely lessened or removed pain, as when given in the largest doses; while the inconveniences which usually arise from these have in this manner been avoided.

§ 8. *Of Lumbar Abscesses.*

EVERY collection of matter seated on any part of the loins, may be denominated a Lumbar Abscess. But it is that variety of the disease we are now to consider, which originates about the superior

rior part of the os sacrum; and in which we find, by dissection, that the matter contained in a cyst, is lodged on the anterior surface of the internal iliac and psoas muscles.

These abscesses are always preceded by pain and tension over the loins; which often shoots up along the course of the spine, and down towards the thighs; and often with difficulty of standing erect.— In some cases, these symptoms are suspected to be nephritic; but for the most part the disease assumes the appearance of lumbago. When suppuration ensues, shivering fits are apt to occur: but the pain, which at first was acute, becoming dull and less perceptible, the patient is led to conclude that he is getting better, till the matter, after falling down in a gradual manner behind the peritonæum, is observed to point outwardly, either at the anus by the side of the rectum, or on the upper and fore part of the thigh, where the large blood-vessels pass out,
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beneath Paupart's ligament, from the abdomen.

When the matter takes the course of the gut, and appears near to the anus, it either soon bursts, or is laid open on the supposition of its being an abscess originating in the contiguous parts. But when it passes down with the fœmoral artery, which we find to be most frequently the case, as it lies deep, and is covered with the strong tendinous fascia of the thigh, instead of pointing at any particular part, it falls gradually lower, till in some cases it reaches near to the joint of the knee.

The tumor is seldom attended with more pain than might be expected to occur from the distention of the fascia and contiguous parts by the matter collected beneath. There is no discolouring of the skin; the teguments, for the most part, retaining their natural appearance to the last. A fluctuation of a fluid is evidently discovered through the whole extent of the tumor, particularly when

when the patient is erect; for at this time the swelling is always much more tense than when the body is lying in a horizontal posture, when a considerable part of the matter runs along the sac towards its origin in the loins.

We have already observed, that this variety of abscess, when the matter falls down towards the anus, may be mistaken for a common phlegmon originating in the neighbourhood of the rectum. But no farther inconvenience can occur from this mistake, than that the sore, which ensues from laying it open, or from the matter bursting out, will not so readily heal as when the disease is merely local: And it is probable that this is one cause of abscesses in these parts being in some instances so difficult to cure. But in the more ordinary form of the disease, where the matter falls down beneath Paupart's ligament, the tumor exhibits appearances so similar to those of a crural hernia, that the one has often been mistaken for the other. Of this I
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have seen different instances, even where practitioners of experience were deceived. This proceeds, however, from inattention; for the two diseases may be clearly distinguished from each other.

The history of the rise and progress of the swelling should be first attended to. A crural hernia usually appears suddenly, without any previous symptom, after some unusual exertion; and for the most part it is attended with obstruction to the passage of the fæces, with vomiting, and other symptoms of hernia: And from the first, the tumor is attended with pain on being handled. But in the lumbar abscess, before the matter appears at the top of the thigh, the patient is previously distressed with the symptoms of inflammation over all the under part of his back and loins. No obstruction of the bowels takes place, nor any symptom of hernia; and the patient admits of the tumor being freely handled. In the crural hernia, the swelling seldom arrives at any considerable bulk; and when it does become

come large, it is by slow degrees: no fluctuation is perceived in it; but, on the contrary, it feels either soft like dough, or knotty and unequal, according as the omentum or fæces contained in it have been long lodged in it or not. But in the lumbar abscess, the tumor commonly falls quickly down the thigh for the space of several inches; a fluctuation is always perceived; and no inequalities are observed in it. In the hernia, even when it is not strangulated, some degree of pressure is usually necessary, even when the patient is in an horizontal posture, to make the contents of the tumor recede. But in the lumbar abscess, the tumor becomes flaccid immediately on the patient lying down, whether any pressure be applied to it or not: And it often happens, when the matter has fallen any considerable way down the thigh, that the upper part of the cyst at the top of the thigh is found perfectly clear; that is, a certain space can be discovered between the upper part of the matter
and

and the inferior boarder of the abdominal muscles, which can never be done in any kind of hernia ; and which therefore, in this state of the disease, is always a certain means of distinction. It is scarcely necessary to observe, that in this examination the patient should be erect.

By due attention to these circumstances we may always distinguish one of these tumors from the other. Both indeed may occur at the same time in the same thigh, by which a mixture of appearances will be produced. This, however, must be extremely rare ; and when it does take place, as the matter of the abscess and the parts protruded from the abdomen will always be contained in several sacs, the combination will be easily discovered.

In the treatment of these affections, the period of the disorder first requires our attention. In the inflammatory state of the disease, the strictest antiphlogistic course should be adopted, in order if

possible to prevent the formation of matter. For the most part, we discover, that it has been induced by the small of the back or loins having received some considerable injury, either by a twist or a severe bruise: and if accidents of this nature were immediately treated with that attention which their importance merits, those disagreeable consequences which are apt to ensue from them might frequently be prevented. Whenever it is found that a patient, who has suffered in this manner, complains of severe pain in the injured part, blood-letting should be immediately advised; and as local blood-letting proves always in such cases most effectual, it should be done by cupping and scarifying the pained part. The affected parts being deeply covered, the lancets of the scarificator should be made to go to a considerable depth; for which purpose the spring of the instrument should be stronger than usual, by which means any quantity of blood we may judge proper may be taken with ease; and

and I am convinced, that by carrying this practice a sufficient length, we might very commonly, in the early stages of the disease, remove it entirely. It is difficult to say when injuries of these parts would terminate in suppuration or otherwise; but I have met with different instances, where, from the severity of the pain and other symptoms, there was much cause to suspect that matter would have formed, if it had not been prevented by a timely and plentiful discharge of blood from the injured parts; a remedy which commonly gives immediate relief to the pain, however violent it may be. But at the same time that we depend chiefly on local blood-letting, other remedies which experience shows to prove useful in inflammation should not be neglected: Of these, blisters, opiates, and gentle purgatives, are to be most relied on.

These, however, as well as every other remedy, will in some instances fail; and in others, practitioners are not called

till suppuration has taken place, and till the matter has actually begun to point, either in the neighbourhood of the anus or on the fore-part of the thigh. In this situation, what are we to do? Are we to allow the matter to remain, or to discharge it by making an opening into it? In my opinion there is no room for hesitation: The matter should be evacuated as soon as a fluctuation is distinctly perceived in the tumor.

I know, however, that practitioners are of different opinions upon this point: for it is alledged, that as these abscesses are so deeply seated, it would be in vain to attempt the cure of them; and therefore that no advantage can be derived from their being laid open; while much harm, they observe, may accrue from the air being freely admitted to them. But it does not appear that this reasoning is founded on observation. I have always held it as a leading principle in surgery, that the matter of every abscess seated near to any of the large cavities of the body should be discharged as soon as its existence is clearly

clearly ascertained : So that in the treatment of the lumbar abscess, I have uniformly given vent to the matter, without any bad consequences ensuing ; while much mischief may occur from this being omitted. We find by dissection after death, that these abscesses, when of long duration, affect not only the softer parts covering the vertebræ of the loins, but the substance of the vertebræ themselves ; which in some cases have been found carious, and even partially dissolved in the matter of the abscess. Now these accidents are surely more likely to happen when the matter is allowed to continue in the abscess, than when it is discharged : at the same time, by emptying the sac, the matter is prevented from bursting into the cavity of the abdomen : which in different instances has happened, to the great inconvenience and hazard of the patient. The matter, however, ought certainly to be discharged in such a way as to prevent the air as effectually as possible from getting access to the cavity

of the abscess. With this view a trocar may be used with advantage. By pressing the matter down to the most depending part of the abscess, the skin is made so tense, that a trocar is readily introduced. I tried this in one case with very complete success; and the patient wore a small canula in the opening for several months, by which the matter was freely discharged. But when the case is not perfectly obvious, and when the least doubt remains in the mind of the surgeon with respect to the contents of the tumor, instead of pushing a trocar into it, the opening should be made in a slow gradual manner with a scalpel, in the same manner as is practised in cases of hernia; so that in the event of any of the contents of the abdomen being down, no injury may be done to them.

After the matter has continued to flow for some time, and if at the end of two or three weeks the quantity does not become considerably less, it may prove useful to throw up with a syringe a weak solution

lution of *faccharum saturni*, lime-water, or some other gentle astringent; by which the discharge will be gradually diminished, till at last it ceases entirely. But although this should never happen, and although the patient, during life, should submit to the inconveniency of a constant *stillicidium* of matter from the fore; yet even this would be preferable to the risk, allowing every abscess of this kind to remain unopened.

As I have happened to meet with many instances of this disease; as practitioners are divided in opinion respecting it; and as no distinct account of it is given by authors; I have considered it more particularly than I otherwise might have done.

§ 9. *Of the Paronychia or Whitlow.*

THE paronychia is a painful inflammatory swelling, occupying the extremities of the fingers under the nails.

Several varieties of this disease are described by authors; but there are three only which require to be distinguished, and even these are all of the same nature, the one being only more deeply seated than the others.

In the first, the patient complains of an uneasy burning sensation for several days over the point of the finger; the part becomes tender and painful to the touch; a slight degree of swelling takes place, but with little or no discoloration; and if the inflammation be not removed by resolution, an effusion is at last produced between the skin and the parts beneath. On discharging this by an incision, it is found to be a thin, clear, acrid serum; and the removal of it, in general, gives immediate and complete relief.

In the second variety of the disease the same set of symptoms are produced; only the pain is more severe, and it is attended with some uneasiness over the whole finger and hand. The effusion which takes place is not so perceptible

as in the other ; and on laying it open, it is found to lie beneath the muscles of the finger, between these parts and the periosteum.

And in the third, the pain is still more intense in the point of the finger, at the same time that the whole hand and arm becomes stiff, swelled, and painful. The lymphatics leading from the finger, and even the glands in the arm-pit, swell and inflame ; and on making an incision into the effusion, it is found to lie between the periosteum and bone, the whole phalanx being in general carious.

Swellings of this kind may be produced by various causes. They frequently occur from external violence, particularly from punctures and contusion : But they happen more frequently from causes, the nature of which we are not acquainted with.

There are two sets of remedies employed in paronychia : The one consists of fomentations, poultices, and other emol-

emollients ; the other of ardent spirits, vinegar, and other astringents.

As we find from experience that no advantage is ever produced by the effusion which occurs in this disease ; but on the contrary, that it is always productive of much additional pain, all those applications should be avoided which have any tendency to promote it. Some practitioners have been induced to make use of warm poultices, with a view to promote the suppuration of the swelling, after they have had reason to believe that effusion has taken place. But I have never observed any advantage to accrue from them ; and as the serum which we meet with in these collections is produced entirely from membranous parts, I do not suppose that it can be converted into pus ; at least none of the remedies I have known employed have ever been able to effect it. I endeavour therefore in every instance to prevent this effusion from taking place ; by local blood-letting, and by the
use

use of astringents. Indeed the same remedies prove most effectual here which are useful in the removal of inflammation in other parts. I have had different instances even of very violent degrees of pain being almost immediately removed by the application of several leeches over the diseased phalanx of the finger. But in the more violent degrees of it, where the arm swells, and by which fever is sometimes produced, general blood-letting is likewise necessary, at the same time that large doses of opiates are indicated.

After as much blood is discharged by the leeches as is judged proper, the immersion of the pained parts in strong brandy, or even in spirit of wine or alcohol, is one of the best remedies: And when the bites are somewhat healed, or when leeches have not been employed, spirit of turpentine or strong vinegar may be used in the same manner.

It is proper to remark, however, that it is in the first stages only of this affection

tion that remedies of this kind can prove useful: for when effusion has actually taken place, the state of the disease is produced which they were meant to prevent; and it does not appear that they have any effect in removing it. As soon as we are convinced that effusion has occurred, an opening should be made without delay: For we have already observed, that it is in vain to attempt to convert the effused fluid into pus; and being in itself acrid, it is apt to injure the contiguous parts, while at the same time the patient is kept in an extreme degree of pain as long as it remains confined. When the collection is superficial, and merely covered with skin, this is a very simple operation. A puncture with a lancet commonly proves sufficient: But when the matter is more deeply seated, it requires some attention to avoid the flexor and extensor tendons of the finger.

When the matter lies above the periosteum, all that we have to do is to make the opening sufficiently large for dif-

discharging it, and to dress the sore as if it was produced by any other cause. But, when the matter lies between the periosteum and the bone, in every case that I have met with, the bone has not only been laid bare, but it has been found to be carious. The common practice is to endeavour to keep the incision open till an exfoliation of the diseased parts of the bone takes place; but I have never observed any advantage accrue from this. The process is not only extremely painful, but tedious. The matter is apt to lodge beneath the nail; painful fungous excrescences sprout out over the sore, which it is difficult even with the strongest caustic to keep under; and at last it has very commonly happened, after the patient has suffered several months of distress, that instead of a partial exfoliation, the whole diseased phalanx has come away. I am therefore convinced, that much time and trouble would be saved both to the patient and surgeon, if the diseased bone
were

were immediately removed on making the opening to discharge the matter. By making a free incision along the whole length of the diseased phalanx, the bone is easily removed with common forceps. The pain attending it is indeed severe, but it is only momentary: and the measure, which does not deprive the patient of the use of the joint so much as might be imagined, is seldom opposed when the surgeon advises it. I have had several instances of people who had in this manner lost the last phalanx of bone in one of their fingers, having such a degree of firmness in the parts which remained, as to experience very little inconvenience from the want of it.

When the diseased bone is removed, the remaining sore commonly heals with ease. It requires some attention, however, to preserve the lips of it from adhering till it fills up from the bottom. This is done in the easiest manner by insinuating a small pledgit between them
of

of soft lint, spread with any mild emollient ointment.

In every variety of the disease, excepting in a few cases of the mildest kind of it, we find that the nail is apt to fall off: But this proves only a temporary inconvenience; for when the parts are properly protected, nature never fails to supply the deficiency.

In the commencement of paronychia, it is the last phalanx of the finger only that is affected: And to whatever extent the pain and swelling of the softer parts may spread, we never find that the bone of the contiguous phalanx suffers, unless from improper management in allowing the diseased bone to remain, or the acrid matter to lodge too long. In such cases, the surrounding teguments are apt to swell and inflame, and small ulcerations to occur over the whole extent of the carious bone. In this situation we are often under the necessity of advising the finger to be amputated, in order to prevent

vent the disease from spreading to the hand.

§ 10. *Of Chilblains.*

THESE are painful inflammatory swellings, to which the fingers, toes, heels, and other extreme parts of the body, are liable, on being much exposed to severe degrees of cold. The tumor is for the most part of a deep purple, or somewhat of a leaden colour: the pain with which it is attended is not constant, but shooting and pungent; and in general, it is accompanied with an insupportable degree of itching. In some cases the skin remains entire, even although the tumefaction be considerable; but in others it bursts or cracks, and discharges a thin somewhat fetid matter. And where the degree of cold has either been very great, or the application of it long continued, all the parts that have been affected are apt to mortify and to slough off, when a
very

very foul ill-conditioned ulcer is always left.

We have observed above, that it is the extreme parts of the body chiefly that are liable to be attacked with chilblains: and we likewise find that delicate children and old people are more apt to suffer by them than those who are robust. It is also remarked, that they are particularly severe in people of a scrophulous habit.

The best preventative of chilblains is to avoid exposure to cold and dampness: And when once a person has suffered from swellings of this kind, if the injured parts be not protected by sufficient coverings, he will be liable to a return of them every winter. Much distress, therefore, and inconvenience, may be prevented by due attention to this circumstance.

The utmost care, however, will not always prevent chilblains. In this case, it is often in our power to mitigate the complaint, by bringing the affected parts

gradually to their natural heat, instead of warming them more quickly. The patient should not be allowed to approach a fire: instead of which, he should be put into a cold apartment; and the frost-bit parts should first be well rubbed with snow, and afterwards immersed in the coldest water that can be procured: for nothing so certainly proves hurtful to parts in this state as heat being suddenly applied to them. Even snow and cold water afford a warm sensation to parts attacked with chilblains; but it is found by experience that no detriment ensues from this. After the parts have been treated in this manner, the patient may in a gradual way be brought into a greater degree of heat; but he should for a considerable time keep at a distance from fire. Rubbing the parts with salt will in this situation prove useful; and immersion in warm wine is likewise employed with advantage.

A patient much benumbed with cold should not even have cordials given to him

him suddenly. A glass of cold wine may at first be allowed. Afterwards warm wine may be given, either by itself or mixed with some of the warmer spices: and when stronger cordials are required, ardent spirits may be employed.

Remedies of this kind, however, are only necessary in the more severe degrees of these affections. In common cases of chilblains that occur in this country, as soon as the part is perceived to be affected, it should be well rubbed either with spirit of turpentine, or with camphorated spirit of wine; and pieces of soft linen moistened in one or other of these should be kept constantly applied to it. In this manner we have it often in our power to remove swellings which otherwise would be productive of much distress: But we must again observe, that the best advice that can be given to such patients as are liable to them, is to protect the parts that are most exposed to suffer from cold as much

as possible during the winter; and when they accidentally get wet with snow, which proves more particularly hurtful than any other kind of moisture, they should be as quickly cleared of it as possible.

As there are some patients who suffer severely with chilblains every winter, either in their fingers, arms, toes, heels, or lips, our being able to prevent them without that inconvenience which always occurs from confinement and much caution, would often be an object of importance; and it is a point upon which practitioners are frequently consulted. I have had different instances where sea-bathing during the summer season has appeared to prove useful: and in one patient who had suffered severely from the effects of cold for several winters, I advised a chamber-bath to be used even during the winter; by which the parts which used to suffer were so much strengthened, that several years have elapsed without any return of the disease.

When

When chilblains ulcerate, by the teguments being altogether thrown off, or merely cracking and oozing out matter, warm poultices and emollient ointments are commonly employed. For the purpose of cleansing the sores, and inducing a discharge of right matter, poultices may with propriety be advised for a few days; but they should never be long continued: Nor should emollient ointments be much persisted in; for they very universally induce fungous excrescences over the sores, which afterwards it is sometimes difficult to remove. The daily application of caustic to the edges of the sore, and dressing the sore itself with common digestive ointment, mixed with a large proportion of red precipitate, are the best preventatives of this. The common simple diachylon plaster, spread upon thin leather, makes an useful application for sores of this kind.

§ 11. *Of Sprains and Contusions.*

CONTUSIONS of the softer parts of the body, and sprains of the tendons and ligaments of joints, are usually productive of immediate painful inflammatory swellings.

The slighter affections of this kind seldom meet with much attention; but when the injury is severe, it often requires the utmost skill of the practitioner, as well as the greatest caution on the part of the patient, to remove those effects which ensue from it, and which otherwise might continue during life.

An increased action in the arteries of any part, by which red globules are forced into vessels which naturally do not admit them, will account for all the phenomena which usually attend inflammation: But in the severer degrees of sprains and contusions, along with an increased action of the arteries in the
part,

part, which must necessarily result from the pain with which they are accompanied, it is evident that instantaneous effusion likewise takes place, from the rupture of many of the smaller vessels of the part. In no other way can we account for those very considerable tumors which often rise immediately after injuries of this nature. For the most part the effusion must be of the serous kind, as the skin usually retains its natural colour for some time after the accident: But the tumefied parts are sometimes of a deep red, and on other occasions of a leaden colour, from the first; owing to a rupture of some of the vessels containing red blood.

In the treatment of sprains and contusions, there are two circumstances which chiefly require attention. In the first place we should endeavour to prevent the swelling, as far as it can possibly be done, and afterwards those remedies should be employed which we know to prove most

powerful in preventing or removing inflammation.

It is alledged, indeed, by some practitioners, that the swelling which occurs from this injury never does harm, and therefore requires no particular attention. In contusions of the cellular substance, or even of the muscles, I allow that this is often the case; for to whatever extent the tumefaction may proceed, the effused fluid is in these parts very commonly absorbed. But even here the swelling in some cases proves extremely obstinate: and in sprains of the tendons and ligaments, a very troublesome, painful thickness of the parts that have been injured, is apt to continue for a great length of time; in some cases, even for life: And I have commonly observed, that this has in general been nearly in proportion to the size of the tumor which occurred at first; for it would appear that effusions thrown out by ligamentous parts are not so readily absorbed as those which occur in other parts of the body.

Hence

Hence in every accident of this kind, it is an object of importance to prevent the swelling from arriving at any considerable magnitude.

With this view, astringent applications are most to be depended on; such as the lees of red wine, ardent spirits of every kind, and vinegar. By immersing a sprained or contused part in any of these immediately on receiving the injury, if the effusion be not altogether prevented, it will at least be rendered much less than otherwise it probably would be. And it often happens that the immediate application of cold proves equally useful. Plunging a sprained limb into the coldest water that can be procured, or even into water rendered artificially colder than natural, is a practice that often proves useful; and it should be always advised in the first place, till one or other of the articles mentioned above can be procured; for as the effusion takes place, as we have already observed, very quickly,

no time should be lost in the application of the remedies.

It fortunately happens, that those applications which prove most effectual in preventing the effusion that ensues from sprains, prove likewise useful in preventing inflammation. But as this symptom is in severe sprains apt to proceed to a great height, other remedies are required in the treatment of it; and none that I have ever employed prove so effectual as local blood-letting. By the time that the cold water and other discutients we have mentioned may be supposed to have produced any effect, which will be in the space of an hour, a number of leeches should be applied over all the tumefied part; or, in contusions of fleshy muscular parts, cupping and scari-fying will be found to answer equally well. But in whatever way it be done, a quantity of blood should be drawn off somewhat proportioned to the strength of the patient and violence of the injury.

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For a considerable time I have been in the constant practice of employing local blood-letting in sprains and contusions of every kind; and in all of them, whether the injury has been slight or severe, it has proved an useful pleasant remedy. In the slighter kind of sprains, one plentiful evacuation of blood by means of leeches, will in general prove sufficient. But when the parts are much injured, we are under the necessity of applying them repeatedly. They should be ordered indeed from time to time as long as any considerable pain remains in the affected parts. Even when the inflammation and swelling of the teguments are entirely gone, a fulness or thickening is often discovered in the tendons and other deep seated parts; and we conclude, that they continue inflamed, as long as they are much pained either upon pressure or upon motion. In this situation nothing ever proves so effectual as the application of leeches: The remedy indeed seems to prove equally useful, whether the inflammation

mation be seated entirely in the skin, or in the more deep seated parts ; so that it should not in any case be omitted.

In violent sprains the pain is often so severe, as to induce quickness of pulse and other symptoms of fever. In such cases, along with local blood-letting, it is sometimes necessary to take blood from some of the larger vessels. Opiates become necessary, together with all the remedies that prove useful in fevers arising from inflammation.

After blood has been freely evacuated from a sprained part, the best application that can be used for some days, at first, is a solution of *saccharum saturni* ; and afterwards, when a thickening of the tendons continues, as sometimes happens notwithstanding the utmost attention, pouring warm water upon the part two or three times daily, for the space of a quarter of an hour or so each time, proves often an useful remedy. Even common spring water frequently answers the purpose ; but it seems to prove more pene-

penetrating when slightly impregnated with sea salt: and we have likewise reason to think that the warm waters of Bath and Buxton are rendered more effectual in cases of this kind by the impregnations which they contain, than they otherwise would be.

Along with warm bathing, frictions with emollient applications prove often serviceable in removing this thickening of the parts induced by sprains. But in order to prove useful, they should be persisted in for a considerable time.

During the cure of a contusion or of a sprain, the injured part should be kept as much as possible in an easy posture. In every instance this should be attended to: but it becomes more particularly proper when the pain is more severe than usual; an occurrence which we often suppose to happen from the fibres of some of the sprained tendons being ruptured, and which nothing will cure so readily as the limb in which it has happened being kept for

a considerable time in a relaxed easy posture.

We have already mentioned the warm bath as a remedy in sprains. In various cases cold bathing also proves serviceable. After sprains have been of some duration, the injured part is apt to continue weak and relaxed, even when the pain and swelling are mostly gone. In this situation, cold water being poured upon the part from a height, or being suddenly dashed upon it, and repeated once or twice daily, will prove more effectual in strengthening the weakened limb than perhaps any other remedy. It is for the removal of debility only, however, that it should be employed; and there is much reason to think that it has done mischief when used in the more early stages of sprains. While that thickening of the tendons and ligaments remains, which we have mentioned above, and which often proves the most formidable, as well as the most obstinate symptom which accompanies sprains,
cold

cold bathing seems to do harm, by rendering it more firm than it was before, while the contrary effect often results from a proper application of warm water.

A bandage or roller applied over the injured parts, as tight as the patient can easily bear it, proves often useful in sprains. By supporting the relaxed parts, it not only prevents pain, but the œdematous swellings also, to which sprained limbs are often liable. The roller should be of flannel, which yields more readily than linen to any variety in the size of the limb, and is the most effectual preventative of the rheumatic affections with which limbs that have suffered much from sprains are liable to be attacked. The roller must be carried spirally upwards from the inferior part of the limb, with an equal pressure on every part of it, in order to prevent œdema, which might otherwise take place.

SECTION

SECTION III.

Of Chronic or Indolent Tumors.

THE general character of this class of tumors is, that they are slow in their progress, and not necessarily attended with inflammation. Tumors of every kind may eventually, indeed, induce inflammation: Thus swellings, which have long remained indolent, by an increase of bulk will often distend the skin so much as to become inflamed; and all the varieties of hernia, although not necessarily accompanied with this symptom, for they frequently take place without it, yet they often tend to induce it, for reasons too obvious to require being mentioned. But in these, we consider inflammation as an accidental occurrence only, and in no way connected with

with their rise or formation. Of the chronic tumors we shall first consider the encysted.

§ 1. *Of Encysted Tumors.*

EVERY tumor might be considered as encysted, the contents of which are surrounded with a bag or cyst, as is the case with all the variety of herniæ and of hydrocele, as well as with some other tumors; but in common practice those tumors only are termed Encysted that are contained in cysts of a preternatural formation. In common language, these, as well as various tumors of the sarcomatous kind, are termed Wens.

The different parts of which an animal body is composed, are connected together by a common medium termed the Cellular Substance; which is so universally diffused, that it seems to form a very considerable part of every fibre. In a state of health the cells of this substance communicate with each other; and, like the large cavities of the body, they are

kept soft and moist by a secretion that is constantly passing into them by the exhalents, and returning from them by the absorbents. In some parts of the body this secretion would appear to be entirely of a ferous nature; while in others, it consists evidently of oil or fat.

While the absorption of this fluid is in proportion to the quantity exhaled, no accumulation will take place: but various causes may concur to destroy the equilibrium; and in whatever way this may be done, if more be secreted than is carried off by the absorbents, a fulness or swelling must necessarily ensue. Where this superabundance is of the ferous kind, a dropical swelling will be produced; when of an oily nature, obesity or fatness will take place.

A general disposition in the system to this kind of accumulation is a frequent occurrence; but causes sometimes occur by which collections are produced in particular parts. In a sound state of the

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cellular substance, that natural communication we have mentioned as subsisting between the different cells of it, must necessarily prevent any partial or circumscribed collection. And accordingly we know, that all serous effusions very readily pass from one part of it to another. But this communication may be interrupted by different causes, and accumulation of the natural fluid may take place in a particular part.

We thus account for the formation of encysted tumors; to which different names have been applied, according to the consistence or supposed nature of their contents. When of the consistence of honey, the tumor is termed *Meliceris*: when of a soft cheesy consistence, or resembling dough, it is termed an *Atheroma*; and *Steatoma*, when it is formed of fat.

But it is proper to remark, that there are various degrees of consistence to be observed in each of these. Thus the *steatoma* is sometimes soft like butter,

and at other times firm like suet : and the same kind of variety occurs in the contents of the atheroma and meliceris, which in some cases are equal in firmness to new cheese, and in others are not firmer than the thinnest honey.

The matter forming the steatomatous tumors, we conclude to be from the first of an oily or fatty nature ; and that their different degrees of consistence will depend upon the remora of their contents, and upon the quantity of the thinner parts of them that have been absorbed. And we think it probable, that the atheromatous and melicerous tumors are originally formed by a deposition of serum, with perhaps a considerable proportion of coagulable lymph ; and that the degrees of consistence of which we find them, will depend upon various causes : Upon the particular quantity of coagulable lymph contained in them ; upon their being of longer or shorter continuance ; and particularly, upon their having been inflamed or not ; and

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to the extent to which the inflammation may have proceeded.

For the most part, a practitioner accustomed to this branch of business will be able to distinguish pretty exactly the nature of these tumors before laying them open. Thus, in general, the steatoma is of a firm consistence: it is commonly loose, and rolls more readily than the others under the skin; and its surface is apt to be unequal: The atheroma is soft and compressible, but no fluctuation is observed in it: While, in the meliceris, the fluctuation of a fluid or thin matter is in general very distinctly perceived. It is proper, however, to remark, that neither these, nor any other means of distinction, will at all times prove sufficient: for in some cases the steatoma, instead of being firmer than the others, is considerably softer; insomuch that I have met with different instances of the fat of which they are formed, fluctuating or moving between the fingers like thin purulent matter; and

where accordingly the opinion that was previously formed of it was commonly erroneous. The atheroma and meliceris are sometimes combined in the same tumor: One part of it will be evidently of a soft pultaceous nature, and contained in a separate cyst or cell from the rest, which is probably of nearly the same degree of consistence with purulent matter. In a few cases too, the steatoma is conjoined with these; but this is not a frequent occurrence.

In judging of the nature of these tumors, some advantage may be derived from attending to their situation. Thus we observe, that in some parts of the body, fat is much more apt to be secreted and deposited in the cellular substance than in others. In some parts, indeed, fat is scarcely ever found in it; as is the case over a great part of the head; while in others, particularly over the prominent part of the abdomen, we commonly meet with it even in the leanest subjects. Now I believe

lieve it will be observed, that the steatomatous tumors are seldom, if ever, met with in those parts of the body which are not usually in a state of health supplied with fat: at least this has been so uniformly the case in the course of my practice, that I have never met with an instance of it; and it tends much to confirm the idea which I have endeavoured to establish of the formation of these tumors. The head, as I have observed, is very sparingly supplied with fat, at the same time that we find it more liable than any part of the body to encysted tumors; but they are very universally of the atheromatous or melicerous kinds *. Nor have I ever met with the steatomatous tumor but where fat is usually deposited in the contiguous cel-

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lular

* By Atheromatous and Melicerous, I mean to express different degrees of consistence of a curdy pultaceous matter. By some, the firmer kinds of this have been mistaken for and described as the contents of the steatomatous tumor; but they will be found to be in every respect different from the fatty substance contained in the real steatoma.

lular substance. They are rarely indeed observed on that part of the body which, we have just observed, is plentifully supplied with fat. We seldom meet either with these or any other variety of encysted tumor on the abdomen; and at first view this may be considered as an objection to our theory: On farther attention, however, it will rather appear to support it. The parietes of the abdomen being formed of soft yielding parts, with no bone or hard body beneath, we may readily suppose that they will be little, if at all, affected by any ordinary pressure: so that this cause of obstruction will not here have the same effect as it evidently has on the head and other parts where the cellular substance lies immediately contiguous to bone.

All the tumors of the encysted kind are small at first, and increase by very slow degrees. They are of very different shapes and sizes: In some they resemble a walnut; on the head they are commonly round and smooth, and do
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not often arrive at any great bulk; but in other parts of the body they are often of very irregular forms, at the same time that they are more apt to acquire more considerable degrees of bulk. I have met with steatomatous tumors weighing upwards of twenty pounds; and they are sometimes double this weight. They are never at first attended with pain; and the skin for a considerable time retains its natural colour. But when they become large, the veins of the skin, as well as those of the face, become large and varicose; and the prominent part of the tumor acquires a clear shining red colour, similar to that which accompanies inflammation: but it seems to be different from this, as it is seldom attended with pain, excepting it be injured by external violence. In this situation, indeed, a blow or a bruise will readily excite inflammation, by which the skin will become tender and painful, and by which it will soon be made to crack or burst, if it be not prevented by the
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contents of the tumor being discharged by an operation.

This is the ordinary progress of these tumors: But it is proper to remark, that although they never advance quickly, yet in some situations they terminate much sooner than in others, and without arriving at the same degrees of magnitude. Thus, in the head they do not usually become bigger than a large egg. In a few cases, indeed, they are larger; but for the most part they terminate before they acquire this size, by the teguments becoming tense and thin, and even bursting if they be not prevented in the manner we have mentioned. But on other parts of the body, particularly on the back, on the shoulders, and thighs, the teguments will sometimes retain their natural appearance long after a tumor has acquired a very great bulk.— This seems to proceed from a greater or lesser degree of laxity in the skin. In the head, the teguments are firmer, and do not yield so readily to distention as in
other

other parts of the body ; by which any tumors lying beneath them must necessarily be more quickly brought to a period.

This circumstance of situation has likewise a considerable effect on the firmness with which tumors are attached to the contiguous parts. In some situations they are so loose and moveable, especially while they continue small, that they readily yield even to slight degrees of pressure : but in others, particularly when they are covered with any fibres of muscles, they are sometimes very firmly fixed from their commencement. The attachment of tumors is also much influenced by their remaining free of inflammation, or their being to a greater or lesser degree attacked with it ; for they never become inflamed, even in the slightest manner, without some degree of adhesion being produced between the cysts and corresponding teguments.

In the treatment of encysted tumors, we are directed by authors to attempt
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the cure in the first place by resolution; and if this fails, by extirpation. With a view to accomplish a cure by resolution, frictions with mercurial ointments are recommended, together with gum-plasters, and a variety of other applications. No practitioner, however, of the present age, will depend upon this management; nor will he expect to be able to remove these tumors in any other way than by the assistance of surgery.

We shall therefore suppose that the removal of one of them by an operation is agreed upon: The next point to be determined is the mode of effecting it; and this in a great measure should depend upon the contents of the sac. If they appear to be of the thin melicerous kind, which for the most part will be the case if a distinct fluctuation be discovered through the whole body of the tumor, it ought to be treated like a common abscess. In the smaller collections, the matter may be discharged by laying the teguments and cyst open in the most de-

dèpending part of the tumor with a common lancet, and treating it in the ordinary way till it fills up or adheres from the bottom : But in large swellings of this kind, as a free admission being given to the air proves always hurtful, the opening ought to be made in a manner the least apt to be attended with this inconvenience. In a former publication, we have recommended the passing of a seton or cord through large abscesses as the best method of opening them ; and as the same method may with equal propriety be employed in those encysted tumors which are formed by collections of thin matter, we shall refer to what was then said upon the subject *. We shall just observe, that the cord should pass through the whole extent of the tumor, from the superior part of it to the most depending point ; and that the inferior opening at which it passes out should be sufficiently large for admitting the matter to be very freely discharged.

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* Vide Treatise on Ulcers, &c. Part I.

In this manner I have had many instances of large encysted tumors being healed with much more ease than almost ever happens under the ordinary method of treatment. Several years ago, I gave my opinion upon this point at considerable length in the publication above alluded to ; and farther experience of the advantages which result from it has tended much to confirm it.

This method of cure, however, is only applicable where the contents of tumors are so thin as to be easily discharged by a small opening. When they are too firm to admit of this, they must either be emptied by an extensive opening into the cyst, or the cyst with its contents must be dissected out.

Where a cyst containing matter adheres so firmly to the contiguous parts as to require much time to remove it by dissection, it should never be attempted. It will be sufficient to lay it freely open through its whole extent by an incision, and to remove any loose portion of it.

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The contents of the tumor will in this manner be completely removed: and the cure may either be effected in the usual way, by preserving the wound open till it fills up with granulations from the bottom; or it may be attempted by drawing the divided edges of the skin together, and trusting to moderate pressure and the ordinary effects of inflammation for producing a complete reunion. I have succeeded in both ways; and I think it necessary to observe, that both are equally certain, when a considerable part of a cyst is left, as when the whole is carefully dissected off in the usual manner. To those who are accustomed to think that it is necessary to remove the cysts of these tumors entirely, it will at first appear to be unsafe to allow any part of them to remain: Experience, however, will soon convince them that it may be done with safety. In common practice the removal of the cyst is always advised; but where it is to be attempted, it is better to open the cyst by

a longitudinal cut through the whole tumor than to remove it entire. When the cyst is empty, it is more readily laid hold of with the fingers or forceps, and more easily dissected out, than when the bag remains full and distended.

When the bag is thus removed, the teguments should be laid together and retained with adhesive plasters, or with two or three futures, as the operator may incline: and if an equal pressure be made over the whole, a cure may thus be obtained by the first intention. In every part of the body this is an object of importance, as it tends to shorten the cure; but it is particularly proper in the face and other external parts of the body, where the cicatrix produced by a tedious sore proves frequently very unseemly.

The arteries which supply the cysts of these tumors are sometimes so large as to pour out much blood when they are cut. In this case, they should be immediately secured with ligatures: and if
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the threads be left of such a length as to hang out at the lips of the wound, they prove no obstacle to the cure being completed in the manner we have directed; for when they are applied with the tenaculum, as they ought to be, they may be drawn away with ease and safety at the end of the second or third dressing. By an ill-timed caution, some practitioners, from an apprehension that ligatures in such circumstances may do harm, have advised that none of the arteries which appear in the removal of these tumors should be tied. Nay, some have gone so far as to say, that it is seldom or never necessary to apply ligatures to such arteries as are cut in the removal of scirrhous breasts: But as I have known different instances of patients dying suddenly from loss of blood where this precaution was neglected, and as I never met with a single case of any harm having been done by attending to it, I would advise every artery to be secured that does not stop immediately on

being divided. Besides the real danger which sometimes occurs from this being neglected, the very intention of healing the sore without the formation of matter is apt to be frustrated by it.— In the removal of cancerous breasts, where the edges of the divided skin have been drawn together so as to cover the sore, by the bursting of an artery which had not been secured, such a quantity of blood has been effused between the teguments and parts beneath, as has either prevented them from uniting, or has rendered it necessary to remove the bandages, and to lay the parts again open in order to discover the bleeding vessel. Of this I have met with different instances; and every practitioner of experience must probably have done the same.

In tumors of an ordinary size, there is never any necessity for removing any part of the skin. By a single incision along the course of the tumor, in the manner we have directed, the sac will either be sufficiently opened, or it may be removed
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with equal ease as if it were opened by a crucial incision; and although the skin may at first appear to be too extensive, yet in the course of a short space of time it will contract so as merely to cover the parts beneath. But in very extensive tumors, where the skin is so much distended as to give cause to imagine that it will be much puckered if part of it be not removed, it will be better to take away some portion of it. This will be best effected by two semilunar cuts including as much of the skin as ought to be taken away; and this being done, the portion of skin thus separated must be removed along with the cyst. And in the same manner, when we are operating upon a tumor where the prominent part of the skin is either ulcerated, or rendered so thin by distention that we cannot with propriety attempt to save it, such parts of it as are thus affected must be included between two semilunar cuts, and removed in the manner we have mentioned. In other respects, the cure

must be conducted as if none of the skin were taken away, by drawing the divided edges of the teguments together, and endeavouring to make them unite by the first intention in the manner we have advised.

Where the tumor is so large as to render it proper to remove any part of the skin, we are desired by some practitioners to do it with caustic; and by others caustic is used for opening every tumor. The only instance, however, in which caustic should be employed, is where patients are so timid that they will not submit to the use of the scalpel.

§ 2. *Of Ganglions.*

By the term Ganglion we here mean an indolent moveable tumor which forms upon the tendons in different parts of the body, but most frequently on the back part of the hand and joint of the wrist.

Tumors of this kind when pressed upon are found to possess a considerable degree of elasticity ; by which they may in general be distinguished from the encysted tumors described in the last section. They seldom arrive at any great bulk ; they are not often attended with pain ; and for the most part the skin retains its natural appearance. On being laid open, they are found to contain a tough, viscid, transparent fluid, resembling the white of an egg.

It seldom happens that tumors of this kind become so large as to render them objects of surgery : and when duly attended to on their first appearance, they may often be removed entirely, either by moderate friction frequently repeated, or gentle compression applied to them by means of thin plates of lead or any other pliable metal. In this manner, they are more readily dissolved than any other kind of swelling : but neither the friction nor the pressure should be carried too far, otherwise the skin may be

so much fretted as to give rise to inflammation ; by which suppuration, and abscesses difficult of cure, may be induced.

When this method of removing a ganglion does not succeed, nothing farther should be attempted as long as the tumor remains of a small size : But when it becomes so large as to prove troublesome, either by impeding the motion of a joint, or in any other manner, it ought to be removed by excision, in the same manner as we have advised in the treatment of encysted tumors when the cyst is to be taken entirely away ; that is, by making a longitudinal cut through the teguments over the whole extent of the tumor ; and after separating the skin from it on each side, to dissect it off from the tendon : Or, when it is found to adhere so firmly to the contiguous parts as to render this impracticable, an incision may be made into it of such a depth as to discharge the contents of it,
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when a cure may be effected by preferring the wound open till it fills up with granulations from the bottom.

In general, practitioners are averse to operate in tumors of this kind, on the supposition of the wound being difficult to heal ; but I have seldom known this to be the case.

§ 3. *Of Swellings of the Bursa Mucosæ.*

THE bursa mucosæ are small membranous bags seated upon, or very contiguous to the different large joints. They naturally contain a thin, transparent, gelatinous fluid, which seems to be intended for lubricating the parts upon which the tendons move that pass over the joints. They are met with in other parts of the body, but chiefly about the hip-joint, that of the knee, ankle, shoulder, elbow, and wrist*.

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* I am happy at having it in my power to announce

In a state of health, the fluid contained in these burſæ or ſacs is in ſuch ſmall quantity, that it cannot be diſcovered till they are laid open by diſſection: But in ſome caſes it accumulates to ſuch an extent as to produce tumors of a conſiderable ſize. This is not an unfrequent effect of contuſions and ſprains; and I have often met with it as a conſequence of rheumatism. The ſwelling is ſeldom attended with much pain: it yields to preſſure, but is more elastic than where ordinary matter is contained: at firſt it is always confined to one part of the joint; but in ſome caſes the quantity of accumulated fluid becomes ſo conſiderable as nearly to ſurround the joint.—The ſkin always retains its natural appearance, unleſs it be attacked with inflammation.

The contents of theſe tumors are found
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nounce to the public, that a deſcription of all the burſæ mucoſæ which have yet been diſcovered, with an account of the diſeaſes to which they are liable, will ſoon be publiſhed by Dr Monro.

to be of different kinds : and this variety seems to depend on the cause by which the swelling is produced ; a circumstance which merits particular attention. Thus when a swelling of this kind is induced by rheumatism, the contents of the tumor are commonly thin and altogether fluid, resembling the synovia of the different joints ; at least this has been the case in any of those which I have known opened : While in such as proceed from sprains, there is usually found mixed with this transparent fluid, a considerable quantity of small firm concretions. In a few cases I have met with these concretions of a softer texture, so as to be easily compressed between the fingers ; but in general they are too firm to admit of this. We may commonly, however, judge of this by the kind of fluctuation which is discovered in the tumor : when the concretions are soft, the fluctuation is usually distinct ; but when they are firm, it is not so clearly perceived, and they are easily felt beneath the fingers

fingers on being pressed from one part of the sac to another.

In practice it will be found to be an object of importance to be able to distinguish between those collections which proceed from rheumatism, and such as are the consequences of old sprains: For in the former, I believe, it will be seldom necessary to propose any operation; as in most instances, perhaps in all, the swelling will disappear in course of time, merely by keeping the parts warm with flannel; by frequent frictions; by warm water being frequently pumped upon them; or by the application of blisters. At least this has happened in almost every rheumatic case of this kind in which I have been concerned.— But in those swellings of the *bursæ mucosæ*, which originate from sprains, although the quantity of effused fluid may remain stationary, it will seldom, if ever, disappear entirely. In such cases, therefore, when the tumor arrives at such a size as to prove troublesome, we are under

der the necessity of proposing an operation for removing it.

The only operation that is admissible, is the opening the sac, so as to discharge the matter contained in it, and to preserve the wound open till it fills up with granulations from the bottom. In most situations this may be done with safety; but in some parts, particularly about the joint of the wrist, these collections are so covered with tendons that a good deal of caution and attention is required in the treatment of them. When it is found that the contiguity of tendons prevents the sac from being opened to such an extent as may probably ensure a cure, it will be better to lay it open at each end; and after pressing out the contents to pass a small seton or cord from one opening to the other. In this manner a slight degree of inflammation will be excited on the inside of the sac, when the cord may be withdrawn, so as to admit of a cure being attempted by gentle pressure, applied with a roller over the
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course of the tumor. I have sometimes succeeded in this way, when a cure could not be obtained by any other means; and when the cord is cautiously introduced with a blunt probe, no harm occurs from it, even when it passes beneath some of the tendons. The cord, however, should not be continued so long as to induce any great degree of inflammation; for in the neighbourhood of large joints this might prove alarming: And we know from experience, that even a slight degree of inflammation answers the purpose sufficiently.

A considerable degree of stiffness commonly remains upon that part of the joint where the tumor was situated. The most effectual remedy for this, is frequent frictions with emollients, and a proper application of warm steams to the part affected.

§ 4. *Of Collections within the Capsular Ligaments of Joints.*

COLLECTIONS of various kinds are met with in the capsular ligaments of joints. Blood may be effused within them. Inflammation is here, as in other parts, frequently succeeded by the formation of matter; and serous effusions occur in them, forming what are commonly termed Dropfical Swellings of the joints.

Swellings of this kind should be distinguished with as much precision as possible. They are most apt to be confounded with collections in the bursæ mucosæ, or with matter effused in the cellular substance covering the joints. From the first of these they may in general be distinguished, by the contained fluid passing with freedom from one side of the joint to the other; and from its being diffused over the whole of it: Whereas, when it is contained

tained in one of the burfæ, the tumor is more circumscribed ; being for the moft part fixed above or upon one fide of the joint. And in thefe there is feldom any great degree of pain ; while collections of every kind within the capsular ligaments are apt to be painful.

They are more eafily diftinguifhed from matter collected in the cellular fubftance covering the joints. In the laft, the collection is evidently very fuperficial ; and it is not fo much confined to the joint itfelf, being in general found to extend in every direction farther than the boundaries of the capsular ligaments.

We judge of the nature of the fluid collected in thefe fwellings by the circumftances which have preceded them, as well as by the fymptoms with which they are accompanied. When a violent bruife of a joint is immediately fucceeded by a large effufion within the capsular ligament, it will probably be found to confift chiefly of blood. This is not

a frequent occurrence ; but as I met with a remarkable instance of it in one case, I conclude that it may happen in others.

When inflammation of a joint terminates in effusion within the capsular ligament, there will be reason to imagine that the matter forming the tumour is of a thin serous kind, with some tendency to purulency: for well-conditioned pus is seldom met with in ligamentous or membranous parts. And lastly, when collections within the capsular ligaments succeed to rheumatic affections, there will be much reason to suppose that they are entirely serous; for we know that these effusions which take place in rheumatism are very commonly of this kind.

The importance of our being able to distinguish the nature of the matter contained in these swellings, becomes obvious from the different practice which they require: As the making an opening into a large joint is always hazardous,
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from the pain and inflammation which it is apt to excite, it should never be attempted but in cases of necessity. One of the causes which in general are supposed to require it, is matter collected within the capsular ligaments: But when by experience we discover that a particular kind of matter may be allowed to remain in this situation without any detriment, we rather allow it to lodge, than to incur the risk which often ensues from letting it out. Now this is uniformly the case with those effusions which we have mentioned as the consequences of rheumatism. Whether they be collected in the bursa mucosa, as mentioned in the last section, or within the capsular ligament of a joint, they should never be laid open. Of whatever size they may be, they will very commonly be dissolved by the remedies we have mentioned, namely, by frictions: the pouring of warm water upon the parts affected; by proper covering with flannel; and the use of blisters; or, when these fail, supporting the
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tumefied parts with a laced stocking, or with a roller, applied with such a degree of tightness as the patient can easily bear, will often prove successful. But whether we are able to dissipate the swelling entirely or not, when we are convinced that it is of the rheumatic kind, no opening should be made into it. The patient may continue to complain of some uneasiness and stiffness in the joint; but this will always be trifling when compared with the pain and inflammation which may occur from laying it open. But when matter is collected in the cavities of joints, which may do mischief by lodging, or which does not readily admit of absorption, an opening should be made for discharging it. The matter which forms in consequence of high degrees of inflammation, and effused blood, are of this kind. Blood is indeed frequently extravasated among soft parts without much detriment; but when in contact with cartilage or bone, it soon hurts them materially; and the same effect follows from

the lodgment of matter formed by inflammation.

The danger which attends this operation, seems to depend in a great measure upon air finding admission to the cavity of the joint; it ought, therefore, to be done in such a manner as may most effectually prevent this occurrence. For this purpose the opening should be made with a trocar; and if the skin be previously drawn tight to the upper part of the tumor, by pulling it down immediately on withdrawing the canula after all the fluid is evacuated, the risk of air being admitted will thus be lessened. A piece of adhesive plaster should be directly laid over the opening in the skin; and the whole joint should be firmly supported, either with a laced stocking, or a flannel roller properly applied round it.

As a farther preventative of bad consequences from this operation, if the patient be plethoric, he should be bled to such an extent as his strength will bear:

bear : He should be put upon a strict antiphlogistic regimen ; and in every respect should be managed with caution : for inflammation being very apt to ensue from it, we cannot be too much on our guard against it.

§ 5. *Of Concretions and preternatural Excrescences within the Capsular Ligaments of Joints.*

WE sometimes find joints become painful, and their motion much impeded, by the preternatural formation of different substances within the capsular ligaments. In some cases they are small loose bodies, of a firmness equal to that of cartilage ; and in others they are of a soft membranous nature, sprouting from an eroded surface of one of the bones forming the joint, or from the inner surface of the capsular ligament.

In some cases, these substances remain always in nearly the same situation, without being much affected either by

pressure or by the motion of the joint ; particularly in the soft membranous kinds of them, which are in some degree fixed by their attachments. But the others, which have nearly the firmness of cartilage, are commonly so moveable, that their situation is altered by the least degree of motion ; and they slip so easily on being touched, that it is difficult to fix them even with the fingers.

In the former, which remain fixed nearly to the same situation, the pain is constant, but it is seldom severe ; whereas in the latter, it is only felt in particular situations, perhaps when the connecting membrane passes between the ends of the bones : but in these cases it proves often so excruciating as to be altogether insupportable. I have known different instances of this, where in some particular postures of the leg, for it is in the knee in which these concretions seem chiefly to occur, the pain became suddenly so exquisite as to induce fainting. And where this returns frequently, the patient

tient is so much afraid of it, that he chooses rather to avoid walking almost entirely than to run any risk of inducing it. Nay, in some cases, I have known the patient roused from the most profound sleep, by the limb being merely moved when in bed.

As these substances are of a nature which will probably for ever resist the powers of every medicine, and as they can only be removed by the joint being laid open, the question to be determined is, Whether this ought to be attempted or not? Many speak of this as an operation attended with so little risk, that practitioners are apt to advise it in every case where the pain induced by the disease is in any degree severe. In two cases, indeed, which fell under my own management, the joints of the knee were laid open; the foreign bodies were removed; and the wounds healed almost with the same ease, as might have been expected in similar injuries in any other part of the body. But since that period,

different instances have occurred where this operation induced the most alarming symptoms; which even terminated in such a manner as to render it necessary to amputate the limb. I never observed indeed such high degrees of inflammation from any other cause; neither is it confined to the joint itself. The whole limb, both above and below the wound, becomes stiff and swelled in a remarkable degree, with a painful inflammatory tension, extending from one end of it to the other.

The uncertain success of this operation may make us doubtful in every instance of advising it. The following is the opinion I have formed on this point, drawn from a good deal of experience in cases of this kind. Where concretions formed within the capsular ligaments of joints appear, upon examination with the fingers, to be perfectly loose and detached, if the pain which they excite is very severe, rather than submit to a long continuance of it,
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we should venture in a cautious manner to take them out, by making an incision into the joint: But wherever there is much reason to suspect that they are connected with any part of the joint, the patient should rather be advised to submit to the pain which they induce, which in general will be rendered moderate by avoiding exercise, than to run the risk attending the extirpation of them.

The pain indeed, even in a retired life, may sometimes become insupportable. In this case I would advise the amputation of the limb. The remedy is no doubt severe; but it is less painful, as well as less hazardous, than the excision of any of those concretions which have ever proved that have been attached to the capsular ligaments.

The opening into the capsular ligament for the removal of these loose bodies, may be made in the following manner: If it is the joint of the knee or ankle that is to be opened, the patient should be laid upon a table or on a bed;

but if any of the joints of the arm are to be opened, he may be allowed to sit; only, in whatever posture he may be, the limb should be secured in the firmest manner by assistants, in that posture which admits of the body to be taken out being felt in the most distinct manner. On this being done, the surgeon should endeavour to fix it with the fingers of his left hand towards the upper part of the joint, after an assistant has been desired to draw the skin as much as possible upwards from the part where the incision is intended to be made. The surgeon, with a scalpel in his right hand, is now to make an incision thro' the teguments and capsular ligament, directly upon the substance itself, of such a size as will admit of its being easily taken out; which may be done either with the point of one of the fingers, or with the end of a blunt probe passed in beneath it. If it is found to be connected by any small filaments, either to the capsular ligament or to the cartilages of the joint,

joint, they should be cautiously divided, either with a probe-pointed bistoury or probe-pointed scissars, after drawing the substance itself as far out as it can be got, with small pointed forceps, or with a sharp hook when it is of a texture that admits of a hook being used. When more concretions than one are found, they should all be taken out at the same opening when this can be done: but when they lie on opposite sides of the joint, two openings will be necessary; only in this case it will be better to allow the first incision to heal before attempting the second, so as to avoid as much as possible the exciting of inflammation.

After the concretion is removed, the skin should be immediately drawn over the wound in the capsular ligament; and the lips of the opening in the skin being laid together, they should be secured in this situation by pieces of adhesive plaster, so as to prevent the air from finding access to the cavity of the joint.

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Till the wound be completely healed, the patient should not only be confined to bed, but the limb should be kept as much as possible in one posture; and a strict antiphlogistic regimen should be observed. But for the farther management of such cases, and of the symptoms with which they are apt to be attended, we must refer to Chap. XXXVI. Section VIII. on the subject of Wounds in the Ligaments.

We have desired, that in making the incision into the capsular ligament, it may be done at the upper part of the joint. The intention of this is to prevent the synovia, after the skin is drawn over the opening in the ligament, from finding such ready access as it otherwise would do to lodge in the cellular membrane immediately beneath the skin; a precaution that is easily attended to, and from which some advantage may be derived.

§ 6. *Of Anasarca or Oedema.*

THE terms *Anasarca* and *Oedema* are applied to that variety of dropical swelling where the water is collected, not in any distinct cavity, but in the cellular substance. The part is generally cold, and of a pale colour; and being possessed of little or no elasticity, it retains the mark of the finger when pressed upon.

In general, swellings of this kind are connected with some general affection of the system; but in some cases they occur in particular parts, from causes which affect these parts only. Thus, legs or arms which have been much weakened by contusions or sprains are apt to become œdematous. Tumors pressing upon any of the larger lymphatics are apt to induce them. And they sometimes occur from the lymphatics of a limb being cut, either by accident or by some surgical operation.

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In the treatment of these swellings, this circumstance of their being general or local requires particular attention. When they are induced by tumors pressing upon the lymphatics, the removal of these tumors will alone effect a cure. And when weakness of a limb, in consequence of sprains or contusions, seems to be the cause of them, the best method of cure will be to support the weakened parts either with a laced stocking or a flannel roller, to prevent their yielding to distention, till in course of time, and by the effects of cold bathing and moderate frictions, they recover their natural tone.

But in those anasarcaous swellings of the feet and legs which take place as a symptom of general dropsy, we must not venture upon removing or preventing them by compression; for if the serum be prevented from falling down to the legs, it will be apt to fix upon parts of more importance. In these cases, we trust to the general tendency in the system

stem being removed by proper medicines, for obtaining a complete cure: But when the swelling becomes considerable, we have it in our power to procure a temporary relief, by discharging the water by small punctures made through the skin into the cellular membrane, which will often empty the swelling of a whole limb. The relief which this procures is often so considerable, that we ought to advise it more early in the disease than is, commonly done. It will seldom have any material effect on the cure of the disease; but besides the present ease which it gives, it prevents that loss of tone which the cellular substance must suffer, and which must always be detrimental where anasarcaous swellings are permitted to go to such a height as they often do.

In general the water is discharged by incisions instead of punctures: But small punctures made with the point of a lancet answer the purpose better: they give a sufficient vent to the water, at the same time

time that they are not so apt to inflame and mortify. But as we had occasion to speak of this when treating of the Anasarcaous Hydrocele in Chapter VI. Section II. we shall refer to what was then said upon it.

Where the swelling is induced by any of the lymphatic vessels of a limb being cut, as sometimes happens in extirpating indurated glands from the arm-pit, small punctures made in the under part of the limb afford immediate relief; while little advantage is derived from any other remedy.

§ 7. *Of the Spina Bifida.*

THE term Spina Bifida is applied to those small soft swellings which sometimes appear in the course of the spine in new-born children, most frequently at the inferior part of it, between the two last vertebræ of the loins. A fluctuation is distinctly perceived in them:
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and the fluid which they contain can in some measure be pressed in at an opening which takes place between the spinous processes of the two vertebræ on which they are seated. In some cases this opening is found on dissection to proceed from a natural deficiency of bone; in others, from the spinous processes of the vertebræ being merely separated from each other: in all of them, the disease proceeds from serum collected within the natural coverings of the spinal marrow. In a few cases it is connected with hydrocephalus; but this is not common. For the most part it is a local affection.

This is perhaps one of the most fatal diseases to which infancy is liable; for as yet no remedy has been discovered for it. In some cases, however, children labouring under it have lived for two or three years; but in general they linger and die in the space of a few months. All the assistance that art has hitherto been able to afford, is to support the

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tumor by gentle pressure, with a proper bandage. In this manner it has for some time been prevented from increasing, by which life has been protracted; but this is all that we have yet been able to do.

It has sometimes unfortunately happened, where the nature of these tumors has not been understood, that they have been laid open with a view to discharge the fluid contained in them. Experience shows, however, that every attempt of this kind should be avoided; for hitherto the practice has uniformly proved unsuccessful. The patient has either died suddenly, or in the course of a few hours after the operation.

If conjecture may at any time be indulged, and proposals for innovation mentioned, it must surely be allowable in cases hopeless as the one we are now considering. If the swelling in the spina bifida be produced by real disease subsisting in the vessels of the spinal marrow, or in those of its membranes, it is not probable that any remedy will
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ever be discovered that will remove it: But if the opening between the spinous processes of the vertebræ with which it is always accompanied, be not the *effect* of the disease, as it is commonly supposed to be, and if the want of support, which this deficiency of bone must create to the membranes of the spinal marrow, be the *cause* of serous effusions within these membranes, might not some advantage be derived from applying a ligature round the base of the tumor, not merely with a view to remove it, but also to draw the bottom of the cyst so closely together, that it may act as a proper support to the parts beneath? Whether any benefit may be derived from it or not, is no doubt very uncertain: But in a disease which we know will otherwise terminate fatally, we are warranted in proposing whatever can afford even the smallest chance of safety; so that I mean to attempt it in the first case of this kind that falls under my care. After applying a ligature as close-

ly as possible to the base of the tumor, and as soon as the tumor itself has fallen off, I would propose to apply a firm-stuffed pad, similar to that of a rupture-truss, to the opening between the vertebræ; and by means of a proper bandage, to secure it with such a degree of tightness as may serve to support the parts within.

Whether or not this method may in any case effect a cure is uncertain; but it appears to be the most probable one of prolonging life: for wherever the tumor has been opened, death seems to have ensued more by the removal of support from the contained parts than from any other cause. Now, no method of treatment we could advise would so readily compress the parts within, and at the same time remove the tumor.

The tumor termed *Spina Bifida* occurs, as we have already observed, in different parts of the spine; but a swelling of perhaps the same nature is sometimes met with on different parts of the head. A

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tumor is observed at birth; and on examination, it is found to be formed by a fluid lodged beneath the membranes of the brain, which have been forced out at some unossified part of the skull. In some cases the swelling remains stationary for a great length of time; but for the most part it becomes quickly larger, and at last terminates in death. Hitherto the same effect has resulted from laying this kind of tumor open, as was mentioned to occur in cases of spina bifida.—The patient has commonly died in a few hours after the operation.

§ 8. *Of Scrophulous Tumors.*

IN a former publication, when treating of the Scrophulous Ulcer, we offered some general observations upon scrophulous tumors. We shall now, therefore, refer to what was then said, and at present advert to the method of treating them. It is not the cure of the scrophu-

lous constitution which we mean to consider : This subject belongs more to the province of medicine.

The first question that occurs in the chirurgical treatment of a scrophulous tumor is, Whether we should endeavour to promote the suppuration of it or not, by means of poultices and other external applications ? For a considerable time I adopted this practice in the freest manner, of applying warm poultices and fomentations to every tumor of this kind ; but by experience I was at last convinced of its inefficacy. Nay, I now think, that it often does harm : for scrophulous tumors being formed of matter which is not convertible into pus, poultices and other warm applications have little effect in bringing them forward ; and when long used, they weaken and relax the parts so much, that the sores which ensue are more difficult of cure than when poultices are not employed. In every scrophulous sore, the parts are apt to remain long soft and spongy, by which they

they are prevented from healing. The effect of these emollient relaxing applications is to increase this tendency to softness to a degree which often proves prejudicial.

As I know of no application which in the real scrophulous tumor ever proves useful, either in retarding its progress or in bringing it forward, I now advise even every covering to be laid aside, unless the patient wishes to prevent the swelling from being seen; in which case he is desired to cover it in the manner that is most agreeable to himself. But as I do not observe that exposure to the air does harm, and as in some cases I have thought that this exposure of the tumor renders the subsequent sores more easy to cure, I would prefer this mode of treatment whenever it can be done with propriety. Even the external application of hemlock, which in the form of poultices is often advised in scrophulous tumors as a discutient, should be laid aside. In scrophulous sores, I have ob-

served some advantage derived both from the internal exhibition and outward application of hemlock: but although I have often known it used in tumors of this kind, I cannot say that it was ever productive of any benefit. The only remedy I have ever known to act with any apparent efficacy in preventing scrophulous tumors from coming forward, has been a long continued use of the cold bath, particularly of sea-bathing, and of mineral waters, especially those of Moffat: but in order to produce any effect, they should be begun early in the disease, while the tumors are small, and long persisted in. Indeed, as soon as it becomes sufficiently obvious that a patient is attacked with scrophula, I would advise him, whenever it can be done, to resort to such a situation where one or other of these remedies can be employed with perhaps little interruption for several years together. In what manner the drinking of these mineral waters, or even of sea-water, operates in preventing

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ing the formation of tumors in scrophulous patients, will be difficult to determine: But it seems to be probable, that cold bathing proves chiefly useful by invigorating the system at large, and particularly the lymphatic system, which in scrophula appears to be remarkably weak and relaxed.

The next question to be determined with respect to scrophulous tumors is, when they have become soft, and even full of matter, whether they should be opened, or allowed to burst of themselves? This should in a great measure be determined by their situation. When they are seated upon any of the large joints, or upon the cavities of the thorax or abdomen, as there might be a risk of the matter bursting into them, it ought certainly to be discharged by a free opening made with a lancet or scalpel; or in very large collections, where it might prove hurtful to expose the cavity of an extensive abscess to the air, it may be done with more safety with a trocar,

or by passing a seton or cord through it. But where the tumors are so situated that no harm can arise from the matter remaining in them, it is better that they should be allowed to break of themselves: for even when they are managed in the most judicious manner, the sores which ensue will prove tedious and difficult to cure, while a scar will be the consequence whether the tumor has been opened or not; and the patient and his friends, from ignorance of the nature of the disease, as well as from other motives, are apt to blame any opening that is made, as the cause either of a tedious cure, or of an unseemly mark. As an additional reason for this practice, I believe it will be found, that sores which ensue from scrophulous tumors will for the most part heal more kindly when allowed to burst than when they are opened.

I have only to observe farther, that tumors of a scrophulous nature are sometimes met with, which from inadvertency

tency are apt to be mistaken for those of the real scirrhus kind. And there is cause to suspect that mistakes of this kind have tended to raise the reputation of different medicines, particularly of cicuta, as well as to have been the cause of the extirpation of tumors, which ought not to have been touched. When scrophulous tumors are deeply seated, they have commonly a degree of firmness which they do not possess in the more external parts; and when they are in a suspicious situation, as in the glandular part of a woman's breast, they are apt to be mistaken on a slight examination for swellings of a bad nature. But a moderate degree of attention will always prevent mistakes of this kind: Even the firmest kind of the scrophulous tumor is soft and compressible when compared with the real scirrhus: It is always of a smooth equal surface; it is seldom in its early stages attended with pain; and for the most part similar affections appear in other parts of the body; whereas the real scirrhus

rhus is always somewhat unequal or knotty : Although it does not for a considerable time become uniformly painful, a stinging disagreeable pain is commonly felt in it from time to time, even from its first appearance ; and it is not necessarily connected with symptoms of scrophula.

§ 9. *Of Bronchocele.*

EVERY tumor of an indolent nature occupying the fore-part of the neck, is in common practice termed a Bronchocele. In the English language we have no precise denomination for it. In French this disease is termed Goitre.

Swellings in this situation would with more propriety be termed Tracheacele : But with a view to prevent confusion, we think it better to retain that appellation under which they have commonly been described.

Authors mention different diseases under

der this denomination : Some contending, that the term Bronchocele should be confined to one variety of tumor ; and others, that it may be applied to swellings of very different kinds. Disputes of this nature, however, answer no good purpose ; and as practical observations are the chief objects of this work, I think it better to mention the varieties of the disease, which I have either seen, or which have been accurately described by authors, with the treatment suited to each, than to enter the lists of controversy upon this subject.

I. The fore-part of the neck, like every part of the body supplied with large arteries, is liable to swellings of the aneurismal kind. They do not frequently occur in this situation, but instances of them are sometimes met with.

This variety of the disease may be distinguished by all the ordinary symptoms of aneurism : But its appearing suddenly after some violent exertion, particularly
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in coughing or laughing ; by its being soft and compressible from the first ; by the tumor being at first seated directly on the course of one of the carotid arteries ; by the pulse in the advanced stages of the disease being evidently affected by it, so as to become intermittent ; and by a strong pulsation being discovered thro' the whole extent of the tumor.

2. Encysted tumors, particularly those of the melicerous kind, are frequently met with on the course of the trachea.— They are characterised by the same symptoms in this situation by which they are marked in other parts of the body : They are soft and compressible ; the fluctuation of a fluid is evident upon pressure ; although they are always small at first, they frequently become so extensive, as to extend from one ear to another ; and the skin usually retains its natural appearance to the last. The seat of this variety of the disease is evidently in the cellular membrane.

3. Instances have occurred of tumors
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forming in this situation, by the lining membrane of the trachea being forced out between two of the cartilages by violent fits of sneezing, coughing, or laughing. In this case the swelling will at first be small; and although soft and compressible, no fluctuation will be perceived in it.

4. The lymphatic glands of the neck have in some cases of scrophula become so swelled, as to produce tumors of considerable magnitude over the whole course of the trachea. They are distinguished by the symptoms which usually accompany scrophulous swellings.

5. The thyroid gland has in some instances been known to swell to a great bulk, so as to induce tumors of an enormous size, extending from each side of the trachea to the angle of the corresponding jaw. In this variety of the disease, the swelling is at first soft; but no fluctuation is perceived in it; the skin retains its natural appearance; and no pain takes place in it: But as the tumor ad-

advances in size, it becomes unequally hard; being firm or elastic in some parts, and perfectly soft in others: The skin acquires a copper colour, and the veins of the neck become varicose; and in this state of the disease the face becomes flushed, and the patient complains of frequent head-achs, as well as of stinging pains through the body of the tumor.

This is mentioned by authors as that variety of the disease which occurs so frequently among the inhabitants of the Alps and other mountainous countries, and which in general is supposed to originate from the use of snow-water.

6. Whatever may be the nature of those varieties of bronchocele which occur in other kingdoms, I have reason to believe, that in this country it does not so frequently proceed from swellings of the thyroid gland as is commonly imagined. At least in two cases of bronchocele, the only ones where I had an opportunity of discovering the seat of the disease by dissection, although it was
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firmly believed in both of them that the swelling originated in the thyroid gland, yet, on laying the parts open, it was found to be much otherwise. This gland, instead of being increased, seemed evidently diminished by the compression produced by the tumor; and the swelling itself was chiefly formed of a condensed cellular substance, with effusions in different parts of it of a viscid brown matter. In one case the tumor was chiefly fixed on one side of the neck; but in the other it occupied both sides, and reached from one ear to the other, and from the sternum to the chin. In both cases the swelling subsisted for a great number of years; and in one of them the patient died at last of another disease. At first they had no other appearance than might be expected from a natural increase in the parts lying contiguous to the trachea; they were soft and compressible; but no fluctuation was perceived in them, and the skin retained its natural colour; But as they increased
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in size, they likewise became firmer ; for although at last a softness, and even a fluctuation, was discovered in different parts of them, yet the principal part of the tumor continued hard, while others had a peculiar springiness or elasticity, similar to that of a tin canister : The veins on the surface of the tumors became turgid ; and the face of a livid colour, evidently from the blood being impeded in its course from the head. In one case, the patient complained of much giddiness : In both, the breathing was much obstructed ; and the patient, who died of the disease, seemed to suffer chiefly from this circumstance.

These are the varieties of bronchocele, for which one method of treatment cannot be applicable. And hence appears the absurdity of specifics for this disease, such as calcined egg-shells, proposed and recommended by authors : for although a medicine may be useful in one, yet it cannot prove so in all the varieties of it.

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In the aneurifmal bronchocele, the treatment suited to aneurifm in general must be observed. To secure either of the carotid arteries with a ligature, will no doubt be considered as a hazardous operation : But here there is no alternative ; whether it be a true or a false aneurifm, death will ensue if it be not prevented by this operation. This chance, therefore, ought always to be given ; as in other cases of aneurifm the artery should be tied both above and below the affected part.

In cases of bronchocele produced by encysted tumors upon the trachea, what we have said upon the treatment of these tumors in general will prove applicable. While they are small, the cysts with their contents may be removed in the manner we have mentioned : And even in the most enlarged state of them, we need not despair of being able to afford effectual relief. When they are of the steatomatous kind, consisting of real fat, however large they may be, we may with pro-

priety attempt to remove them: for in almost every instance, the connection of tumors of this description with the contiguous parts is so slight, that they are removed with ease. The vessels on the surface of the tumor may be enlarged; but these will be chiefly veins, and they may be easily avoided. In tumors consisting entirely of fat, I have never seen any of the arteries of such a size as to be productive of any disturbance; they are always small, and are easily secured by compression when they lie beyond the reach of ligatures.

When, again, the contents of the swelling are fluid, they may be discharged either by an incision with a scalpel, or by passing a seton or cord through the cyst; and when the contained matter is of a pultaceous consistence, forming what is termed an Atheroma, it must be discharged by a large opening in the most depending part of the tumor.

Where the tumor is formed by a hernia of the lining membrane of the trachea,

chea, gentle compression is the only remedy to be depended on; and all such exertions should be avoided as might have any influence in producing it; particularly violent laughter, sneezing, coughing, and crying. In scrophulous swellings of this kind, we must depend chiefly on those remedies which prove most useful in other scrophulous affections: and with a view to remove the compression produced upon the trachea, as well as upon the veins returning from the head, the contents of the tumors should be discharged as soon as they are found to be in any degree fluid.

In that variety of the disease which originates from a tumefaction of the thyroid gland, frequent frictions prove useful, particularly when employed early, before the swelling has become large; and saponaceous and mercurial plasters have in some cases appeared to prove serviceable. Practitioners, however, are seldom consulted in that stage of the disease in which remedies of this kind may be use-

fully applied : For as the swelling does not often occasion uneasiness at first, it is seldom mentioned by the patient till it has subsisted for some time. In the enlarged state of this gland, I do not suppose that any remedy will ever be found powerful enough to discuss it ; so that the only questions we have to determine are, whether or not we should attempt to remove the tumor by an operation ? and whether it should be done with caustic or the scalpel ?

We know that this gland is very plentifully supplied with blood, and that the arteries which belong to it are usually much enlarged in the disease we are now considering. This, together with the contiguity of the thyroid gland to the carotid arteries, which in this enlarged state of that gland are even apt to be compressed by it, renders the extirpation of it in an advanced period of the disease extremely hazardous. For the arteries are of such a magnitude as to pour out a great deal of blood in a short space of time ; while they

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they lie at such a depth in this enlarged state of the parts, that they cannot be easily laid hold of with ligatures, nor can much compression be applied to them from their situation with respect to the trachea. I therefore conclude, that when tumors of this description have acquired any considerable bulk, it would not be advisable to run the hazard of attempting to remove them with the knife; and that the patient should rather trust to the treatment usually employed in such cases for palliating the symptoms as they occur*. And although we are informed,

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Mr Gooch relates a case, where in an attempt to remove a bronchocele by excision, such profuse hemorrhagy took place, that the operator, although very intrepid, was obliged to desist before the operation was half finished. No means that were employed could put a total stop to the blood; and the patient died in less than a week.

Another case had very nearly terminated fatally; and the patient's life was only preserved by having a succession of persons to keep a constant pressure upon the bleeding vessels, day and night for near a week, with their fingers on proper compresses, after the operator had
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that in this situation the potential, and even the actual cauteries have been employed with advantage, yet the practice has not become so general as to make it probable that it has ever been successful; nor can we, from what we have learned, presume to recommend it in any stage of this disorder.

But although the reasons we have mentioned appear to be sufficient for deterring us from attempting the removal of these tumors in any way when they are much enlarged; yet while the gland is not much increased; when frictions and other remedies fail; and when the disease is continuing to advance; I think any practitioner would be warranted in advising it to be removed by excision: for in this early period of the disease, the difficulty of securing the arteries with ligatures will be much less than it is found to be in the more advanced stages of it:
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been repeatedly disappointed in the use of the needle and ligature.—Vide Gooch's *Medical and Chirurgical Observations*, p. 136.

at least the risk occurring from this will be inconsiderable, when compared with that which will probably ensue from the tumor being allowed to remain.

In the sixth and last variety of the disease which we have mentioned, frictions with mercurial ointment have in the first stages of it appeared to prove serviceable. And in one case the progress of the tumor was evidently retarded by repeated blisters; but the patient going to a distance, they were neglected, and at last it arrived at a very enormous size. In this state I saw him at the distance of several years, but I did not learn in what manner the case terminated. I have reason to think, however, from the appearance of the swelling, both at its commencement and in its more advanced stages, that it proceeded from an effusion into the cellular substance of the neck, attended with that condensed state of this substance which was discovered by dissection in the two cases mentioned above.

But however serviceable blisters, as well as other remedies, might prove in the early stages of the disease, no advantage can be expected from them when the tumor has acquired any great bulk. In this situation palliatives only should be employed; for the basis of the swelling usually runs so deep, that it could not be removed but with the utmost hazard; and it is not probable that any advantage would be derived from laying it open; for, a considerable part of it being firm and solid, the size of the tumor would not be much diminished by the discharge which might be procured, while the sore that would ensue might degenerate into cancer.

§ 10. *Of Nævi Materni.*

By *Nævi Materni* are meant those marks which we frequently find in different parts of the body at birth; and which are supposed to originate from impressions

pressions made on the mind of the mother during pregnancy. They are of various forms, being frequently found to resemble strawberries and cherries, and in other instances grapes, figs, pears, &c. Their colour is various ; but for the most part they are of a deep red, resembling the colour of claret or red port.

Many of these marks are perfectly flat, and never rise above the level of the skin ; and as they are not painful, they never in this state become the objects of surgery. But in some cases they appear from the first in the form of small protuberances, which frequently increase so quickly as to arrive at great degrees of bulk in the course of a few months. I once saw a tumor of this kind in a child of a year old of the size of a goose's egg, which at birth was not larger than a pea.

No fluctuation is discovered in these tumors ; on the contrary, they feel to be firm and fleshy. In some cases they are pendulous, and hang by slender attachments

ments to the contiguous parts; but for the most part they are fixed by broad extensive bases.

Various remedies have been recommended for the removal of these excrescences; and in ancient times different charms were proposed for them. The mystery proceeding from this is perhaps one reason of the general aversion which still prevails against any attempt being made to remove them. But so far as I have seen, no greater danger attends the removal of these swellings than the extirpation of any other tumor of the sarcomatous kind. They are supplied indeed more plentifully than other tumors with blood; for in many instances they appear to be entirely formed by a congeries of small blood-vessels; but the arteries which go to them are in general easily secured with ligatures. It is proper, however, to remark, that the operation should never be long delayed: for as the size of the vessels depends upon that of the tumor, they sometimes become so
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large as to throw out a good deal of blood before they can be secured; so that the operation should always be proposed as soon as it is observed that the tumor, instead of remaining stationary, acquires a greater bulk.

The operation is of a very simple nature. The tumor, with all the discoloured skin, is to be dissected off with a scalpel; and the arteries being secured, the edges of the remaining skin should be drawn together, and kept in this situation either with adhesive plasters or sutures: Or, when they cannot be drawn completely together, they may at least be made to cover a considerable part of the fore; by which the cure will be much shortened, and the cicatrix lessened. In this case, that part of the fore which is left uncovered must be treated like a wound from any other cause.

It is scarcely necessary to mention, that where the tumor is pendulous, and connected to the parts beneath by a narrow neck only, it should be removed by
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tying a ligature round it of a degree of tightness sufficient for putting an immediate stop to the circulation through the whole of it.

§ II. *Of Warts.*

WARTS are indolent, small, hard, colourless excrescences, which appear on different parts of the body, but chiefly on the fingers and hands. They take their rise from the cutis and cuticle. They occur at every period of life, but more frequently in infancy than in old age.

When from their size or situation warts do not prove troublesome, they should not be touched; for generally in course of time they either fall off or waste gradually away. But sometimes warts are so large and so situated that we are under the necessity of employing means for removing them.

When they are pendulous, and have
narrow

narrow necks, the easiest method of taking them away is with ligatures: for this purpose a hair is sometimes used, but a fine thread is preferable. But when their bases are broad, we remove them either with the scalpel or with escharotic applications. There are few patients, however, who will submit to the scalpel; and as we seldom fail with escharotics, they are generally employed.

The lunar caustic, or lapis infernalis, are the strongest applications of this kind; but warts commonly become very painful after being two or three times rubbed with them. The same objection takes place to a solution of quicksilver in aquafortis, otherwise it proves a very powerful escharotic. Mercury dissolved in an equal quantity, or even in double its weight, of strong spirit of nitre, is a remedy that will not fail in removing warts of every kind; but as it is apt to spread, it should be used with much caution. Pulvis fabinæ being daily applied

plied to warts, will for the most part remove them in the course of two or three weeks ; but this likewise is apt to induce inflammation. The best application I have tried is crude sal ammoniac : It acts slowly, but induces neither inflammation nor pain ; and excepting in the very harder kind of warts, it seldom fails in removing them. They should be well rubbed two or three times daily with a piece of the salt previously moistened in water. Liquified salt of tartar sometimes answers the purpose ; and I have known spirit of hartshorn prove successful.

Warts frequently appear upon the penis as a symptom in venereal affections, and as they are nearly of the same nature with those we have been considering, the same method of treatment will apply to them. In general, the tendency in the system to produce them does not continue long ; and if the parts be kept clean, they will at last begin to decay, and go entirely off whether any application be
made

made to them or not. But as patients are always anxious to get free of them, practitioners are often induced to make trial of remedies which should be avoided: For till this tendency to their formation is removed, they rise almost as quickly as they are rubbed off. Nor has mercury any good effect here: I have known different mercurial courses advised for the removal of warts; but they have never produced any advantage, and they very commonly do harm. When we have reason to suppose that every other symptom of the disease is eradicated, the continuance of warts should be no inducement to the exhibition of more mercury. When they are tender on the surface, and produce matter, as is sometimes the case, washing them morning and evening in lime-water, or in a weak solution of saccharum saturni, will commonly remove this; and at last they will disappear in the manner we have mentioned. But when this delay will not be agreed to, one or other of the escharotics mentioned

tioned above must be employed; or if the patient consents to their being removed with the scalpel, the parts from whence they are cut may be touched with lunar caustic, in order to prevent them, with as much certainty as possible, from returning.

It is proper to remark, that in the treatment of warts of every kind, we should be cautious in avoiding every application which we have once observed to excite inflammation; for this symptom, when it arrives at any height, is difficult to remove. For the same reason, when a wart is to be removed with the scalpel, we should rather encroach a little upon the sound skin, than run any risk of injuring the wart itself, or of leaving any part of it. By want of attention to this precaution, I have known the most formidable symptoms induced by what at first appeared to be such a trifling excrescence, as not to deserve notice. In one case, indeed, such a painful obstinate sore ensued on the leg, from
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the removal of a small wart, that amputation of the limb was rendered necessary, in order to save the life of the patient.

§ 12. *Of Fleshy Excrescences.*

No part of the body is altogether exempted from the formation of fleshy tumors or excrescences. They differ from warts in being softer, and in their being apt to become large. They are seldom painful. In general they are somewhat more red than the skin in natural health; and for the most part they have a firmness of consistence resembling that of the lips. When laid open, they have at first sight nearly the same appearance with a piece of muscular substance newly divided; but on farther examination, no fibres can be discovered in them. They seem to consist chiefly of cellular substance, with a great

proportion of blood-vessels infinitely ramified.

In the treatment of these tumors, no external applications are found to have any good effect. Escharotics have sometimes been employed for removing them; but they seldom prove effectual, and they are very apt to irritate and excite inflammation. Whenever it is determined, therefore, to remove a tumor of this kind, it should either be done with a ligature, or with the scalpel. When the neck is narrow, the method by ligature should be preferred; but when the attachment to the parts beneath is broad, this is inadmissible. When the scalpel is employed, care should be taken that no part of the tumor be left; and the edges of the divided skin should be drawn so together, as to cover as much of the remaining sore as can with propriety be done. When any part of it does not heal by the first intention, it must be treated like a wound produced in any other manner.

§ 13. *Of Corns.*

CORNS are small hard tubercles, which occur on different parts of the body, particularly on the toes and soles of the feet. In some cases they appear to be of a horny inorganic nature. But in others, it is evident that they are supplied both with blood-vessels and nerves, from their being painful, and discharging blood on being cut. For the most part they are seated in the skin: but in some instances they pass to such a depth as to reach the periosteum; by which much pain and swelling are apt to occur on the contiguous parts. This is more especially apt to happen when they are seated upon any of the joints, or upon parts thinly covered with flesh.

The best preventative of corns, is the wearing of wide shoes, and avoiding every kind of pressure: and unless this be attended to, it is impossible in any case to

remove them. Various remedies are recommended for the cure or removal of corns. The most effectual I have ever tried, is the paring off all the inorganic part of them, after bathing for the space of half an hour or so in warm water, and immediately thereafter applying over them slips of soft leather spread with *emplastrum gummofum*. If the soaking in water and paring the corns be repeated from time to time, and the application of this plaster be continued, the corns will be kept easy, and the hard knots will often separate and fall out; when, if pressure be avoided, the vacancy produced by their removal will soon fill up with cellular substance, and no return of them will be experienced.

§ 14. *Of a simple Exostosis, Venereal Nodes, and Spina Ventosa.*

AN Exostosis is an indolent hard tumor originating from a bone. In some cases

cases it is altogether a local affection; being produced by a superabundant calculus in fractured bones; by bones being deeply wounded, or their substance eroded by an ulcer. In others, it appears as the symptom of some general affection of the system, particularly of the lues venerea and scrophula. In the first of these diseases, the tumor is termed a Venereal Node. When it appears as a symptom of scrophula, which it frequently does, it is usually termed a Spina Ventosa.

Exostoses, when local, and proceeding from an effusion of osseous matter in fractured or wounded bones, are seldom attended with pain; and after arriving at a certain size, they commonly remain stationary. But when they originate from an internal cause, they are commonly painful from the first; probably from the distention of the periosteum, which being a firm membrane, and closely attached to the bone beneath, does not readily yield to the tumefaction. And in this case the swelling continues to

advance, either till it bursts into a sore, or till the disease in the constitution by which it was produced be eradicated.

In venereal nodes, the periosteum is often found inflamed and much thickened; and in some cases a small quantity of a thin acrid serum is effused between this membrane and the bones. Hence, in those cases, the swelling in the bone appears to be much larger than it really is; for on being laid open, it is often found to be inconsiderable when compared with the previous size of the tumor. This has made some suspect that the swelling which we term a Node in lues venerea, is not originally an affection of the bone, but a thickening of the periosteum, and that the bone only suffers from its connection with this membrane. There is much reason, however, to imagine, that the reverse of this is the case, and that the bone is the part primarily affected. For it is worthy of remark, that it is in the advanced stages of the syphilis only, that the bones are

apt to be affected; and even then, that it is the hardest parts of them, such as the fore-part of the tibia and the bones of the cranium, which are most apt to suffer.

In scrophulous patients we frequently find the whole substance of a bone swell, particularly the extremities of the large bones forming the joints of the knee, ankle, elbow, and wrist. Various conjectures are met with in authors of the origin of the term *Spina Ventosa* given to this swelling; but whatever may have been the first cause of it, or whether it be properly applied or not, we think it right to retain it, in order to prevent that confusion which is apt to ensue from different names being given to the same disease.

In the *spina ventosa* a pain is first discovered in the affected bone, and it is usually so deeply seated, that the patient is led to think from his feelings, that it proceeds from the very center of the bone. This sometimes takes place for

several days before any swelling is perceived; but for the most part a slight degree of fulness is observed from the first. When this occurs in a patient with other symptoms of scrophula, and especially when it fixes on any of the large joints, there will be much cause to suspect the nature of it. But it often happens that this is the first symptom of scrophula, especially when it occurs in childhood: in which case both the parents and surgeon are apt to suspect that it proceeds from a contusion or sprain; nor does the delusion cease with the former, till the disease becomes evident by breaking out in other parts of the body.

When these swellings occur in the middle part of bones, as sometimes happen in the bones of the hands and feet, they are apt to advance quickly; and on the soft parts bursting above them, a thin, ill-conditioned matter is discharged, and the bones are discovered to be carious on the introduction of a probe. But when the disease fixes on any of the
large

large joints, although it seldom fails to terminate in a sore at last, yet it commonly proceeds to this state in a more gradual manner; nor does any remedy with which we are acquainted prevent the progress of it. In this situation it lays the foundation of what is usually termed a White Swelling; a disease we have formerly considered at full length*.

When these swellings burst and terminate in sores, the soft spongy parts of the bones are found to be dissolved; and on the matter which they produce being discharged, the remaining cavities have the appearance of being formed by all the interior part of the bones having been scooped out, there being nothing left but a thin osseous covering formed of the hard external lamella of the bone. In this state of the disease, the appearances which the bone exhibits are very similar to those of scrophulous sores in the softer parts of the body: And as the *spina ventosa* is, in one stage of it or another,

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* Vide Treatise on Ulcers, &c. Part III.

almost always accompanied with other symptoms of scrophula, I am clearly of opinion, as was elsewhere observed, that we should consider it entirely as a scrophulous affection, it being the same in the bones what scrophula in its more usual form is in the lymphatic glands.

In the treatment of an exostosis, the cause by which the tumor seems to have been induced requires particular attention. Where it is perfectly local, and formed merely by an exuberance of callosus, although some deformity may ensue from it, yet it is seldom productive of so much pain or inconvenience as to induce the patient to speak of it. But when tumors, even of this local kind, become so large as to prove troublesome or painful, they necessarily excite the attention both of the patient and practitioner. As they are of a nature that will not yield to any medicine, we must trust entirely, in those cases where it is necessary to remove them, to a surgical operation.

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The patient being placed upon a table, and properly secured by assistants, if there be any risk of contiguous large arteries being cut, a tourniquet should in the first place be applied so as to compress them above: An incision should now be made through the teguments covering the tumor; and in order to give sufficient freedom in the remaining steps of the operation, it should not only be carried along the whole course of the swelling, but an inch or even more past each end of it, when it is so situated as to admit of it. The cut is now to be continued down to the bone, at the same time that the operator should avoid as much as possible doing any injury to the contiguous muscles, tendons, veins, arteries, and nerves. By a little attention to this part of the operation, much distress may be prevented, which might probably occur were it to be done in a more hurried manner.

On the bone being laid bare, we are next to determine on the best method of

removing that part of it which forms the tumor: and this will depend upon the size of it. If it is merely a small knob that can be admitted into the head of a trepan, it may be taken off with that instrument: or if it be too large for this, it may be removed with a common saw; and after taking away any *Ipiculæ* which might create irritation, the sore may be treated like wounds produced in any other manner. The soft parts should be drawn over the bone, and the edges of the skin being laid together and secured with adhesive plasters, a cure may possibly be obtained by the first intention. In some cases, indeed, this may be prevented by small exfoliations taking place from the site of the tumor. I know, however, from experience, that it will sometimes succeed, and therefore I would always advise it to be attempted; for even where small exfoliations take place, the pieces of bone will be forced to the surface, and may be afterwards taken
out

out long after the cure of the soft parts is completed.

An exostosis, however, is sometimes found to surround a bone entirely. In this case the treatment now advised will not apply. In this situation, that portion of the bone must be taken out on which the exostosis is fixed, when the bone is of such a length and is so situated as to admit of it: But as this can scarcely be done in the small bones of the hands and feet, when any of these are affected, it becomes necessary to remove the diseased bone entirely. In a case of this kind which occurred on one of the metatarsal bones, and where the exostosis surrounded the whole circumference of the bone, I thought it better to take out the bone altogether, than to leave the two ends of it only: The one operation was performed with no great difficulty: the other would have been much more painful as well as more tedious, and it would not have proved more successful. For although the part did not fill up with bone,
it

it became sufficiently firm to enable the patient to walk as well as he did before.

In the long bones, however, of the thighs, legs, or arms, we may safely venture to remove any portion of them on which an exostosis is fixed: and where the constitution is healthy, we need never despair of nature supplying the deficiency; for instances have been often met with, even of entire bones being regenerated. When a portion of bone is to be removed, after laying it freely bare by an extensive incision, a piece of paste-board, or a thin sheet of lead, should be passed beneath it, in order to protect the parts below from the teeth of the saw. Where a portion of the fibula or tibia is to be removed, the splint must be passed in between these bones; and when either of the bones of the fore-arm are affected, it must be passed between the radius and ulna. Different forms of saws have been employed for dividing the bone; but the common saw used in amputations answers better perhaps than any other.

When the portion of bone is removed,
the

the fore should be dressed with the mildest applications ; a piece of soft lint spread with the common wax liniment, or merely dipped in oil, should be inserted between the lips of the wound ; and if any thing be employed for retaining them, it should be the many-tailed bandage, which can be undone without moving the limb. It is a matter of importance to place the limb in a situation the most favourable for the discharge of matter ; and as the operator has it commonly in his power to make the wound more or less inclined to any side of the limb, this circumstance should be attended to in the first part of the operation.

When the operation has been performed upon either of the bones of the leg or fore-arm, the remaining sound bone will always keep the limb at its full length, so that there will be little or no risk of its becoming shorter. But when a portion of a single bone is taken out, some attention is required to prevent the limb from becoming shorter during the cure. For this purpose different machines have been

been invented ; but I have never found any assistance of this kind necessary : for if the patient be informed of the great importance of keeping the limb in a proper posture, he will give it all the attention that is requisite : and besides, much inconvenience, pain, and inflammation, are apt to ensue from any instrument employed for this purpose, when applied with that tightness that is necessary for keeping a limb in a state of extension.

During the cure of the sore, the chief object is to prevent matter from lodging and passing between the contiguous sound parts. If this be prevented, and the lips of the wound be kept open by the easy dressings we have mentioned, till it fills up with granulations from the bottom, the rest will be accomplished by nature alone. Those soft granulations which at first occupied all the vacancy between the ends of the divided bones, will soon acquire the consistence and strength of bone ; and in the course of a short time, if the general state of health continues
good

good, the limb will become equally useful as it was before.

Hitherto we have supposed the disease to be seated in the extremities. But tumors of this kind are also found in other parts of the body: on different parts of the skull; on the under-jaw; on the ribs and clavicles; and I once saw a large exostosis on the upper part of the scapula. But wherever they are situated, the treatment is the same. While they give no uneasiness, nothing should be done; for they will sometimes continue small and stationary for life: But when they increase and prove troublesome, the sooner they are removed the better; for the earlier the operation is performed, the more easily will it be done.

In that variety of exostosis termed a Node, proceeding from the lues venerea, the first point to be determined is the state of the system. The patient should be immediately put upon such a course of mercury as can be depended upon for the removal of any infection he may labour under; and if the tumor in the

bone be recent, and not far advanced, it may be carried off by the mercury alone. With a view, however, to make the medicine as effectual as possible, it should be thrown in as quickly, and in as great quantities, as the patient can bear: for the system being completely infected with the virus before nodes appear, it requires, for the most part, a very considerable quantity of the medicine to check their progress.

At the same time that mercury is given inwardly, it is a common practice to rub the part itself with mercurial ointment, or to keep it covered with mercurial plaster. I have never observed, however, that any advantage is derived from this; and I think it is apt to do harm. In tumors of this kind there is much reason to suppose that the periosteum becomes inflamed from the first. In different instances, the inflammation has appeared to be aggravated both by the application of plasters, and by the friction used with mercurial ointment. Till we know whether the internal exhibition

hibition of mercury is to prove effectual or not, some mild sedative application, such as a solution of saccharum saturni, or the unguentum nutritum, which is a preparation of lead, should only be employed. These keep the parts easy; and by tending to remove inflammation, they may even have some influence in removing the tumor.

But if we find, after there is full evidence of the mercury having entered the system, that the local affection of the bone still continues to advance, that the tumor becomes larger and the pain more severe, other remedies should be advised. In this situation, I have sometimes found the pain relieved immediately by the application of several leeches over the tumor; and the pain being rendered moderate, we are thereby enabled to delay every other remedy till a more complete trial be given to the mercury. In some cases, where leeches have failed, blisters applied directly upon the parts affected have proved successful. Neither they nor leeches can have any influence on the

original disease: they will not lessen the tumor of the bone; but by lessening the tension of the periosteum, they will prove more useful than perhaps any other remedy we could employ.

Sometimes, however, when these means are too long delayed; when the tumor advances with more rapidity than usual; or when acrid matter is perhaps confined beneath the periosteum; neither leeches nor blisters afford relief. In such cases, an incision made along the course of the tumor to the depth of the bone, will often give immediate ease. The matter evacuated from these tumors is frequently a thin brown sanies; at other times, it is a viscid transparent mucus.

In some cases the incision heals kindly by common treatment, even when the tumor of the bone is by no means inconsiderable. Healthy granulations will form, and a cure of the sore will be accomplished, even before the patient has taken as much mercury as may be judged necessary for the cure of the disease. In such cases, the tumefaction of the bone is
not

not to be regarded: It may probably, indeed, continue during the life of the patient; but no inconveniency will afterwards ensue from it. So that unless it be so situated as to produce much deformity, it should never be touched.

But, on other occasions, the sore, instead of healing easily, will remain obstinate, notwithstanding all the remedies that can be employed. In such circumstances, the obstinacy in the sore is for the most part supposed to arise from the venereal virus not being destroyed, and a farther continuance of mercury is therefore advised. The mercurial course should no doubt be carried so far as there is any chance of its proving useful. But beyond this, it will commonly prove hurtful, and will rather tend to protract the cure of every sore. This, however, is a point upon which no precise directions can be given; the judgment of the practitioner in attendance must determine it.

When the obstinacy of the sores depends upon other diseases of the system,

the removal of these will forward the cure. But when there seems to be a tendency in the diseased bone to exfoliate, the completion of this process will alone prove effectual. In such circumstances, the treatment adapted to promote exfoliation ought to be pursued: But as we have elsewhere considered this subject fully; it is unnecessary now to enter upon it*.

After all the diseased parts of the bone are removed, the sore will for the most part heal readily. But in some cases, such a fullness and thickening of the periosteum and other contiguous parts has been produced by the long continuance of the disease, that the cure still proceeds slowly. In such circumstances, mild emollient applications do harm: and nothing in general proves so useful as those ointments that are strongly impregnated with red precipitate, or with verdigris. In some cases, even these do not act very speedily; when touching the surface of the sore, once in two or three days, with lunar caustic or with lapis infernalis,

* Vide Treatise on Ulcers, &c. Part II. Sect. VII.

fernalis, will make the sloughs throw off, and for the most part their place will be supplied by healthy granulations; after which, the cure will probably proceed without interruption.

In describing this variety of exostosis, we have repeatedly mentioned the pain which attends it; a symptom which always takes place; at least I never met with an instance of the contrary. Venereal nodes, particularly those on the head, are not indeed always accompanied with much pain, but merely with a slight uneasiness. But this variety of node does not originate from the bone, but proceeds merely from an affection of the periosteum. In this case the tumor commonly subsides entirely, either by the effects of mercury alone, or by the application of a blister; and no advantage is derived from making an incision into it. But in the other, if the bone be affected in any considerable degree, the tumor never subsides, if it be not by a portion of the bone exfoliating. Even after every other symptom of the disease is removed, these

tumors in the bones continue equally fixed and large as they were at first. We judge that a node proceeds from the bone itself; by the pain, as we have just observed, being in general acute; by the tumor being considerably harder than when the periosteum only is affected; by its advancing much more slowly than the other; and by its continuing fixed and permanent, notwithstanding all the remedies we can employ to remove it.

We come now to speak of the treatment of the *spina ventosa*, or that variety of exostosis which we suppose to originate from scrophula; and I am sorry to observe, that I have nothing satisfactory to offer upon it. Fomentations, ointments, plasters, and a variety of other remedies, are recommended; but I know of none that any advantage has ever been derived from. Tumors of this kind which appear formidable at first, will sometimes indeed continue stationary, either from the scrophulous disposition in the system being checked by cold-bathing, or some other similar remedy;

or from some change taking place in the constitution, with the nature of which we are perhaps altogether unacquainted. But this is a rare occurrence: for in general, notwithstanding all the remedies we employ, a *spina ventosa*, from its first appearance, proceeds in a gradual manner to turn worse.

When the disease appears at the same time in different parts of the body, all we can with propriety attempt, is to support the constitution with a proper diet. To advise bark and cold-bathing as the best strengthening remedies; and when the pain is severe, to endeavour to render it moderate by adequate doses of opium. But when it is confined to one part, as often happens in the knee and other large joints, in cases of white swelling, it becomes frequently adviseable to remove the diseased part by an operation. In affections of the joints, it has been the common practice in this situation to amputate the diseased limbs entirely. But an attempt has lately been made by Mr Park, an ingenious surgeon in Liverpool,

to

to save the limbs that are thus diseased, by removing the heads of the affected bones only, and afterwards healing the sore at which they were taken out. When we come to treat of the operation of amputation, we shall enter more fully into the consideration of this; for we think it highly deserving of notice: and at present shall only remark, that there is cause to suspect that it will not be found to prove so generally useful, as at first view might be expected. But in local swellings of this kind which occur on the middle of bones, we think it right to observe, that the same practice may be pursued which we have already recommended for the removal of those cases of exostoses which proceed from external violence: The swelled portion of bone may be cut out when it is situated on any of the long bones of the extremities; and on any of the short bones of the hands or feet, the diseased bones may be removed entirely.



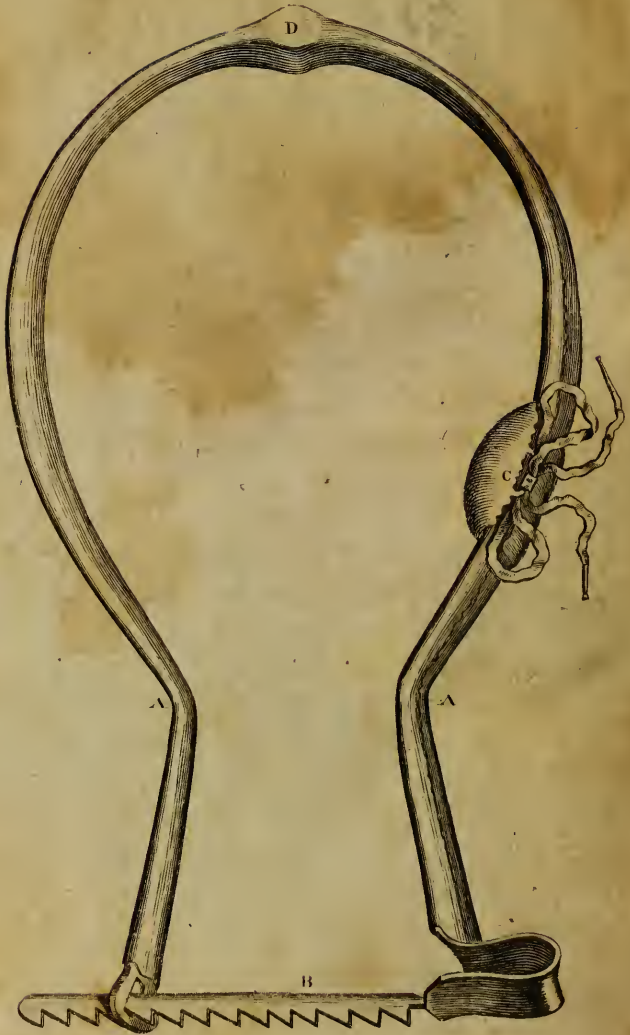




PLATE LXVIII

FIG. 1.

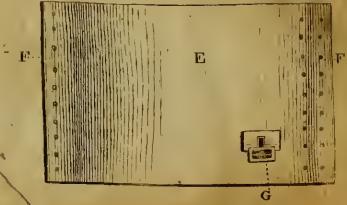


FIG.

3.

FIG. 2.

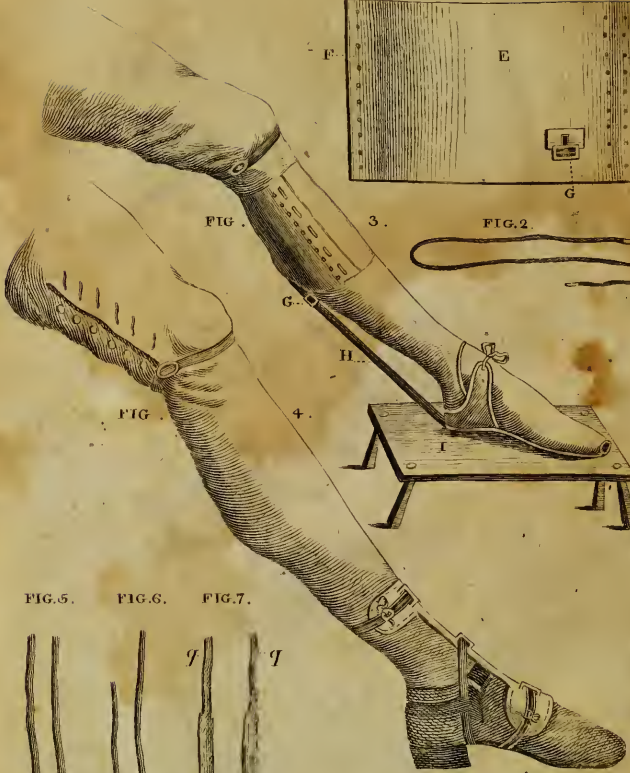


FIG.

4.

FIG. 5.

FIG. 6.

FIG. 7.

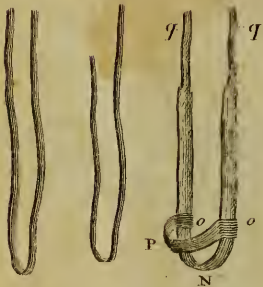


FIG. 8.



FIG. 9.





FIG. 1.

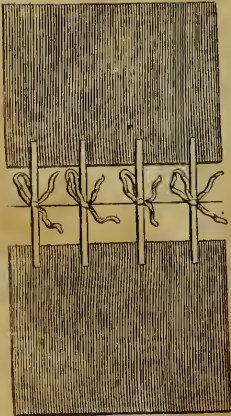


FIG. 2.

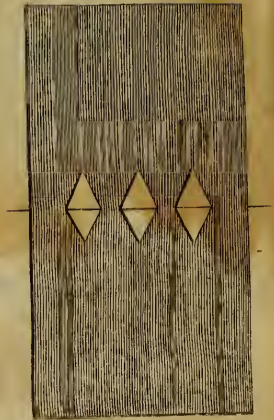


FIG. 3.



FIG. 4.



EXPLANATION OF THE PLATES.

PLATE LXVII.

[Opposite to page 59.]

Figures 1. 2. 3. and 4. are different representations of the edges of wounds drawn together, and retained by adhesive plasters, as mentioned in page 58.

PLATE LXVIII.

[Opposite to page 145.]

The different figures in this plate represent an apparatus for the cure of a rupture of the tendo Achillis. An explanation of it is given in p. 145, &c.

PLATE LXIX.

[Opposite to page 178.]

The figure in this plate is the invention of Mr Chabert of Paris, and is taken from the second volume of Memoirs of the Royal Academy of Surgery: It is the best instrument that has yet been published for compressing the jugular veins.

It

It consists of two curved pieces of steel, *A A*, connected by a joint at the back-part of the machine, *D*. One of the sides terminates in a horizontal plate, *B*; the teeth of which passing through a hole in the opposite plate, the pressure made with it may be increased or diminished at pleasure. The cushion, *C*, is meant to be placed upon the jugular vein, either upon a bleeding orifice in cases of hemorrhagy, or immediately below the opening to be made into it where blood is to be taken from this vein. This cushion should be moveable, so as to pass with ease from one part of the instrument to another. Every part of the machine, excepting the plate *B*, should be covered with soft leather.

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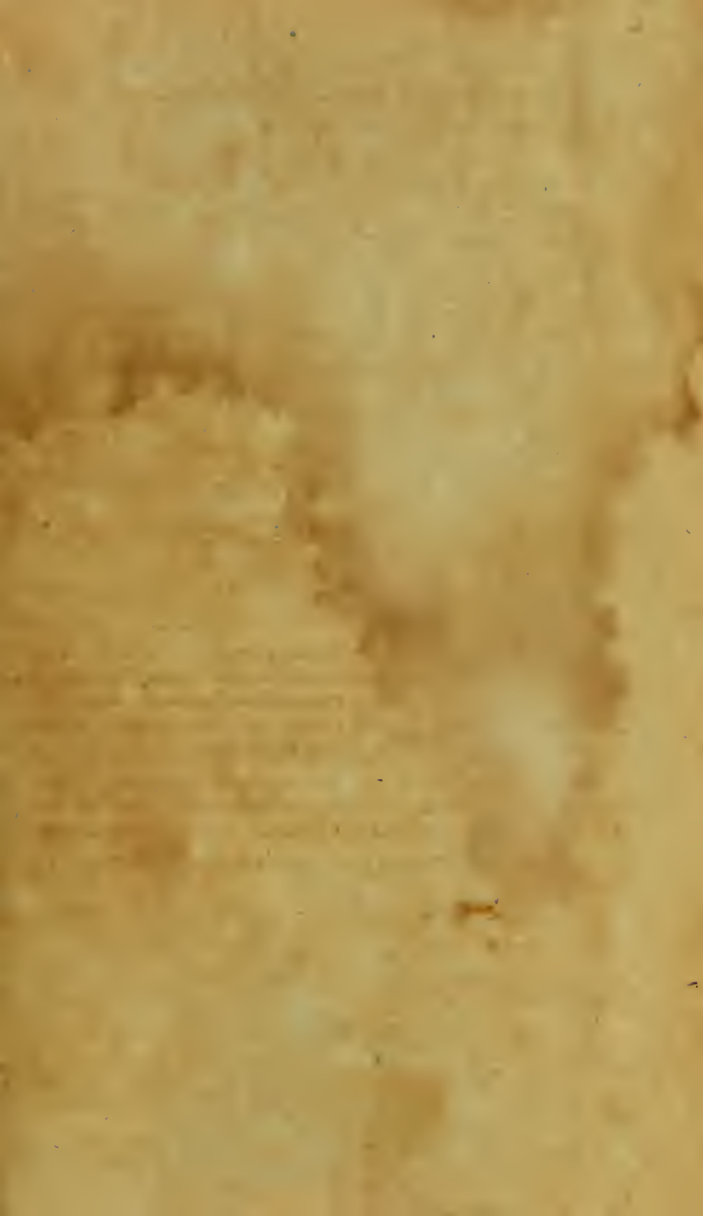
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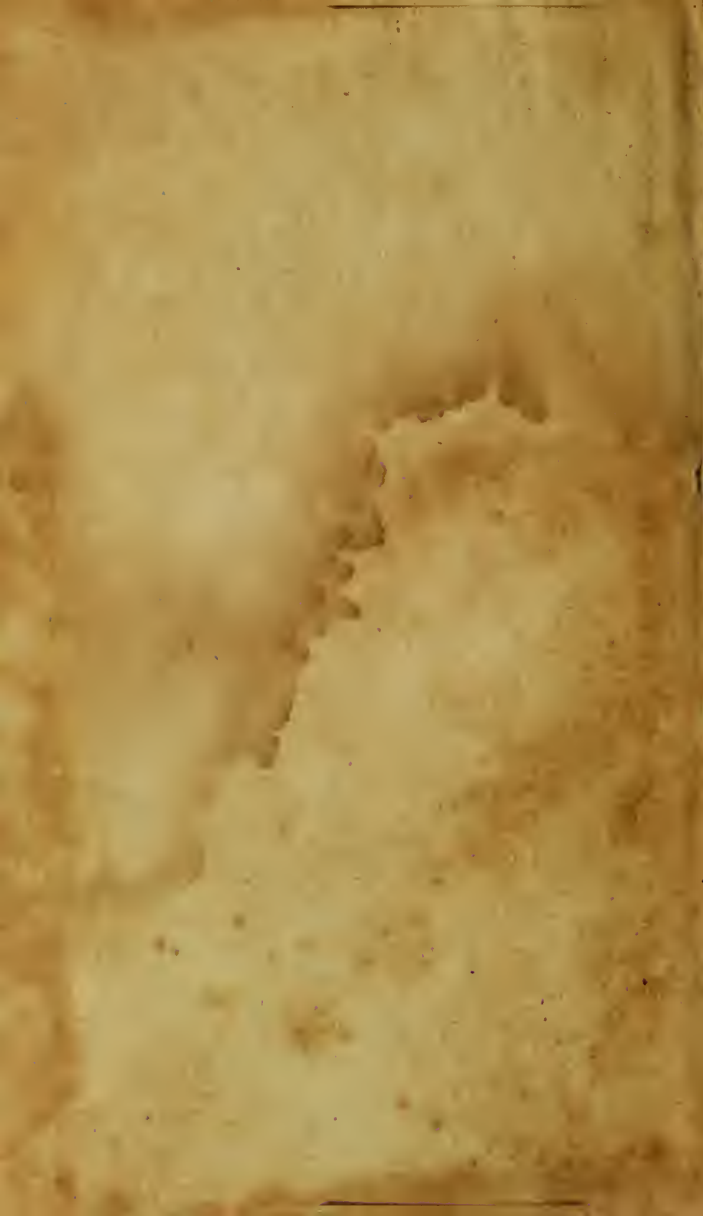
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