

A dictionary of practical surgery: containing a complete exhibition of the present state of the principles and practice of surgery, collected from the best and most original sources of information, and illustrated by critical remarks (Volume 2).

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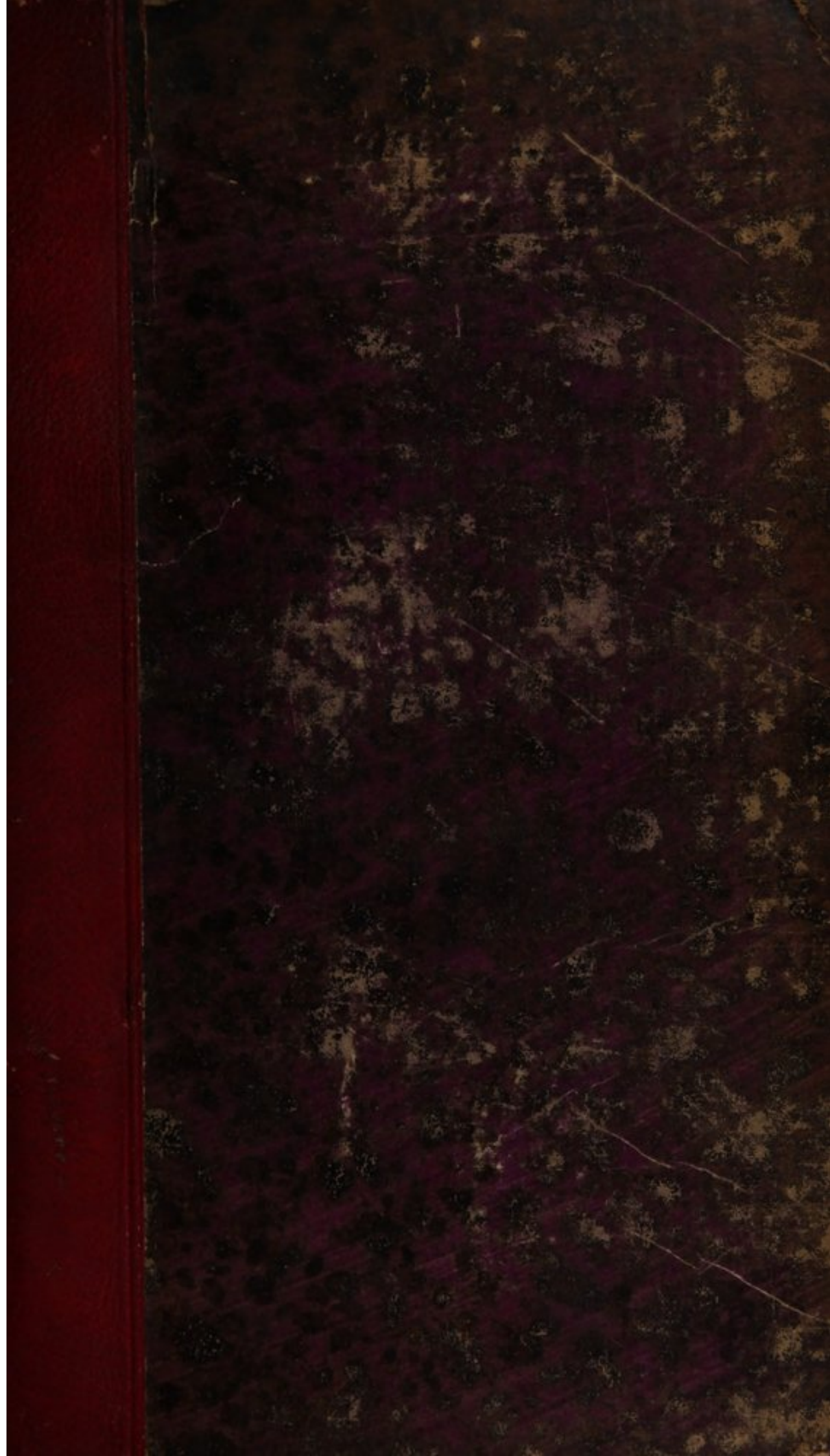
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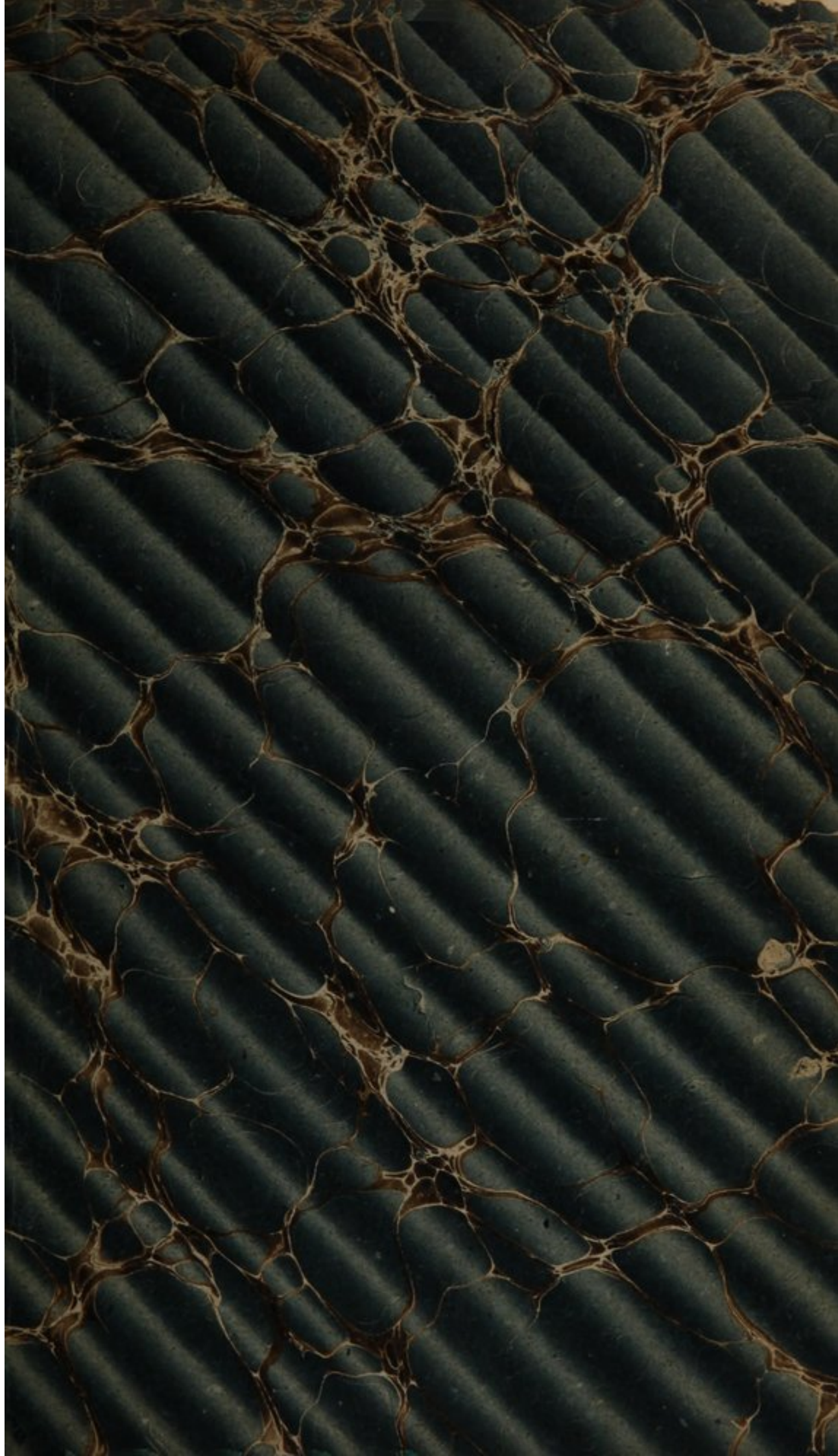
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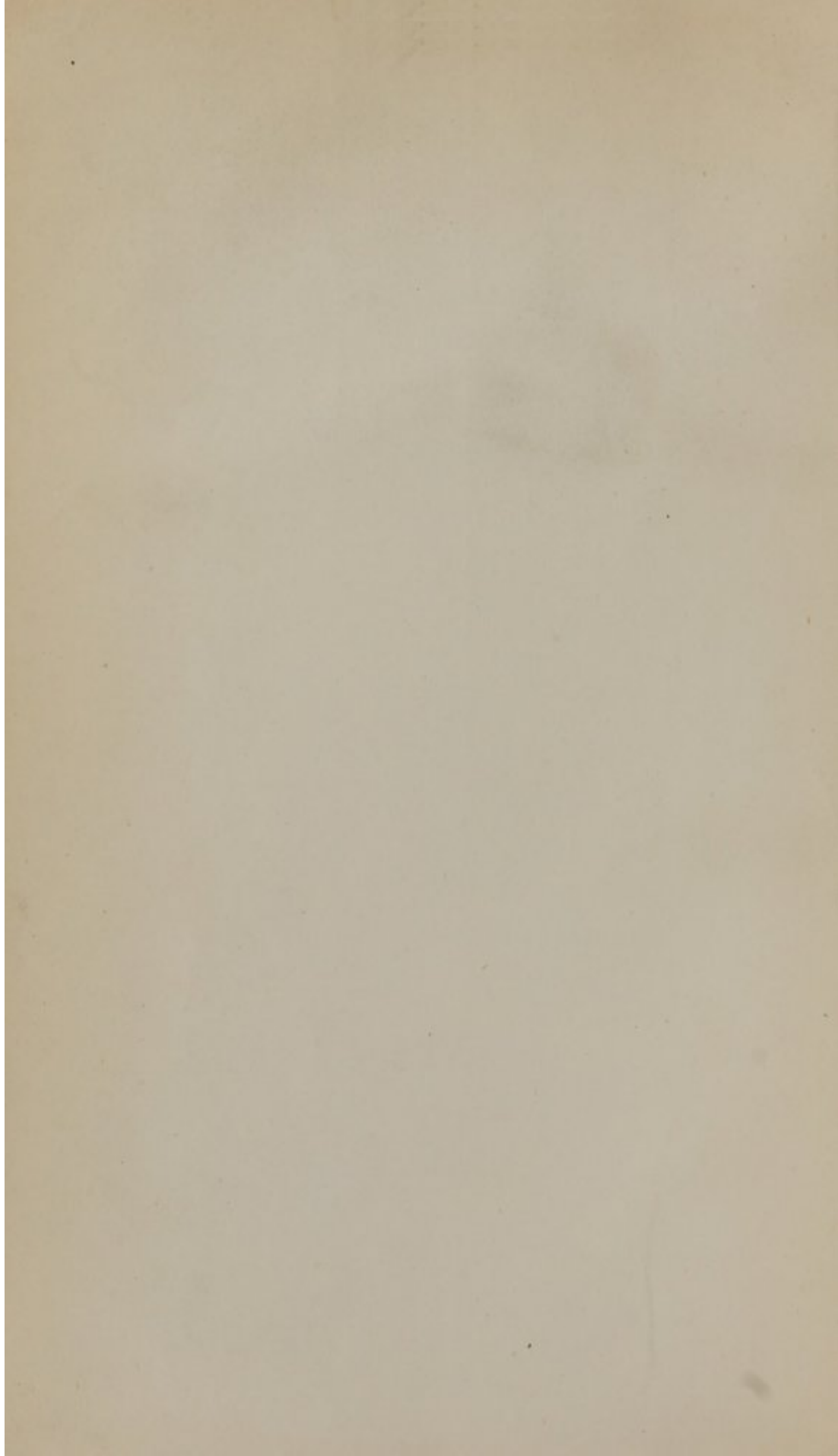
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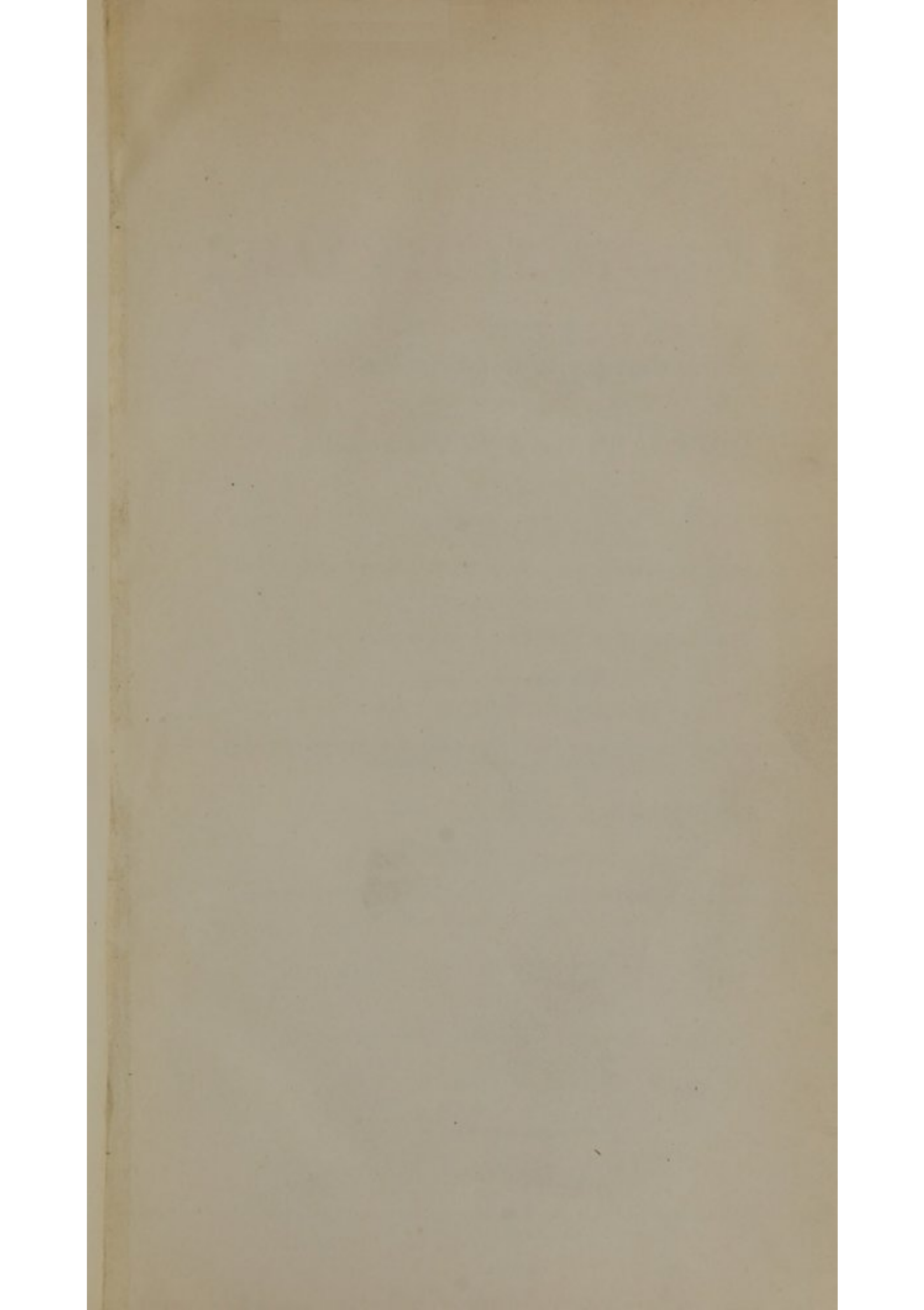
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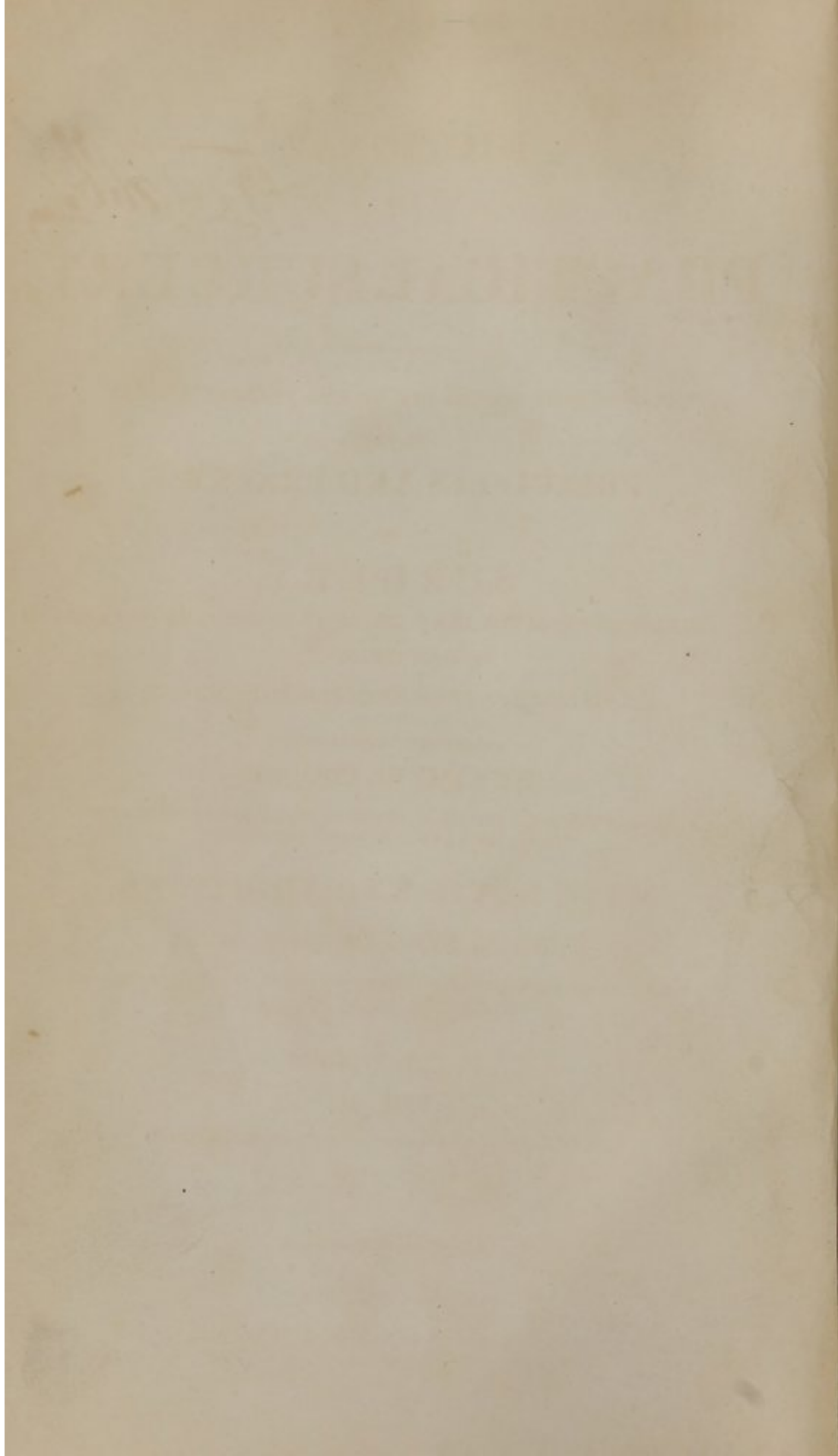
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A
DICTIONARY
OF
H. Tabbs
PRACTICAL SURGERY,
CONTAINING
Thos. Stone
A COMPLETE EXHIBITION OF THE PRESENT STATE
OF THE
PRINCIPLES AND PRACTICE
OF
SURGERY,
COLLECTED FROM THE BEST AND MOST ORIGINAL SOURCES OF
INFORMATION,

AND ILLUSTRATED BY CRITICAL REMARKS.

BY SAMUEL COOPER,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, LONDON, AND AUTHOR OF THE
"FIRST LINES OF THE PRACTICE OF SURGERY."

WITH NOTES AND ADDITIONS,

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IN TWO VOLUMES.

VOL. II.

SECOND AMERICAN, FROM AN ENLARGED LONDON EDITION.



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PRINCIPLES AND PRACTICE

PRINCIPLES AND PRACTICE

A DICTIONARY

OF

PRACTICAL SURGERY.

HÆMATOCELE. (from *αἷμα*, blood, and *κῆλη*, a tumour.) This is a swelling of the scrotum, or spermatic cord, proceeding from, or caused by, blood.

A distinction of the different kinds of hæmatocele, though not usually made, is absolutely necessary toward rightly understanding the disease; the general idea, or conception of which, appears to Mr. Pott to be somewhat erroneous, and to have produced a prognostic which is ill-founded, and hasty. According to this eminent surgeon, "the disease, properly called hæmatocele, is of four kinds; two of which have their seat within the tunica vaginalis testis; one within the albuginea; and the fourth in the tunica communis, or common cellular membrane, investing the spermatic vessels.

"In passing an instrument, in order to let out the water from an hydrocele of the vaginal coat, a vessel is sometimes wounded, which is of such size, as to tinge the fluid pretty deeply at the time of its running out; the orifice becoming close, when the water is all discharged, and a plaster being applied, the blood ceases to flow from thence, but insinuates itself partly into the cavity of the vaginal coat, and partly into the cells of the dartos; making, sometimes, in the space of a few hours, a tumour nearly equal in size to the original hydrocele. This is one species.

"It sometimes happens, in tapping an hydrocele, that although the fluid discharged by that operation be perfectly clear and limpid, yet, in a very short space of time, (sometimes in a few hours) the scrotum becomes as large as it was before, and palpably as full of a fluid. If a new puncture be now made, the discharge, instead of being limpid (as be-

fore) is now either pure blood, or very bloody. This is another species: but, like the preceding, confined to the tunica vaginalis.

"The whole vascular compages of the testicle is sometimes very much enlarged, and at the same time rendered so lax and loose, that the tumour produced thereby has, to the fingers of an examiner, very much the appearance of a swelling composed of a mere fluid, supposed to be somewhat thick or viscid. This is in some measure a deception; but not totally so: the greater part of the tumefaction is caused by the loosened texture of the testis; but there is very frequently a quantity of extravasated blood also.

"If this be supposed to be an hydrocele, and pierced, the discharge will be mere blood. This is a third kind of hæmatocele; and very different, in all its circumstances, from the two preceding: the fluid is shed from the vessels of the glandular part of the testicle, and contained within the tunica albuginea.

"The fourth consists in a rupture of, and an effusion of blood from, a branch of the spermatic vein, in its passage from the groin to the testicle. In which case, the extravasation is made into the tunica communis, or cellular membrane investing the spermatic vessels."

Each of these four, Mr. Pott says, he has seen so distinctly, and perfectly, that he has not the smallest doubt concerning their existence, and of their difference from each other.

"The tunica vaginalis testis, (he continues) in a natural and healthy state, is a membrane, which, although firm, is of no great thickness; it is white, or rather of a reddish white colour; and its blood-vessels are (in a healthy state) no more apparent to the eye, than are those of the

tunica albuginea: but when it has been long or much distended, it thereby becomes thick, and tough; and the vessels (especially those of its inner surface) are sometimes so large, as to be very visiole, and even varicous. If one of these lies in the way of the instrument, wherewith the palliative cure is performed, it is sometimes wounded; in which case, as I have already observed, the first part of the serum which is discharged, is pretty deeply tinged with blood.

"Upon the collapsion of the membranes, and of the empty bag, this kind of hemorrhage generally ceases, and nothing more comes of it. But it sometimes happens, either from the toughness of the tunic, or from the varicous state of the vessel, that the wound (especially if made by a lancet) does not immediately unite; but continues to discharge blood into the cavity of the said tunic, thereby producing a new tumour, and a fresh necessity of operation."

This is what Mr. Pott calls the first species of hæmatocele, which evidently consists in a wound of a vessel of the vaginal tunic.

"Upon the sudden discharge of the fluid, from the bag of an over-stretched hydrocele, and thereby removing all counter-pressure against the sides of the vessels, some of which are become varicous, one of them will, sometimes, without having been wounded, burst. If the quantity of blood, shed from the vessel so burst, be small, it is soon absorbed again; and, creating no trouble, the thing is not known*. But if the quantity be considerable, it, like the preceding, occasions a new tumour, and calls for a repetition of the operation." This, Mr. Pott calls the second species: "which, like the first, belongs entirely to the vaginal coat, and has no concern either with the testicle, or with the spermatic vessels. In both, the bag which was full of water, becomes in a short space of time distended with blood; which blood, if not carried off by absorption, must be discharged by opening the containing cyst: but in neither of these can castration (though said to be the only remedy) be ever necessary: the mere division of the sacculus, and the application of dry lint to its inside, will, in general, if not always, restrain the hemorrhage, and answer every purpose, for which so severe a remedy has been prescribed. The other two are indeed of more consequence; they interest

either the testicle itself, or the vessels by which it is supplied with blood, and rendered capable of executing its office; and are sometimes not curable, but by removal of the part.

"One of these is seated within the tunica albuginea of the testicle; the other in the tunica communis of its vessels: they are neither of them very frequent; but when they do happen, they call for all our attention.

"If blood be extravasated within the tunica albuginea, or proper coat of the testicle, in consequence of a great relaxation, and (as it were, dissolution of part of the vascular compages of that gland, and the quantity be considerable, it will afford or produce a fluctuation, to the hand of an examiner, very like to that of an hydrocele of the tunica vaginalis; allowing something for the different density of the different fluids, and the greater depth of the former from the surface.

"If this be mistaken for a simple hydrocele, and an opening be made, the discharge will be blood; not fluid, or very thin; not like to blood circulating through its proper vessels; but dark, and dusky in colour, and nearly of the consistence of thin chocolate (like to what is most frequently found in the imperforate vagina.) The quantity discharged will be much smaller than was expected from the size of the tumour; which size will not be considerably diminished. When this small quantity of blood has been so drawn off, the testicle will, upon examination, be found to be much larger than it ought to be; as well as much more loose and flabby; instead of that roundness and resistance arising from an healthy state of the gland, within its firm strong coat; it is soft, and capable of being compressed almost flat, and that generally without any of that pain and uneasiness, which always attend the compression of a sound testicle. If the bleeding ceases upon the withdrawing the cannula, (supposing a trochar to have been used) and the puncture closes, a fresh accumulation of the same kind of fluid is soon made, and the same degree of tumefaction is produced, as before the operation: if the orifice does not close, the hemorrhage continues, and very soon becomes alarming.

"In the two preceding species, the blood comes from the tunica vaginalis, the testis itself being safe, and unconcerned; and the remedy is found, by opening the cavity of the said tunic; but in this, the hemorrhage comes from the substance of the testicle; from the convolutions of the spermatic artery, within the tunica albuginea: the division of the vaginal coat

* Hence, the last running of the water from an hydrocele, is often bloody.

can here do no good; and the incision made into the albuginea can only increase the mischief: the testicle is spoiled, or rendered useless, by that kind of alteration made in it, previous to the extravasation; and castration is the only cure, which a patient in such circumstances can depend upon.

"The last species of this disease arises from a bursting of a branch of the spermatic vein, between the groin and scrotum, in what is generally known by the name of the spermatic process. This, which is generally produced by great or sudden exertions of strength, feats of agility, &c. may happen to persons in the best health, whose blood and juices are in the best order, and whose genital parts are free from blemish, or disease.

"The effusion, or extravasation, is made into the cellular membrane, which invests and envelopes the spermatic vessels, and has something the appearance of a true hernia. When the case is clear, and the extravasated blood does not give way to discutient applications, the only remedy is to lay the tumour fairly open, through its whole length. If the vessel or breach be small, the hemorrhage may be restrained by mere compression with dry lint, or by the use of styptics; but if it be large, and these means do not succeed, the ligature must be made use of." (*Pott's Chirurgical Works, Vol. II.*)

The bleeding point should be tied singly. It can never be warrantable to tie the whole spermatic chord, and then perform castration, in a case like this, notwithstanding Mr. Pott advises this plan, in case the bleeding branch cannot be tied singly. Discutient applications, and an occasional purge, will almost always disperse the swelling; and if not, opening it, taking out the blood, filling the cavity with lint, and using compression, one may say, will always answer.

The best of the old writers on Hematocele, are Celsus and Paulus Aegineta: Pott has excelled every modern one.

HÆMORRHAGIA. (See Hemorrhage.)

HÆMORRHOIDES. (See Hemorrhoids.)

HARE-LIP. (*Labia Leporina.*) A fissure, or longitudinal division of one or both lips.

Children are frequently born with this kind of malformation, particularly of the upper lip. Sometimes the portions of the lip, which ought to be united, have a considerable interspace between them; in other instances they are not much apart. The cleft is occasionally double, there being a little lobe, or small portion of the lip, situated between the two fissures.

Every species of the deformity has the same appellation of *hare-lip*, in consequence of the imagined resemblance which the part has to the upper lip of a hare.

The fissure commonly affects only the lip itself. In many cases, however, it extends along the bones of the palate, even as far as the uvula. Sometimes these bones are totally wanting; sometimes, they are only divided by a fissure.

Such a malformation is always peculiarly afflicting. In its least degree, it constantly occasions considerable deformity; and when it is more marked, it frequently hinders infants from sucking, and makes it indispensable to nourish them by other means. When the lower lip alone is affected, which is not most frequently the case, the child can neither retain its saliva, nor learn to speak, except with the greatest impediment. But when the fissure pervades the palate, the patient not only never articulates but very imperfectly, but cannot masticate nor swallow, except with great difficulty, on account of the food readily getting up into the nose.

After these remarks, it is obviously very important to cure the malformation as soon as possible. But as this object cannot be accomplished without an operation, attended with some degree of pain, several practitioners, as Dionis, Garengeot, and others, have advised waiting till the child is four or five years old, on the supposition, that, at an earlier age, the child's agitations and cries would render the operation impracticable, or derange all the proceedings taken to ensure its success. It is plain, however, that such reasons are not exceedingly weighty. A child four or five years old, and, very often, even one eight or ten years of age, is more difficult to manage, in this circumstance, than an infant only a few months old. There is no child, though advanced to that age, which has not a thousand times more dread of the pain than of the deformity, or of the inconveniences of the complaint, to which he is habituated; while an infant of tender years fears nothing, and only feels the pain of the moment.

A more rational objection is the liability of infants to convulsions after operations, and this has induced many excellent surgeons of the present day to advise postponing the cure of the hare-lip, till the child is about two years old. Perhaps this apprehension, however, does not vindicate the delay.

Mr. Sharp observes, "there are many lips, where the loss of substance is so great, that the edges of the fissure cannot

be brought together, or, at best, where they can but just touch; in which case it need not be advised to forbear the attempt; it is likewise forbid in young children, and with reason, if they suck; but otherwise it may be undertaken with great safety, and even with more probability of success than in others that are older." (*Operations in Surgery, chap. 34*)

Le Dran has performed the operation on children of all ages, even on those at the breast. B. Bell did it with success on an infant only three months old. Muys advises it to be undertaken as soon as the child is six months old. Roonhuysen operated on children ten weeks after their birth, and all his contemporaries have praised his singular dexterity and success. This latter surgeon advises, as a step essential to the success of the operation, to hinder children from sleeping a certain time before undertaking it, in order that they may fall asleep immediately afterwards. Opiates have also been recommended to ensure this occurrence. M. Louis is of opinion, that the operation done without any suture will succeed better on infants, than any other method. This subject, however, we shall treat of in due time.

All practitioners entertain the same sentiment with regard to the object of this operation, which consists in reducing the preternatural solution of continuity to the state of a simple wound, by cutting off the edges of the separated parts throughout their length, and then approximating these parts, so as to make them continue in contact until they have completely grown together. But although such principles are admitted by all surgeons, all are not of the same opinion with respect to the method, which it is best to follow in practice; some having recourse to sutures to keep the edges of the wound in contact; others disapproving of the plan, and believing that a perfect cure may always be accomplished by means of adhesive plaster and a uniting bandage, so as to save the patient a great deal of pain, which sutures always occasion.

M. Louis has been the chief advocate for this method, which proscribes sutures, and he has published on this subject two very interesting memoirs, which we shall presently quote, for the purpose of informing the reader of the reasons, on which this celebrated man founded his opinion on this matter, and of the means which he employed.

M. Louis thought that the use of sutures, in the operation for the hare-lip, originated from a false idea which prevailed, respecting the nature of the disease. The fissure in the lip having been

imprudently imputed to the loss of substance, it was thought impossible to keep the parts in contact, except by a suture.

"The separation of the edges of the fissure in the lip is only the effect of the retraction of the muscles, and is always proportioned to the extent of the cleft. Those who have hare-lips are capable of bringing the edges of the fissure together by muscular action, when they pucker up their mouths. On the other hand, the separation is considerably increased when such persons laugh, and the breach appears excessively large, after superficially paring off its edges on both sides. Hence, the interspace in the hare-lip must not be mistaken for a loss of substance. The truth of this is confirmed by the effects of sticking plaster, which has sometimes been applied to the hare-lip, as a preparatory measure before the operation, and which exceedingly lessens the separation of the parts.

"According to the confession of all who have written in favour of the twisted suture, it seems advisable only on the false idea, that the hare-lip is the effect of a greater or lesser loss of substance; and they say, positively, that we must not have recourse to it when there is only a simple division to be united. The twisted suture must then be proscribed from the operation for the natural hare-lip, since it is proved that this malformation is unattended with a loss of substance. But the loss of substance is but too real, after the extirpation of scirrhus and cancerous tumours, to which the lips are very subject. Yet, even in these very cases, the extensibility of the lips allows an attempt to be made to reunite the double incision, by which the tumour has been removed, and it succeeds without the smallest deformity, when care has been taken to direct each incision obliquely, so that both of them form, where they meet, an acute angle, in the base of which the tumour is comprised. It is on this occasion, that the means to procure an union ought to be the more efficacious, because the difficulty of keeping the edges of the wound approximated is greater. M. Pibrac has already shewn, in his memoir on the abuse of sutures, when speaking of the hare-lip, that they are badly conceived means, and more hurtful in proportion to the greater loss of substance, because the greater the interspace is between the two parts, the more fear is there of their efforts on the needles or pins left in the wound. Hence, care has always been taken to make the dressings aid the operation of the suture. After this consideration, judiciously made by the partisans of this plan, there was only one more step to be taken, according to

M. Pibrac, in order to evince the necessity of proscribing it. The cap, or copper head-piece, described by Verduc and Nuck, for compressing the cheeks; the clasps of Heister; the strips of adhesive plaster, which no author has neglected expressly to recommend; all this has been invented in order to support the parts, and keep them from being disunited. When the suture failed, it was by these means, that the original deformity was corrected, together with that produced by the laceration, which would not have occurred without the suture. As, then, the dressings, when methodically applied, are capable of effectually rectifying the mischief of the suture, why should they be considered only as a resource in a mere accidental case? Why should they not be made the chief and primary means of reuniting the lips, even when there is a loss of substance?

"Nothing can be opposed to the proofs adduced upon this point. They are even drawn from the practice of those, who have employed sutures without success. Such persons themselves have furnished the arguments in favour of the bandage being capable of repairing the mischief resulting from the twisted suture. Practitioners can only be vindicated in employing this suture by confessing, that the true principles of the art have not been established concerning this subject."

M. Louis, with a view of perfecting our notions on this matter, lays it down as a fact, that, the retraction of the muscles being the cause of the separation of the edges of the fissure, it is not to those edges we are to apply the force which is to unite them; but that it should be applied further to the very parts, whose action (the cause of the separation) is to be impeded, and whose contraction is thus to be prevented. A great many means for supporting the wound, only irritate the muscles and excite them to action, and it is this action which we should endeavour to overcome. The means for promoting a union can only be methodical, when directly employed to prevent such action, by an immediate application on the point where it is to be resisted. The facility, with which the parts may be brought forward, so as to bring the two commissures of the lips into contact, by the mere pressure of the hands, shews what may be expected from a very simple apparatus, which will execute the same office without any efforts, in a firm and permanent manner, and which will render sutures, unnecessary, the inconveniences of which are too well known.

M. Louis, after having explained the reasons of the theory, on which he found-

ed his method, relates several cases, taken either from his own practice, or that of others, to illustrate its advantages. He details the history of twenty cases, in which his plan perfectly succeeded, both in accidental hare-lips, with considerable loss of substance, and in natural ones. In most of these instances, however, it was thought proper to assist the bandage with one stitch at the extremity of the fissure, close to the vermilion border of the lip, for the purpose of keeping the parts securely on a level.

Notwithstanding the operation as performed with the twisted suture, is opposed by an authority of such weight as that of M. Louis, still it is the one most commonly practised. Few practitioners doubt that a hare-lip may be cured by means of adhesive plaster, and uniting bandages, quite as perfectly as by a suture; and all readily allow, that the first of these methods, as being more simple and less painful, would be preferable to the latter one, if it were equally sure of succeeding. But it is considered far more uncertain in its effect. To accomplish a complete cure, the parts to be united must be maintained in perfect contact, until they have contracted the necessary adhesion; and how can we always depend upon a bandage keeping them from being displaced? What other means, besides a suture, affords in this respect such perfect security?

We shall not take upon us to decide which of these two methods is the best, contenting ourselves with explaining the mode of proceeding in both, and leaving it for surgeons to determine, by their own experience, and the evidence of facts, which one merits the difference. First, of the ancient plan.

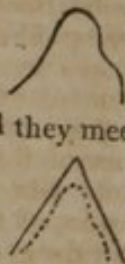
Having placed the patient in a convenient situation, the first thing is to examine whether there is any adhesion of the lip to the gum; and, if there be one, to divide it with a knife. Some authors (*Sharp*) recommend always dividing the *frænulum*, which attaches the lip to the gum; but, when the hare-lip is at some distance from this part, and will not be in the way in the operation, there is no need of dividing it; but, when the *frænulum* is situated in the centre of the division, it is clear that, in operating, we must necessarily include it in the incision, and it must be divided before-hand, taking care not to encroach too much upon the gum, lest the alveolar process should be laid bare; nor too much upon the lip, because making it thinner would be unfavourable to its union.

Sometimes one of the incisor teeth being opposite the fissure, and projecting

forward, must be drawn, lest it should distend and irritate the parts, after they have been brought into contact.

Sometimes also, but particularly in cases in which there is a cleft in the bony part of the palate, a portion of the os maxillare superius forms such a projection, just in the situation of the fissure in the lip, that it would render the union very difficult, if not impracticable. In this circumstance, the only plan is to cut off the projecting angles of bone, which may easily be done with a strong pair of bone-nippers.

In the operation, the grand object is to make the wound as smooth and even a cut as possible, in order that it may more certainly unite by the first intention, and of such a shape, that the cicatrix may form only one narrow line. The edges of the fissure should, therefore, never be cut off with scissors, which always bruise the fibres which they divide, and a sharp knife is always to be preferred. The best plan is, either to place any flat instrument, such as a spatula, underneath one portion of the lip, and then holding the part stretched and supported on it, to cut away the whole of the callous edge; or else to hold the part with a pair of forceps, the under blade of which is much broader than the upper one: the first serves to support the lip; the other contributes also to this effect, and, at the same time, serves as a sort of ruler in guiding the knife in an accurately straight line. When the forceps are preferred, the surgeon must of course leave on the side of the upper blade, just as much of the edge of the fissure as is to be removed, so that it can be cut off with one sweep of the knife. This is to be done on each side of the cleft, observing the rule, to make the new wound in straight lines, because the sides of it can never be made to correspond without this caution. For instance, if the hare-lip had this shape, the incision of the edges must be continued in straight lines, till they meet in the manner here represented. In short, the two incisions are to be perfectly straight, and are to meet at an angle above, in order that the whole track of the wound may be brought together, and united by the first intention.



Two silver pins, made with steel points, are next to be introduced through the edges of the wound, so as to keep them accurately in contact. A piece of thread is then to be repeatedly wound round the ends of the pins, from one side of the division to the other, first transversely, then obliquely, from the right or left end of one pin above, to the opposite end of the lower one, &c. Thus the thread is made to cross as many points of the wound as possible,

which greatly contributes to maintaining its edges in even apposition. It is obvious, that a great deal of exactness is requisite in introducing the pins, in order that the edges of the incision may afterwards be precisely applied to each other. For this purpose, some previously place the sides of the wound in the best position, and mark with a pen the points at which the pins should enter, and come out again. The pins ought never to extend more deeply than about two-thirds through the substance of the lip, and it would be a great improvement always to have them constructed a little curved, as this is the course which they naturally ought to take when introduced. The steel points should also admit of being easily taken off, when the pins have been applied; and, perhaps, having them to screw off and on is the best mode, as removing them in this way is not so likely to be attended with any sudden jerk, which might be injurious to the wound, as if they were made to pull off. The pins may commonly be safely removed in about four days, after which the support of sticking-plaster will be quite sufficient.

The process we have just been describing, is what is well known by the name of the *twisted suture*.

It is worthy of attention, that this suture is applicable to other surgical cases, in which the grand object is to heal some fistula or opening, by the first intention. Mr. Sharp says, it is of great service in fistulae of the urethra, remaining after the operation for the stone, in which case the callous edges may be cut off, and the lips of the wound held together by the above method.

What has hitherto been stated, refers to the most simple form of the hare-lip, viz. to that which presents only one fissure. When there are two clefts, the cure is accomplished on the same principles; but, it is more difficult of execution; indeed, so much so, that the old surgeons, until the time of Heister, have almost all regarded the operation for the double hare-lip, as impracticable, though they have described it, directing us to operate on each fissure, just as if there were only one. M. de la Faye, however, performed this operation with success, as may be learnt in the *Mémoires de l'Acad. de Chirurgie, Tom 4. 4to.* But, we are indebted to M. Louis for having obviated all the difficulties, by simply proposing to do the operation at two times, and to await the perfect cure of one of the fissures, before undertaking that of the other. Heister seems to have conceived a similar idea, about the same time, but he never put it in practice, nor did he even positively advise it.

In cutting off the edges of the fissure, the incisions must be carried to the upper part of the lip; and even when the fissure

does not reach wholly up the lip, the same thing should be done; for, in this manner, the sides of the wound will admit of being applied together more uniformly, and the cicatrix will have a better appearance. We should also not be too sparing of the edges which are to be cut off. Practitioners, says M. Louis, persuaded that the hare-lip was a division with loss of substance, have invariably advised the removal of the *callous* edges. But, in the natural hare-lip there is no callosity; the margins of the fissure are composed, like those of the lip itself, of a pulpy, fresh-coloured, vermilion flesh, covered with an exceedingly delicate cuticle. The whole of the part having this appearance, must be taken away, even encroaching a little way on the true skin. At the lower part of the fissure, towards the nearest commissure, a rounded red substance is commonly situated, which it is absolutely necessary to include in the incision. Were this neglected, the union below would be unequal, and, through an injudicious economy, a degree of deformity would remain, which is always unpleasant, when it can be avoided. The grand object, however, is to make the two incisions diverge at an acute angle, so that the edges may be put into reciprocal contact their whole length, without the least inequality.

M. Louis used to operate as follows: the patient being seated in a good light, his head is to be supported on an assistant's breast, who, with the fingers of both hands, pushes the cheeks forward, in order to bring the edges of the fissure near to each other. These are to be laid on a piece of pasteboard, which is to be put between the jaw and lip, and be an inch and a half long, from twelve to fifteen lines broad, and at most one line thick. The upper end should be rounded, by flattening the corners. To facilitate the incision, the lip is to be stretched over the pasteboard, the operator holding one portion over the right with the thumb and index finger of the left hand, while the assistant does the same thing on the left side. Things being thus disposed, the edges of the hare-lip are to be cut off with two sweeps of the bistoury, in two oblique lines, forming an acute angle above the fissure.

For a long while scissars were preferred to a knife, for cutting off the edges of the hare-lip; but, they are now very generally disused for this purpose. The pinching and bruising, which result from the action of the two blades, in overlapping each other, are deemed obstacles to the union of the sides of the wound; for, the bruised fibres must necessarily suppurate; and, slight as this may be, the

cure is at least retarded by it. Let not practitioners be led by Mr. B. Bell's stating, that in one instance he cut off one side of the fissure with a knife, and the other with scissars; that the latter cut produced least pain, and that on this side there was no more swelling nor inflammation than on the opposite one.

The pins should be introduced at least two-thirds of the way through the substance of the lip, lest a furrow should remain on the inside of the part, which might prove troublesome, by allowing pieces of food to lodge in it. There is, however, a stronger reason for attending to this circumstance, viz. the hemorrhage which may take place when it is neglected. The bleeding almost always ceases, as soon as the edges of the wound have been brought together by means of the suture, when the pins are properly placed; but, when they have not been introduced deeply enough, the posterior surfaces of the incisions not been applied to each other, the blood may continue to run into the mouth, and give the surgeon an immense deal of trouble. In the memoir written by Louis, there is a history of a case, in which the patient died in consequence of such an accident. Persons who had undergone the operation, were always advised to swallow their spittle, even though mixed with blood, in order to avoid disturbing the wound, by getting rid of it otherwise. In the case alluded to, the patient, who had been operated upon for a cancer which he had in the lip, swallowed the blood as he had been directed to do, and he bled so profusely that he died. On the examination of the body, the stomach, and small intestines were found full of blood. "This deplorable case," says the illustrious author who relates it, "deserves to be recorded for public instruction, for the purpose of keeping alive the attention of surgeons on all occasions, where, in consequence of any operation whatsoever, there is reason to fear any bleeding in the cavity of the mouth. Platner is the only writer, who, as far as I know, foresaw this kind of danger. The bleeding from the edges of the wound stops of itself, (says he) as soon as they have been brought into contact, and stitched together; but, care must be taken that the patient does not swallow the blood, which might make him vomit, or else suffocate him. Hence, his head should be elevated, that the blood may escape externally, a precaution more particularly necessary in regard to young children."

Having described the mode of operating for the hare-lip, as approved of by the generality of practitioners, and detailed

every thing which seemed material, we have now only to describe the method which M. Louis adopted. His sentiments respecting several particular points of the operation, have been already stated; and an account of the means which he employed, in lieu of the twisted suture, for uniting the edges of the wound, is all that we have to offer farther on the present subject.

Different authors, as already mentioned, have devised bandages for supporting the two portions of the divided lip, and lessening the pressure which they make against the pins designed for uniting them. Franco and Quesnay, in particular, have described two kinds, which have been considered very well calculated for this object; and these means were not only employed as auxiliary, but even sometimes as curative ones, when it was impossible to use needles. To such bandages, too complicated and too uncertain, in their effect, M. Louis prefers a simple linen roller, one inch wide, three ells long, and rolled up into two unequal heads. He begins with applying the body of this bandage to the middle of the forehead; he unrolls the two heads, from before backward, above the ears between the upper part of the cartilage, and the cranium, in order to make them cross on the nape of the neck, and then be carried forward again. The assistant, who supports the head, and pushes forward the cheeks, must lift up the ends of his fingers, in the place of which, on each side, a thick compress is to be put. This being covered, and pushed from behind forward, by the roller, will constantly perform the office of the assistant's fingers, who is to continue to support the apparatus, until it is all completely applied. The longest of the two heads of the roller, being slit in two places near the lip, presents two parallel openings; the remnant of the shortest one is divided into two parts, as far as its end. The two little narrow bands, in which it terminates, must be passed through the openings of the former, and made to cross upon the middle of the lip. The ends of the roller, being carried from before backward, are then to be made to cross again on the nape of the neck, where the shortest is to end. The remainder of the long one is to be employed in making turns round the head. This bandage may be rendered much more stable, by a piece of tape, which is to pass the forehead, over the sagittal suture, and be pinned at each end to the circumvolutions of the roller; while a second piece of tape is to cross the first one at the top of the head, and

also to be attached, at its extremities, to the uniting bandage, and the compresses, placed under the zygomatic arches, for the purpose of pushing forward the cheeks.

This bandage is extremely simple, and would promise great advantages, even if its success had not been already proved by the cures which it has effected under the hands of its inventor, and several other surgeons, who have employed it, in consequence of his recommendation. Perhaps, if it has not been equally successful with others, this is rather owing to the defective manner of applying, than to any fault in the plan itself. However it may be, it is much to be wished that this means were sufficiently certain in its effect, to become more generally adopted, so that the suture might be relinquished.

All that we have said concerning the operation for the hare-lip, is equally applicable, not only to the treatment of cancer of the lip, but also to that of accidental cuts, or lacerations, of this part, from any cause whatsoever. We shall only remark that, in a recent wound, all the duty of the surgeon is to have recourse immediately, either to the twisted suture, or the uniting bandage.

In cases, in which the fissure affects the bones forming the roof of the mouth, after the soft parts have been united in the manner above related, the bones, and other separated parts, are ordinarily observed to become approximated, and nature thus corrects, more or less, this kind of deformity. But this does not always happen, and when these parts remain so considerably separated, as to obstruct speech and deglutition, or cause any other inconvenience, a plate of gold or silver, exactly adapted to the arch of the palate, and steadied by means of a piece of sponge, fixed to its convex side, and introduced into the cleft, may sometimes be usefully employed. When the sponge is of suitable size, and very dry, before being used, it will be swelled by the moisture of the adjacent parts, which alone will be sufficient, in many cases, to keep it in its situation, so as greatly to facilitate speaking and swallowing. Sometimes, however, the fissure is so shaped, that the sponge cannot be fixed in it: this principally happens when the opening widens very much, as it approaches externally. In such cases it has been proposed to fix a plate of gold, by means of springs, made of the same metal, so constructed as to fit the cavity; but, no contrivance seems yet to have answered.

On the subject of the hare-lip, consult

B. Bell's Surgery, Vol. 4. Heister's Surgery. Le Dran's Operations; Sharp's Operations; Latta's Surgery, Vol. 2; L'Encyclopédie Méthodique, Partie Chirurgicale, Art. Bec. de Lievre. The Observations of M. Louis, in Mém. de l'Acad. de Chirurgie, Tom. 4. in 4to. De la Médecine Opératoire, par Sabatier, Tom. 3. Œuvres Chirurgicales de Desault, par Bichat, Tom. 2. Traité des Opérations de Chirurgie, par A. Bertrandi, Chap. 19. Richter's Anfangsgrunde der Wundarzneikunst, Band 2. Kap. 7. Richerand's Nosographie Chirurgicale, Tom. 3. p. 245, &c. Edit. 2. Lassus, Pathologie Chirurgicale, Tom. 2, p. 451, &c. Edit. 2.

HEAD, INJURIES OF.

Mr. Pott remarks, that, though the scalp be called the common tegument of the head, yet, from the variety of parts of which it is composed, from their structure, connexions, and uses, injuries done to it by external violence, become of much more consequence, than the same kind of ills can prove, when inflicted on the common teguments of the rest of the body.

Passing over incised wounds, which have no particularity, Mr. Pott proceeds immediately to those which, (though the mischief is originally confined to the mere scalp) yet are frequently very terrible to behold, are often attended with alarming symptoms, and sometimes with danger. Lacerated and punctured wounds, are those referred to. "The former may be reduced to two kinds, viz. those in which the scalp, though torn, or unequally divided, still keeps its natural situation, and is not stript nor separated from the cranium, to any considerable distance beyond the breadth of the wound; and those, in which it is considerably detached from the parts it ought to cover.

"The first of these, if simple, and not combined with the symptoms, or appearances of any other mischief, do not require any particular or different treatment, from what the same kind of wounds require on all other parts; but the latter, (those in which the scalp is separated and detached from the parts it ought to cover) are not only, by the different methods in which they may be treated, frequently capable of being cured with a considerable deal more or less ease and expedition, but are also sometimes a matter of great consequence to the health and well-being of the patient."

Mr. Pott makes no scruple of declaring it as his opinion, that the preservation of the scalp ought always to be attempted.

unless it be so torn as to be absolutely spoiled, or there are manifest present symptoms of other mischief. This kind of wound is sometimes very terrible to look at, and they who have not been accustomed to see it, may be inclined to think there is no remedy but excision; but, Mr. Pott says, he has so often made the experiment of endeavouring to preserve the torn piece, and so often succeeded, that he would recommend it as a thing always to be attempted, even though a part of the cranium should be perfectly bare. The removal of it necessarily produces a larger sore, which must require a good deal of time to heal, and must leave considerable deformity: the preservation of it prevents both.

Here we may remark, that all practitioners now invariably avoid cutting away the scalp, even in the circumstances, in which such practice was allowed by Pott. By *spoiled* this eminent writer must mean so injured as necessarily to slough afterwards. However, as no harm results from taking the chance of its not sloughing, which never can be with certainty foretold; and as the excision of the part is painful, and productive of no benefit, even if sloughing must follow, such operation is, in every point of view, quite wrong. With respect to other mischief, as a reason, the examination of the cranium, and even trephining, never require any of the scalp to be cut away. See *Trephine*.

Let the surgeon, therefore, always make the torn piece clean from all dirt, or foreign bodies, and restore it as quickly, and as perfectly as he can, to its natural situation.

Notwithstanding Mr. Pott assents to the employment of sutures, for uniting certain lacerated wounds of the scalp, we may state, that the best practitioners of the present day only employ sticking-plaster. Sometimes, the loosened scalp will unite with the parts from which it was torn and separated, and there will be no other sore than what arises from the impracticability of bringing the lips of the wound into smooth and immediate contact, the scar of which sore must be small in proportion. Sometimes such perfect re-union is not to be obtained; in which case, matter will be formed and collected in those places where the parts do not coalesce: but this does not necessarily make any difference, either in the general intention, or in the event; this matter may easily be discharged, by one or two small openings made with a lancet; the head will still preserve its natural covering; and the cure will be

very little retarded by a few small abscesses.

In some cases (as Pott proceeds to describe,) the whole separate piece will unite perfectly, and give little or no trouble, especially in young and healthy persons. In some, the union will take place in some parts and not in others; and, consequently, matter will be formed, and require to be discharged, perhaps at several different points; and, in some particular cases, circumstances, and habits, there will be no union at all, the torn cellular membrane, or the naked aponeurosis, will inflame, and become sloughy, a considerable quantity of matter will be collected, and, perhaps, the cranium will be denuded. But, even in this state of things, which does not very often happen, where care has been taken, and is almost the worst which can happen, in the case of mere simple laceration and detachment, if the surgeon will not be too soon, nor too much alarmed, nor in a hurry to cut, he will often find the cure much more feasible than he may at first imagine: let him take care to keep the inflammation under by proper means, let him have patience till the matter is fairly and fully formed, and the sloughs perfectly separated, and when this is accomplished, let him make a proper number of dependent openings for the discharge of them, and let him by bandage, and other proper management, keep the parts in constant contact with each other, and he will often find, that although he was foiled in his first intention of procuring immediate union, yet he will frequently succeed in this his second; he will still save the scalp, shorten the cure, and prevent the great deformity arising, (particularly to women) not only from the scar, but from the total loss of hair.

This union may often be procured, even though the cranium should have been perfectly denuded by the accident; and, it is true, not only though it should have been stripped of its pericranium at first, but even if that pericranium should have become sloughy and cast off, as Mr. Pott has often seen.

"Exfoliation from a cranium laid bare by external violence, and to which no other injury has been done, than merely stripping it of its covering, is a circumstance (says Pott) which would not so often happen, if it was not taken for granted that it must be, and the bone treated according to such expectation. The soft open texture of the bones of children and young people, will frequently furnish an incarnation, which will cover their surface, and render exfo-

liation quite unnecessary; and even in those of mature age, and in whom the bones are still harder, exfoliation is full as often the effect of art as the intention of nature, and produced by a method of dressing, calculated to accomplish such end, under a supposition of its being necessary. Sometimes, indeed, it happens that a small scale will necessarily separate, and the sore cannot be perfectly healed till such separation has been made; but this kind of exfoliation will be very small and thin, in proportion to that produced by art, that is, that produced by dressing the surface of the bare bone with spirituous tinctures, &c. and when a wound on the head, with a sound uninjured bone, denuded by accident, shews a disposition to heal without exfoliation, it never can be right to counteract nature, and oblige her to do what she is not inclined to, and which she would accomplish her purpose better without doing.

"Small wounds, that is, such as are made by instruments, or bodies which pierce, or puncture, rather than cut, are in general more apt to become inflamed, and to give trouble, than those which are larger; and in this part particularly, are sometimes attended with so high inflammation, and with such symptoms as alarm both patient and surgeon."

The parts capable of being hurt by such kind of wound, are the skin, the cellular membrane, the expanded tendons of the muscles of the scalp, and the pericranium.

"If the wound affects the cellular membrane only, and has not reached the aponeurosis or pericranium, the inflammation and tumour affect the whole head and face, the skin of which wears a yellowish cast, and is sometimes thick set with small blisters, containing the same coloured serum; it receives the impression of the fingers, and becomes pale for a moment, but returns immediately to its inflamed colour; it is not very painful to the touch, and the eye-lids and ears are always comprehended in the tumefaction, the former of which are sometimes so distended, as to be closed; a feverish heat and thirst generally accompany it; the patient is restless, has a quick pulse, and most commonly a nausea, and inclination to vomit.

"This accident generally happens to persons of bilious habit, and is indeed an inflammation of the erysipelatous kind; it is somewhat alarming to look at, but is not often attended with danger. The wound does indeed neither look well, nor yield a kindly discharge, while the fever

continues, but still it has nothing threatening in its appearance, none of that look which bespeaks internal mischief; the scalp continues to adhere firmly to the skull, and the patient does not complain of that tensive pain, nor is afflicted with that fatiguing restlessness which generally attends mischief underneath the cranium.

"Phlebotomy, lenient purges, and the use of the common febrifuge medicines, particularly those of the neutral kind, generally remove it in a short time. When the inflammation is gone off, it leaves on the skin a yellowish tint, and a dry scurf, which continues until perspiration carries them away, and upon the disappearance of the disease, the wound immediately recovers a healthy aspect, and soon heals without any farther trouble.

"Wounds and contusions of the head, which affect the brain and its membranes, are also subject to an erysipelatous kind of swelling and inflammation; but it is very different, both in its character and consequences, from the preceding.

"In this, (which is one of the effects of inflammation of the meninges,) the febrile symptoms are much higher, the pulse harder and more frequent, the anxiety and restlessness extremely fatiguing, the pain in the head intense; and as this kind of appearance is, in these circumstances, most frequently the immediate precursor of matter forming between the skull and dura mater, it is generally attended with irregular shiverings, which are not followed by a critical sweat, nor afford any relief to the patient. To which it may be added, that in the former case the erysipelas generally appears within the first three or four days; whereas in the latter, it seldom comes on till several days after the accident, when the symptomatic fever is got to some height. In the simple erysipelas, although the wound be crude and undigested, yet it has no other mark of mischief; the pericranium adheres firmly to the skull, and upon the cessation of the fever, all appearances become immediately favourable. In that which accompanies injury done to the parts underneath, the wound not only has a spongy, glassy, unhealthy aspect, but the pericranium in its neighbourhood separates spontaneously from the bone, and quits all cohesion with it. In short, one is an accident, proceeding from a bilious habit, and not indicating any mischief beyond itself; the other is a symptom, or a part of a disease, which is occasioned by injury done to the membranes of the brain; one portends little or no ill to the patient,

and almost always ends well; the other implies great hazard, and most commonly ends fatally. It is therefore hardly necessary to say, that it behoves every practitioner to be careful in distinguishing them from each other.

"If the wound be a small one, and has passed through the cellular membrane to the aponeurosis, and pericranium, it is sometimes attended with very disagreeable, and even very alarming symptoms, but which arise from a different cause, and are very distinguishable from what has been yet mentioned.

"In this, the inflamed scalp does not rise into that degree of tumefaction, as in the erysipelas, neither does it pit, or retain the impression of the fingers of an examiner; it is of a deep red colour, unmixed with the yellow tint of the erysipelas; it appears tense, and is extremely painful to the touch; as it is not an affection of the cellular membrane, and as the ears and the eye-lids are not covered by the parts in which the wound is inflicted, they are seldom, if ever, comprehended in the tumour, though they may partake of the general inflammation of the skin; it is generally attended with acute pain in the head, and such a degree of fever as prevents sleep, and sometimes brings on a delirium.

"A patient in these circumstances, will admit more free evacuations by phlebotomy, than one labouring under an erysipelas; the use of warm fomentation is required in both, in order to keep the skin clean and perspirable, but an emollient cataplasm, which is generally forbid in the former, may in this latter case be used to great advantage.

"When the symptoms are not very pressing, nor the habit very inflammable, this method will prove sufficient: but it sometimes happens that the scalp is so tense, the pain so great, and the symptomatic fever so high, that by waiting for the slow effect of such means, the patient runs a risk from the continuance of the fever, or else the injured aponeurosis and pericranium becoming sloughy, produce an abscess, and render the case both tedious and troublesome. A division of the wounded part by a simple incision down to the bone, about half an inch or an inch in length, will most commonly remove all the bad symptoms, and if it be done in time, will render every thing else unnecessary." (*Pott.*)

The injuries, to which the scalp is liable from contusion, or the appearances produced in it by such general cause, may be divided into those in which the mischief is confined merely to the scalp;

and those in which other parts are interested.

The former, which only comes under our present consideration, is not indeed of importance, considered abstractedly. The tumour attending it is either very easily dissipated, or the extravasated blood causing it, is easily got rid off by a small opening. Mr. Pott particularly notices this case, on account of an accidental circumstance, which sometimes attends it, and renders it liable to be very much mistaken.

"When the scalp receives a very smart blow, it often happens that a quantity of extravasated blood immediately forms a tumour, easily distinguishable from all others, and generally very easily cured. But it also sometimes happens, that this kind of tumour produces to the fingers of an unadvised or inattentive examiner, a sensation, so like to that of a fracture, with depression of the cranium, as may be easily mistaken." Now, if, upon such supposition, a surgeon immediately makes an incision into the tumid scalp, he may give his patient a great deal of unnecessary pain, and for that reason run some risk of his own character.

"The touch is, in this case, so liable to deception, that recourse should always be had to other circumstances and symptoms, before an opinion be given.

"If a person, with such tumour occasioned by a blow, and attended with such appearances, and feel, has any complaint, which seems to be the effect of pressure made on the brain and nerves, or of any mischief done to the parts within the cranium, the division or removal of the scalp in order to enquire into the state of the skull, is right and necessary; but if there are no such general symptoms, and the patient is in every respect perfectly well, the mere feel of something like a fracture will not authorize or vindicate such operation, since it will often be found, that such sensation is a deception, and that when the extravasated fluid is removed, or dissipated, the cranium is perfectly sound and uninjured.

"The second kind of tumour attending the contused scalp, viz. that which arises from injury done to the cranium, and parts within, does so absolutely proceed from and depend upon such injury, as not to fall under our consideration in this place at all, but will be considered at large when we come to speak of the mischiefs done to the skull and brain by collision, or contusion.

"From what has been said it appears, that the scalp, taken in a general sense, is, when wounded or bruised, liable to be affected with four kinds of tumour,

each of which has a distinct cause, and requires, or permits, a different method of treatment.

"The first does not imply any injury done to the parts within the skull, requires no operation, and almost always is cured by general remedies.

"The second, or that which is caused by the spontaneous separation of the pericranium from the skull, in consequence of internal mischief, is not at first attended with very pressing symptoms; but whoever has observed their progress, and attended to their event, must know what fatal and frequently irresistible evil it is the forerunner of, nothing less than the inflammation and putrefaction of the membranes of the brain, and the formation of matter between them and the skull; and that is a case which, of all others, will least admit delay.

"The third, though it sometimes gives way to free evacuation, and lenient external applications, yet is sometimes also attended with symptoms which are too pressing to wait the effect of such remedies, and is capable of being immediately relieved by a division of the inflamed and irritated parts: whereas the same incision, made into the first kind of tumefaction, would most probably exasperate the disease, and heighten the symptoms.

"The fourth, consisting of extravasated blood, seldom requires any chirurgic operation; time, and the use of the common discutient applications, (of which the *lotio salis ammoniaci* is best,) almost always dissipate it; and it only becomes of consequence, by the possibility of its being misunderstood and mistreated."—(*Pott on Injuries of the Head*.)

2. *Effects of Contusion on the Dura Mater and Parts within the Skull.*

Mr. Pott remarks, "that in order to understand rightly, and to have a clear idea of, this kind of injury, it is necessary to recollect, that the vessels of the pericranium, those of the diploe, or medullary substance between the two tables of some parts of the cranium, and those of the dura mater within it, do all constantly and freely communicate with each other; and that this communication is carried on by means of innumerable foramina, found in all parts of both surfaces of the skull, as well as at the sutures; that upon the freedom of this communication depends the healthy and sound state of all the parts concerned in it; and that from the interruption or destruction of this proceed most of the symptoms attending violent contusions of the head, extravasations of fluid between the cranium and dura mater, inflammations of

the said membrane, and simple undepressed fracture of the skull.

"The pericranium is so firmly attached to the outer surface of the skull, as not to be separable from it without considerable violence; and when such violent separation is made in a living subject (especially if young,) the cranium is always seen to bleed freely, from an infinite number of small foramina. The dura mater, which is a firm strong membrane, is almost as intimately attached to the inside of the skull, as the pericranium is to the outside, and by the same means, viz. by vessels; and by these means a constant circulation and communication are preserved and maintained between the two membranes and the bones dividing them. This, all the appearances which attend the scalping a living person, or the separation of the skull from the dura mater of a dead one, (especially if such person died apoplectic, or was hanged) prove beyond all doubt; in the former, the blood will be seen issuing from every point of the surface of the cranium; in the latter, not only a considerable degree of force will be found necessary to detach the sawn bone from the subjacent membrane, but when it is removed, a great number of bloody points will be seen all over the surface of the latter; which points, if wiped clean, do immediately become bloody again, being only the extremities of broken vessels. These vessels are largest at, and about the sutures, at which places the adhesion is the strongest, and the hemorrhage upon separation the greatest.

"It has been thought by many that the dura mater was attached to the skull, only at the sutures; that in all other parts it was loose and unconnected with it; and that it constantly enjoyed or performed an oscillatory kind of motion, and was alternately elevated and depressed. This idea and opinion were borrowed from the appearance which the dura mater makes in a living subject after a portion of the skull has been removed: but although it has been inculcated by writers of great eminence, yet it has no foundation in truth or nature, and has misled many practitioners in their opinions, not only of the structure and disposition of this membrane, but in their ideas of its diseases.

"The dura mater does on the internal surface of the bones of the cranium, the office of periosteum, in the same manner as the pericranium does on the external; (at least they have no other:) to this it is so firmly, and so generally attached, as to be incapable of any, even the smallest degree of motion. The alternate elevation

and subsidence of it, which are observable when any portion of it is laid bare, are owing to a very different cause from any power in itself; neither is, nor can ever be performed, until a piece of the cranium has been forcibly taken away; and consequently cannot possibly be natural, or necessary.

"By blows, falls, and other shocks, some of the larger of those vessels which carry on this communication between the dura mater and the skull are broken, and a quantity of blood is shed upon the surface of that membrane. This is one species of bloody extravasation, and indeed the only one which can be formed between the skull and dura mater. If the broken vessels be few, and the quantity of blood which is shed be small, the symptoms are generally slight, and by proper treatment disappear. If they are large, or numerous, or the quantity of extravasated fluid considerable, the symptoms are generally urgent in proportion; but whether they be slight, or considerable, whether immediately alarming or not, they are always, and uniformly, such as indicate pressure made on the brain and nerves, viz. stupidity, drowsiness, diminution or loss of sense, speech, and voluntary motion.

"This every practitioner knows to be one frequent consequence of blows on the head. But it also often happens, from the same kind of violence, that some of the small vessels, which carry on the circulation between the pericranium, skull, and dura mater, are so damaged, as not to be able properly to execute that office, although there are none so broken as to cause an actual effusion of blood.

"Smart and severe strokes on the middle part of the bones at a distance from the sutures, are most frequently followed by this kind of mischief; the coats of the small vessels, which sustain the injury, inflame and become sloughy, and, in consequence of such alteration in them, the pericranium separates from the outside of that part of the bone, which received the blow, and the dura mater from the inside, the latter of which membranes, soon after such inflammation, becomes sloughy also, and furnishes matter, which matter being collected between the said membrane and the cranium, and having no natural outlet, whereby to escape, or be discharged, brings on a train of very terrible symptoms, and is a very frequent cause of destruction. The effect of this kind of violence is frequently confined to the vessels connecting the dura mater to the cranium, in which case the matter is external to the said membrane; but it sometimes happens, that by

the force either of the stroke or of the concussion, the vessels which pass between and connect the two meninges are injured in the same manner; in which case, the matter formed in consequence of such violence is found on the surface of the brain, or between the pia and dura mater, as well as on the surface of the latter; or perhaps in all these three situations at the same time.

"The difference of this kind of disease, from either an extravasation of blood, or a commotion of the medullary parts of the brain, is great and obvious. All the complaints produced by extravasation, are, such as proceed from pressure, made on the brain and nerves, and obstruction to the circulation of the blood through the former; stupidity, loss of sense and voluntary motion, laborious and obstructed pulse and respiration, &c. and (which is of importance to remark,) if the effusion be at all considerable, these symptoms appear immediately, or very soon after the accident.

"The symptoms attending an inflamed or sloughy state of the membranes, in consequence of external violence, are very different; they are all of the febrile kind, and never, at first, imply any unnatural pressure; such are, pain in the head, restlessness, want of sleep, frequent and hard pulse, hot and dry skin, flushed countenance, inflamed eyes; nausea, vomiting, rigor; and toward the end, convulsion, and delirium. And none of these appear at first, that is, immediately after the accident; seldom until some days are past.

"One set or class of symptoms is produced by an extravasated fluid, making such pressure on the brain and origin of the nerves, so as to impair or abolish voluntary motion and the senses; the other is caused by the inflamed or putrid state of the membranes covering the brain, and seldom affects the organs of sense, until the latter end of the disease, that is, until a considerable quantity of matter is formed, which matter must press like any other fluid."

Mr. Pott next refutes the generally received opinion, that blood shed from its vessels, and remaining confined in one place, will become pus; and that the matter found on the surface of the dura mater, towards the end of these cases, was originally extravasated blood. Both these positions are false. That pure blood shed from its vessels, by means of external violence, and kept from the air, will not turn to, or become matter, is proved uncontestedly by every day's experience, in many instances, in aneurisms by puncture, in retained menses by imperforate vagina, and in all ecchymoses. True pus

cannot be made from blood merely, as may be known from the manner in which all abscesses are formed, and from every circumstance attending suppuration; and that the matter found on the surface of the dura mater, after great contusions of the head, never was mere blood, Mr. Pott is as certain, as observation and experience can make him.

"If there be neither fissure nor fracture of the skull, nor extravasation, nor commotion underneath it, and the scalp be neither considerably bruised, nor wounded, the mischief is seldom discovered or attended to for some few days. The first attack is generally by pain in the part which received the blow. This pain, though beginning in that point, is soon extended all over the head, and is attended with a languor, or dejection of strength and spirits, which are soon followed by a nausea, and inclination to vomit, vertigo or giddiness, a quick and hard pulse, and an incapacity of sleeping, at least quietly. A day or two after this attack, if no means preventive of inflammation are used, the part stricken generally swells, and becomes puffy, and tender, but not painful; neither does the tumour rise to any considerable height, or spread to any great extent: if this tumid part of the scalp be now divided, the pericranium will be found of a darkish hue; and either quite detached, or very easily separable from the skull, between which and it will be found a small quantity of a dark-coloured ichor.

"If the disorder has made such progress, that the pericranium is quite separated and detached from the skull, the latter will even now be found to be somewhat altered in colour from a sound healthy bone. Of this alteration it is not very easy to convey an idea by words, but it is a very visible one, and what some very able writers have noticed.

"From this time the symptoms generally advance more hastily and more apparently; the fever increases, the skin becomes hotter, the pulse quicker and harder, the sleep more disturbed, the anxiety and restlessness more fatiguing; and to these are generally added irregular rigors, which are not followed by any critical sweat, and which, instead of relieving the patient, add considerably to his sufferings. If the scalp has not been divided or removed, until the symptoms are thus far advanced, the alteration of the colour of the bone will be found to be more remarkable; it will be found to be whiter and more dry than a healthy one; or, as Fallopius has very justly observed, it will be found to be more like a dead

bone: the sanies, or fluid, between it and the pericranium will also, in this state, be found to be more in quantity, and the said membrane will have a more livid diseased aspect.

"In this state of matters, if the dura mater be denuded, it will be found to be detached from the inside of the cranium, to have lost its bright silver hue, and to be, as it were, smeared over with a kind of mucus, or with matter, but not with blood. Every hour after this period, all the symptoms are exasperated, and advance with hasty strides: the head-ach and thirst become more intense, the strength decreases, the rigors are more frequent, and at last convulsive motions, attended in some with delirium, in others with paralysis, or comatose stupidity, finish the tragedy.

"If the scalp has not been divided till this point of time, and it be done now, a very offensive discoloured kind of fluid will be found lying on the bare cranium, whose appearance will be still more unlike to the healthy natural one; if the bone be now perforated, matter will be found between it and the dura mater, generally in considerable quantity, but different in different cases and circumstances. Sometimes it will be in great abundance, and diffused over a very large part of the membrane; and sometimes the quantity will be less, and consequently the space which it occupies smaller. Sometimes it lies only on the exterior surface of the dura mater; and sometimes it is between it and the pia mater, or also even on the surface of the brain, or within the substance of it.

"The primary and original cause of all this, is the stroke upon the skull: by this the vessels which should carry on the circulation between the scalp, pericranium, skull, and meninges, are injured, and no means being used to prevent the impending mischief, or such as have been made use of proving ineffectual, the necessary and mutual communication between all these parts ceases, the pericranium is detached from the skull, by means of a sanies discharged from the ruptured vessels, the bone being deprived of its due nourishment and circulation loses its healthy appearance, the dura mater (its attaching vessels being destroyed, or rendered unfit for their office) separates from the inside of the cranium, inflames and suppurates.

"Whoever will attend to the appearances which the parts concerned make in every stage of the disease, to the nature of the symptoms, the time of their access, their progress, and most frequent event,

will find them all easily and fairly deducible from the one cause, which has just been assigned, viz. the contusion. As the inflammation and separation of the dura mater, is not an *immediate* consequence of the violence, so neither are the symptoms immediate, seldom until some days have passed; the fever at first is slight, but increases gradually; as the membrane becomes more and more diseased, all the febrile symptoms are heightened; the formation of matter occasions rigors, frequent and irregular, until such a quantity is collected, as brings on delirium, spasm, and death."

Hitherto Mr. Pott has been describing this disease as unaccompanied by any other, not even by any external mark of injury, except perhaps a trifling bruise of the scalp; "Let us now, (says this eminent surgeon,) suppose the scalp to be wounded at the time of the accident, by whatever gave the contusion; or let us suppose, that the immediate symptoms having been alarming, a wound had been made, in order to examine the skull.

"In this case, the wound will for some little time have the same appearance as a mere simple wound of this part, unattended with other mischief, would have; it will, like that, at first discharge a thin sanies, or gleet, and then begin to suppurate; it will digest, begin to incarn, and look perfectly well; but, after a few days, all these favourable appearances will vanish; the sore will lose its florid complexion, and granulated surface; will become pale, glassy, and flabby; instead of good matter, it will discharge only a thin discoloured sanies; the lint with which it is dressed, instead of coming off easily (as in a kindly suppurating sore) will stick to all parts of it; and the pericranium, instead of adhering firmly to the bone, will separate from it, all round, to some distance from the edges.

"This alteration in the face and circumstances of the sore, is produced merely by the diseased state of the parts underneath the skull; which is a circumstance of great importance, in support of the doctrine advanced; and is demonstrably proved, by observing that this diseased aspect of the sore, and this spontaneous separation of the pericranium, are always confined to that part which covers the altered or injured portion of the dura mater, and do not at all affect the rest of the scalp; nay, if it has by accident been wounded in any other part, or a portion has been removed from any part where no injury has been done to the dura mater, no such separation will happen, the detachment above will always

correspond to that below, and be found no where else.

"The first appearance of alteration in the wound immediately succeeds the febrile attack; and as the febrile symptoms increase, the sore becomes worse and worse, that is, degenerates more and more from a healthy, kindly aspect.

"Through the whole time, from the first attack of the fever, to the last and fatal period, an attentive observer will remark the gradual alteration of the colour of the bone, if it be bare. At first it will be found to be whiter, and more dry, than the natural one; and as the symptoms increase, and either matter is collected, or the dura mater becomes sloughy, the bone inclines more and more to a kind of purulent hue, or whitish yellow; and it may also be worth while in this place to remark, that if the blow was on or very near to a suture, and the subject young, the said suture will often separate in such a manner as to let through it a loose, painful, ill-natured fungus; at which time also it is no uncommon thing for the patient's head and face to be attacked with an erysipelas.

"In those cases, in which the scalp is very little injured by the bruise, and in which there is no wound, nor any immediate alarming symptoms or appearances, the patient feels little or no inconvenience, and seldom makes any complaint, until some few days are past. At the end of this uncertain time, he is generally attacked by the symptoms already recited; these are not pressing at first, but they soon increase to such a degree, as to baffle all our art: from whence it will appear, that when this is the case, the patient frequently suffers from what seems at first to indicate his safety, and prevents such attempts being made, and such care from being taken of them, as might prove preventive of mischief.

"But if the integuments are so injured as to excite or claim our early regard, very useful information may from thence be collected; for whether the scalp be considerably bruised, or whether it be found necessary to divide it for the discharge of extravasated blood, or on account of worse appearances, or more urgent symptoms, the state of the pericranium may be thereby sooner and more certainly known: if in the place of such bruise, the pericranium be found spontaneously detached from the skull, having a quantity of discoloured sanies between them under the tumid part, in the manner already mentioned, it may be regarded as a pretty certain indication, either that the dura mater is beginning to sepa-

rate in the same manner, or that if some preventive means be not immediately used, it will soon suffer; that is, it will inflame, separate from the skull, and give room for a collection of matter between them. And with regard to the wound itself, whether it was made at the time of the accident, or afterward artificially, it is the same thing; if the alteration of its appearance be as related, if the edges of it spontaneously quit their adhesion to the bone, and the febrile symptoms are at the same time making their attack, these circumstances will serve to convey the same information, and to prove the same thing.

"This particular effect of contusion is frequently found to attend on fissures, and undepressed fractures of the cranium, as well as on extravasations of fluid, in cases where the bone is entire; and, on the other hand, all these do often happen without the concurrence of this individual mischief. All this is matter of accident; but let the other circumstances be what they may, the spontaneous separation of the altered pericranium, in consequence of a severe blow, is almost always followed by a suppuration between the cranium and dura mater; a circumstance extremely well worth attending to in fissures and undepressed fractures of the skull, because it is from this circumstance principally, that the bad symptoms, and the hazard, in such cases arise.

"It is no very uncommon thing for a smart blow on the head to produce some immediate bad symptoms, which, after a short space of time disappear, and leave the patient perfectly well. A slight pain in the head, a little acceleration of pulse, a vertigo and sickness, sometimes immediately follow such accident, but do not continue many hours, especially, if any evacuation has been used. These are not improbably owing to a slight commotion of the brain, which having suffered no material injury thereby, soon cease. But if, after an interval of some time, the same symptoms are renewed; if the patient, having been well, becomes again feverish, and restless, and that without any new cause; if he complains of being languid and uneasy, sleeps disturbedly, loses his appetite, has a hot skin, a hard quick pulse, and a flushed, heated countenance; and neither irregularity of diet, nor accidental cold, have been productive of these; mischief is most certainly impending, and that most probably under the skull.

"If the symptoms of pressure, such as stupidity, loss of sense, voluntary motion, &c. appear some few days after the head has suffered injury from external mis-

chief, they do most probably imply an effusion of a fluid somewhere: this effusion may be in the substance of the brain, in its ventricles, between its membranes, or on the surface of the dura mater; and which of these is the real situation of such extravasation, is a matter of great uncertainty, none of them being attended with any peculiar mark or sign that can be depended upon, as pointing it out precisely; but the inflammation of the dura mater, and the formation of matter between it and the skull, in consequence of contusion, is generally indicated and preceded by one which Mr. Pott has hardly ever known to fail; a puffy, circumscribed, indolent tumour of the scalp, and a spontaneous separation of the pericranium from the skull under such tumour.

"These appearances, therefore, following a smart blow on the head, and attended with languor, pain, restlessness, watching, quick pulse, head-ach, and slight irregular shiverings, do almost infallibly indicate an inflamed dura mater, and pus, either forming or formed, between it and the cranium."

By detachment of the pericranium, is not meant every separation of it from the bone which it should cover. It may be, and often is cut, torn, or scraped off, without any such consequence; but these separations are violent, whereas that which Mr. Pott means is spontaneous, and is produced by the destruction of those vessels by which it was connected with the skull, and by which the communication between it and the internal parts was carried on; and therefore it is to be observed, that it is not the mere removal of that membrane which causes the bad symptoms, but it is the inflammation of the dura mater; of which inflammation, this spontaneous secession of the pericranium is an almost certain indication.

Sometimes the scalp is so wounded at the time of the accident, or so torn away, as to leave the bone perfectly bare; and yet the violence has not been such as to produce the evil just now spoken of. In this case, if the pericranium be only turned back, along with the detached portion of scalp, there may be probability of its re-union; and it should therefore be immediately made clean and replaced, for the purpose of such experiment; which, if it succeeds, will save time, and prevent considerable deformity. Should the attempt fail, it can only be in consequence of the detached part sloughing. Hence, removing it with a knife, though allowed by Pott, is now never practised. Frequently, when the scalp does not adhere at once, it becomes attached to the cranium afterwards by a granulating process.

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When the detached piece sloughs, the worst that can happen, is an exfoliation from the bare skull.

Sometimes, the force which detaches, or removes the scalp, also occasions the mischief in question; but, the integuments being wounded or removed, we cannot have the criterion of the tumour of the scalp for the direction of our judgment. Our whole attention must be directed to the wound and general symptoms. The edges of the former will digest as well, and look as kindly, for a few days, as if no mischief was done underneath. But, after some little space of time, when the patient begins to be restless, and hot, and to complain of pain in the head, these edges will lose their vermilion hue, and become pale and flabby. Instead of matter, they will discharge a thin gleet, and the pericranium will loosen from the skull, to some distance from the said edges. Immediately after this, all the general symptoms are increased and exasperated; and as the inflammation of the membrane is heightened, or extended, they become daily worse and worse, until a quantity of matter is formed, and collected, and brings on that fatal period, which, though uncertain as to date, very seldom fails to arrive.

"The method of attempting the relief of this kind of injury consists in two points, viz. to endeavour to prevent the inflammation of the dura mater; or, that being neglected, or found impracticable, to give discharge to the fluid collected within the cranium, in consequence of such inflammation.

"Of all the remedies in the power of art, for inflammations of membranous parts, there is none equal to phlebotomy. To this truth many diseases bear testimony; pleurisies, ophthalmies, strangulated hernias, &c. and if any thing can particularly contribute to the prevention of the ills likely to follow severe contusions of the head, it is this kind of evacuation; but then it must be made use of in such a manner as to become truly a preventive; that is, it must be made use of immediately, and freely."

This eminent surgeon says, he is very sensible that it will in general be found very difficult to persuade a person, who has had what may be called only a knock on the pate, to submit to such discipline, especially if he finds himself tolerably well: yet, in many instances, the timely use, or the neglect of this single remedy, makes all the difference between safety and fatality.

"It may be said, that as the force of the blow, the height of the fall, the weight of the instrument, &c. can never pre-

cisely or certainly determine the effect, nor inform us, whether mischief is done under the bone, or not, a large quantity of blood may be drawn off unnecessarily, in order to prevent an imaginary evil. This is in some degree true; and if the advice just given was universally followed, many people would be largely bled without necessity; but then, on the other hand, many a very valuable life would be preserved, which, for want of this kind of assistance, is lost. *Nihil interest, præsidium an satis tutum sit, quod unicum est*, is an incontestable maxim in medicine; and if it be allowed to use such means as may be in themselves hazardous, surely it cannot be wrong to employ one which is not so; at least, if it be considered in a general sense, whatever it may accidentally prove to some few particular individuals."

Acceleration, or hardness of pulse, restlessness, anxiety, and any degree of fever, after a smart blow on the head, are always to be suspected and attended to. Immediate, plentiful, and repeated evacuations by bleeding, have, in many instances, removed these, in persons to whom, Mr. Pott verily believes, very terrible mischief would have happened, had not such precaution been used. In this, as well as some other parts of practice, we neither have, nor can have any other method of judging, than by comparing together cases apparently similar. Mr. Pott has more than once or twice seen that increased velocity and hardness of pulse, and that oppressive languor, which most frequently precede mischief under the bone, removed by free and repeated blood-letting; and has often, much too often, seen cases end fatally, whose beginnings were full as slight, but in which such evacuation had been either neglected, or not complied with. This judicious writer, "would by no means be thought to infer from hence, that early bleeding will always prove a certain preservative; and that they only die, to whom it has not been applied: this, like all other human means, is fallible; and, perhaps, there are more cases out of its reach, than within it; but, where preventive means can take place, this is certainly the best, and the most frequently successful.

"The second intention, viz. the discharge of matter, collected under the cranium, can be answered only by the perforation of it.

"When, from the symptoms and appearances already described, there is just reason for supposing matter to be formed under the skull, the operation of perforation cannot be performed too soon; it

seldom happens that it is done soon enough.

"The propriety, or impropriety, of applying the trephine, in cases where there is neither fissure, fracture, nor symptom of extravasation, is a point which has been much litigated, and remains still unsettled either by writers or practitioners.

"When there is no reason for suspecting any of those injuries, either from the symptoms, or from the appearances; and the pericranium, whether the scalp be wounded or not, remains firmly attached in all parts to the skull; there certainly is not (let the general symptoms be what they may) any indication where to apply the instrument, and consequently no sufficient authority for using it at all: but whenever that membrane, after the head has received an external violence, separates, or is detached spontaneously from the bone underneath it, and such separation is attended with the collection of a small quantity of thin, brown ichor, an alteration of colour in the separated pericranium, and an unnatural dryness of the bone, Mr. Pott cannot help thinking, that there is as good reason for trepanning, as in the case of fracture; he believes experience would vindicate him, if he said, better reason; since it is by no means infrequent for the former kind of case to do well without such operation; whereas suppuration under the skull never can.

"The spontaneous separation of the pericranium, if attended with general disorder of the patient, with chilliness, horripilation, languor, and some degree of fever, appears to Mr. Pott, from all the observation he has been capable of making, to be so sure and certain an indication of mischief underneath, either in present, or impending, that he should never hesitate about perforating the bone in such circumstances.

"When the skull has been once perforated, and the dura mater thereby laid bare, the state of the matter must principally determine the surgeon's future conduct. In some cases, one opening will prove sufficient for all necessary purposes; in others, several may be necessary. This variation will depend on the space of detached dura mater and the quantity of collected matter. The repetition of the operation is warranted, both by the nature of the case, and by the best authorities; there being no comparison to be made between the possible inconvenience arising from largely denuding the dura mater, and the certain, as well as terrible evils which must follow

the formation and confinement of matter between it and the skull.

"It can hardly be necessary to observe, that notwithstanding the operation of perforation be absolutely and unavoidably necessary, yet the repetition of blood letting or cooling laxative medicines, the use of antiphlogistic remedies, and a most strict observance of a low diet and regimen, are as indispensably requisite after such operation as before; the perforation sets the membrane free from pressure, and gives vent to collected matter, but nothing more; the inflamed state of the parts under the skull, and all the necessary consequences of such inflammation, call for all our attention, full as much afterwards as before; and although the patient must have perished without the use of the trephine, yet, the merely having used it, will not preserve him, without every other caution and care."

Both tables of the skull sometimes exfoliate in consequence of external violence. The dead bone must be removed, as soon as loose; and, if necessary, the scalp divided for the purpose.

3. *Fissures and Fractures of the Cranium, without Depression.*

"Fractures of the cranium, (says Mr. Pott) were, by the ancient writers, divided into many different sorts, each of which was distinguished by an appellation of Greek etymology, borrowed either from the figure of the fracture, or the disposition of the broken pieces. These are to be found in most of the old books; but as they merely load the memory, without informing the understanding, or assisting the practitioner, modern authors have generally laid them aside.

"This kind of injury is divisible into two general heads, viz. those in which the broken parts keep their proper level, or equality of surface, with the rest of the skull, and those in which they do not; or, in other words, fractures without depression, and fractures with.

"These two distinctions are all which are really necessary to be made, and will be found to comprehend every violent division of the parts of the skull (not made by a cutting-instrument) from the finest capillary fissure, up to the most complicated fracture: for, fissures and fractures differing from each other only in the width of the breach, or in the distance of the separated parts, and the disposition of broken pieces, in large fractures, being subject to an almost infinite variety, distinctions and appellations, drawn and made from these circumstances, might be multiplied to even three times the old

number without imparting the smallest degree of useful knowledge to the man, who should be at the pains to get them by heart.

"What are the symptoms of a fractured cranium? is often asked; and there is hardly any one who does not, from the authority of writers, both ancient and modern, answer, Vomiting, giddiness, loss of sense, speech, and voluntary motion, bleeding at the ears, nose, and mouth, &c. This is the doctrine of Celsus, which has been most invariably copied by almost all succeeding authors, and implicitly believed by almost all readers.

"The symptoms just mentioned do indeed very frequently accompany a broken skull, but they are not produced by the breach made in the bone; nor do they indicate such breach to have been made. They proceed from an affection of the brain, or from injury done to some of the parts within the cranium, independent of any ill which the bones composing it may have sustained. They are occasioned by violence offered to the contents of the head in general; are quite independent of the mere breach made in the bone; and either do or do not accompany fracture, as such fracture may happen to be, or not to be, complicated with such other ills.

"They are frequently produced by extravasations of blood, or serum, upon, or between the membranes of the brain; or by shocks, or concussions of its substance, in cases where the skull is perfectly entire and unhurt. On the other hand, the bones of the skull are sometimes cracked, broken, nay, even depressed, and the patient suffers none of these symptoms. In short, as the breach made in the bone is not, nor can be the cause of such complaints, they ought not to be attributed to it; and that for reasons, which are by no means merely speculative. For the practitioner, who supposes that such symptoms do necessarily and certainly imply that the cranium is fractured, must regulate his conduct by such supposition, and remove the scalp, very often without either necessity or benefit; that is, without discovering what he looks for: and, on the other hand, if he does find the skull to be broken, believing all these complaints to be caused by, and deducible from the fracture, he will most probably pay his whole attention to that supposed cause, and may think, that when he has done what the rules of his art prescribe for such case, he has done all that is in his power:—an opinion not unfrequently embraced; and which has been the destruction of many a patient. For, as on one hand, the loss of sense, speech, and voluntary motion, as well as the hemor-

hage from the nose, ears, &c. are sometimes totally removed by, or at least disappear, during the use of free and frequent evacuation, without any operation on the scalp or skull; so, on the other, as these symptoms and appearances are not produced by the solution of continuity of the bone, they cannot be remedied by such chirurgic treatment as the mere fracture may require.

"If any one doubts the truth of this doctrine, (continues Mr. Pott,) I would desire him to consider the nature, as well as most generally successful method of treating these symptoms; and, at the same time, to reflect seriously on the operation of the trepan, as practised in simple, undepressed fractures of the skull.

"The sickness, giddiness, vomiting, and loss of sense and motion, can only be the consequence of an affection of the brain, as the common sensorium. They may be produced by its having been violently shaken, by a derangement of its medullary structure, or by unnatural pressure made by a fluid extravasated on its surface, or within its ventricles; but never can be caused by the mere division of the bone, (considered abstractedly); which division, in a simple fracture, can neither press on, nor derange, the structure of the parts within the cranium.

"If the solution of continuity in the bone be either produced by such a degree of violence, as hath caused a considerable disturbance in the medullary parts of the brain, or has disturbed any of the functions of the nerves going off from it; or has occasioned a breach of any vessel, or vessels whether sanguine or lymphatic, and that hath been followed by an extravasation, or lodgment of fluid; the symptoms necessarily consequent upon such derangement, or such pressure, will follow: but they do not follow, because the bone is broken; their causes are superadded to the fracture, and, although produced by the same external violence, are yet perfectly and absolutely independent of it: so much so, that they are frequently found where no fracture is.

"The operation of the trepan is frequently performed in the case of simple fractures, and that very judiciously and properly; but it is not performed, because the bone is broken, or cracked: a mere fracture, or fissure of the skull, can never require perforation, or that the dura mater under it be laid bare; the reason for doing this, springs from other causes than the fracture, and those really independent of it: they spring from the nature of the mischief which the parts within the cranium have sustained, and

not from the accidental division of the bone. From these arise the threatening symptoms; from these all the hazard; and from these, the necessity, and vindication of performing the operation of the trepan.

"If a simple fracture of the cranium was unattended in present with any of the before-mentioned symptoms, and there was no reason for apprehending any other evil in future, that is, if the solution of continuity in the bone was the whole disease, it could not possibly indicate any other curative intention, but, the general one in all fractures, viz. union of the divided parts."

In many cases of simple undepressed fractures of the cranium, it is true, that trephining is necessary: but, the reasons for the operation, in these instances, are, first, the immediate relief of present symptoms arising from the pressure of extravasated fluid; and, secondly, the discharge of matter, formed between the skull and dura mater, in consequence of inflammation. The operation of trephining was also recommended by Pott, as a *preventive* of ill consequences; a practice, however, which is now never adopted by the most eminent surgeons; and many writers of the highest reputation, especially Desault, Dease, Mr. John Bell, and Mr. Abernethy, urgently, and properly remonstrate against the method.

The latter remarks: "In the accounts, which we have in the former practice in France, it is related, that surgeons made numerous perforations along the whole track of a fracture of the cranium; and, as far as I am able to judge, without any clear design. Mr. Pott also advises such an operation, with a view to prevent the inflammation and suppuration of the dura mater, which he so much apprehended. But, many cases have occurred of late, where, even in fractures with depression, the patients have done well without an operation."

Mr. Abernethy next relates several cases of fracture of the cranium with depression, which terminated favourably, although no operation was performed. This judicious surgeon thinks, that these cases, as well as a great many others on record, prove, that a slight degree of pressure does not derange the functions of the brain, for a limited time after its application: and all those, whom he had an opportunity of knowing for any length of time after the accident, continued as well as if nothing of the kind had happened to them. In Mr. Hill's cases in surgery, two instances of this sort are related, and Mr. Hill knew both the pa-

tients for many years afterwards; yet, no inconvenience arose. Indeed, it is not easy to conceive, that the pressure, which caused no ill effects at a time, when the contents of the cranium filled its cavity completely, should afterwards prove injurious, when they have adapted themselves to its altered size and shape. Severe illness, indeed, does often intervene between the receipt of the injury, and the time of its recovery; and many surgeons might be inclined to attribute this to pressure; but, it equally occurs when the depressed portion is elevated. If a surgeon, prepossessed with the opinion, that elevation of the bone is necessary in every instance of depressed cranium, should have acted upon this opinion in several of the cases, which Mr. Abernethy has related, and afterwards have employed proper evacuations, his patients would probably have had no bad symptoms, and he would naturally have attributed their well-doing to the mode of treatment, which he had pursued: yet, these cases did equally well without an operation. (*Abernethy on Injuries of the Head.*)

Depressed fractures of the skull not being our immediate consideration, we need not expatiate upon them; but, it seemed right to make the preceding remarks, in order to shew how unnecessary it must be to trephine a patient, merely because there is a fracture of the cranium, and with a view of *preventing* bad consequences. Even when the fracture is depressed, it is not necessary, unless there are evident signs, that the degree of pressure, thus produced on the brain, is the cause of existing bad symptoms.

The inflammation and suppuration of the parts, beneath the skull, which Mr. Pott wished so much to prevent by trephining early, do not arise from the occurrence of a breach in the cranium, but, are the consequences of the same violence, which was the occasion of the fracture. Hence, it is obvious, that removing a portion of the bone cannot in the least prevent the inflammation and suppuration, which must result from the external violence which was first applied to the head; but on the contrary, such a removal being an additional violence, must have a tendency to increase the inevitable inflammatory mischief.

From what has been said, it is not to be inferred, however, that trephining is never proper, when there is a simple undepressed fracture of the skull. Such injury may be joined with an extravasation of blood on the dura mater; or, it may be followed by the formation of matter between this membrane

and the cranium; in both which circumstances, the operation is essential to the preservation of the patient, immediately, but not before, the symptoms indicative of the existence of dangerous pressure on the brain, begin to shew themselves. (See *Trephine.*)

A fracture of the skull, unattended with urgent symptoms, and not brought into the surgeon's view by any accidental wound of the integuments, often remains for ever undiscovered; and as no benefit could arise from laying it bare by an incision, such practice should never be adopted. The surgeon ought only to be officious in this way, when he can accomplish by it some better object, than the merely satisfying his own curiosity. And as we shall find from the perusal of this article, and the one intitled, *Trephine*, that the removal of pressure off the surface of the brain is the only possible reason for ever perforating the cranium with this instrument; and as dividing the scalp is only a useful measure, when it is preparatory to such operation; neither the one, nor the other, should ever be practised, unless there exist unequivocal symptoms, that there is a dangerous degree of pressure operating on the brain, and caused either by matter, extravasated blood, or a depressed portion of the skull.

The true mode of *preventing* the bad effects, frequently following, but not arising from, simple fractures of the skull, is not to trephine, but, to put in practice all kinds of antiphlogistic means. For this purpose, let the patient be repeatedly and copiously bled, both from the arm and temporal arteries; let him be properly purged; give him antimonials; keep him on the lowest diet; let him remain in the most quiet situation possible; and if, notwithstanding such steps, the symptoms of inflammation of the brain continue to increase, let his head be shaved and a large blister be applied to it. When, in spite of all these measures, matter forms under the cranium, attended with symptoms of pressure, a puffy tumour of the injured part of the scalp, or those changes of the wound, if there is one, which Mr. Pott has so excellently described, and we have already related; not a moment should be lost in delaying to perforate the bone with the trephine, and giving vent to the matter beneath.

4. *Fractures of the Cranium with Depression.*

"Simple fractures of the skull, or those in which the parts of the broken bone are not depressed from their situation (observes Mr. Pott) differ from what are called fissures, only in the distance of

the edges of the breach from each other. When the separation is considerable, it is called a fracture; when it is very fine and small, it is called a fissure. The surgical intention, and requisite treatment, are the same in each, viz. to procure a discharge for any fluid which may be extravasated in present, (*here we must understand supposing the pressure of such extravasation produces urgent symptoms*) and to guard against the formation, or confinement of matter. The prevention of suppuration will, as we have already remarked, be best accomplished, not by perforating the cranium, as Mr. Pott advised, but by copious bleeding, evacuations, blisters, and a rigorous antiphlogistic regimen. The confinement of matter, producing symptoms of pressure on the brain certainly indicates the immediate use of the trephine.

"But, in fractures, attended with depression, (says Pott) the intentions are more. In these the depressed parts are to be elevated, and such as are so separated as to be incapable of reunion, or of being brought to lie properly, and without pressing on the brain, are to be totally removed. These circumstances are peculiar to a depressed fracture; but, although they are peculiar, they must not be considered as sole, but, as additional to those, which have been mentioned at large under the head of simple fracture: commotion, extravasation, inflammation, suppuration, and every ill, which can attend on, or be found in the latter, are to be met with in the former, and will require the same method of treatment." That loose splintered pieces of the cranium, when quite detached, and already in view, in consequence of the scalp being wounded, ought to be taken away, no one will be inclined to question. That they ought also to be exposed by an incision, even when the scalp is unwounded, and then taken away, whenever they cause symptoms of irritation, or pressure, I believe, will be universally allowed. But, the reader will already understand, from what has been said, in the preceding section, that several excellent surgeons do not coincide with Pott, in believing, that every depressed fracture of the skull necessarily demands the application of the trephine.

"There certainly are (says Mr. Abernethy) degrees of this injury, which it would be highly imprudent to treat in this manner. Whenever the patient retains his senses perfectly, I should think it improper to trephine him, unless symptoms arose, that indicated the necessity of it." P. 21.

Every surgeon, indeed, cannot be too

fully impressed with the following truth, that existing symptoms of dangerous pressure on the brain, which symptoms will be presently related, can alone form a true reason for perforating the cranium. The mode of operating, in order to elevate depressed portions of the skull, is explained in the article, *Trephine*.

5. *Extravasation under the Cranium; Symptoms of Pressure on the Brain, &c.*

Mr. Pott remarks, "the shock, which the head sometimes receives by falls from on high, or by strokes from ponderous bodies, does not infrequently cause a breach in some of the vessels, either of the brain, or its meninges; and, thereby, occasions extravasation of the fluid, which should circulate through them. This extravasation may be the only complaint produced by the accident; or it may be joined with, or added to, a fracture of the skull. But this is not all, for it may be produced not only when the cranium is unhurt by the blow, but even when no violence of any kind has been offered to, or received by the head."

When blood is extravasated beneath the skull, the violence which produces the rupture of the vessel, usually stuns the patient, from which state, provided the quantity and pressure of the blood, and the force of the concussion be not too great, he gradually recovers, and regains his senses. If the first extravasation be trivial, the patient, after regaining his senses, may only feel a little drowsiness, and go to bed. The bleeding from the ruptured vessel continuing, and the pressure on the brain increasing, he becomes more and more insensible, and begins to breathe in a slow, interrupted, stertorous manner. In cases of compression, whether from blood or a depressed portion of the skull, there is a general insensibility, the eyes are half open, the pupil dilated, and motionless even when a candle is brought near the eye; the retina is insensible; the limbs relaxed; the breathing stertorous; the pulse slow, and, according to Mr. Abernethy, less subject to intermission, than in cases of concussion. Nor is the patient ever sick, when the pressure on the brain and the general insensibility, are considerable; for, the very action of vomiting betrays an irritability in the stomach and œsophagus. These symptoms are not peculiar to pressure from blood, but arise also from that of many depressed fractures of the skull, and of suppuration under this part. They are all attributable to the unnatural pressure made on the brain and nerves, and have too often been mistaken, as in-

dications of a disease, which, considered abstractly, can never cause them; we allude to a simple undepressed fracture of the cranium, which may be accompanied by them, but cannot cause them. They differ in degree, according to the quantity, kind, and situation of the pressing fluid. The hemorrhage from the nose and ears, which often follows violence applied to the head, leads to no particular or useful inference: we cannot even calculate, by this sign, that the force has exceeded a certain degree; for, such bleedings take place, in many persons, from much slighter causes than in others.

The preceding class of symptoms only inform us, that the brain is suffering compression; and, leaves us quite in the dark, respecting several other very important circumstances. "We not only have no certain infallible rule, whereby to distinguish, what the pressing fluid is, or where it is situated, but we are, in many instances absolutely incapable of knowing, whether the symptoms be occasioned by any fluid at all; for, a fragment of bone, broken off from the internal table of the cranium, and making an equal degree of pressure, will produce exactly the same complaints." (*Pott.*) In detailing the symptoms of pressure from blood, I took particular notice of the patient being at first generally stunned by the blow; of his gradually regaining his senses, and of his afterwards relapsing into a state of insensibility again. *The interval of sense*, which thus occurs, is a circumstance, of the greatest consequence in making the surgeon understand the nature of the case.

"A concussion, and an extravasation (as Mr. Pott observes) are very distinct causes of mischief, though not always very distinguishable.

"M. Le Dran, and others of the modern French writers, have made a very sensible and just distinction between that kind and degree of loss of sense which arises from a mere commotion of the brain, and that which is caused by a mere extravasation, in those instances in which the time of the attack or appearance of such symptoms are different or distinct. The loss of sense, which immediately follows the violence, say they, is most probably owing to a commotion; but that which comes on after an interval of time has past, is most probably caused by extravasation.

"This distinction is certainly just and good, as far as it will go. That degree of abolition or diminution of sense, which immediately attends or follows the blow or fall, and goes off again without the assistance of art, is in all probability

occasioned by the sudden shake or temporary derangement of the contents of the head; and the same kind of symptoms recurring again some time after they had ceased, or not coming on until some time had passed from the receipt of the violence, do most probably proceed from the breach of a vessel within or upon the brain. But unluckily, we have it not very often in our power to make this exact distinction. An extravasation is often made so immediately, and so largely, at the instant of the accident, that all sense and motion are instantaneously lost, and never again return. And it also sometimes happens, that although an extravasation may possibly not have been made at the moment of the accident, and the first complaints may have been owing to commotion merely, yet a quantity of fluid having been shed from its proper vessels very soon after the accident, and producing its proper symptoms, before those caused by the commotion have had time to go off, the similarity of the effects of each of these different causes is such, as to deprive us of all power of distinguishing between the one and the other, or of determining with any tolerable precision to which of them such symptoms as remain are really owing.

"When an extravasation of any kind is made, either upon or within the brain, if it be in such quantity, or so situated, as to disorder the economy of the animal, it always produces such disorder, by making an unnatural pressure on the parts where it lies. The nature and degree of the symptoms hereby produced are various and different in different persons, according to the kind, quantity, and situation of the pressing fluid. Sometimes it is mere fluid blood, sometimes blood in a state of coagulation, sometimes it is a clear lymph, and at others blood and water are found mixed together; each of these is found either simple or mixed in different situations, that is, between the skull and dura mater, between the dura and pia mater, or in the natural cavities of the brain called its ventricles, and sometimes, in cases of great violence, they are found at the same time in all these different parts. Sometimes a considerable quantity is shed instantly, at the time of the accident; and sometimes the breach by which the effusion is made is so circumstanced, both as to nature and situation, that it is at first very small, and increases by faster or slower degrees. In the former, the symptoms are generally immediate and urgent, and the extravasation is of the bloody kind; in the latter, they are fre-

quently slight at first, appear after some little interval of time, increase gradually till they become urgent or fatal, and are in such case, generally occasioned by extravasated lymph. So that although the immediate appearance of bad symptoms does most certainly imply mischief of some kind or other, yet, on the other hand, no man ought to suppose his patient free from hazard, either because such symptoms do not shew themselves at first, or because they appear to be but slight: those which come on late, or appearing slight at first, increase gradually, being full as much to be dreaded as to consequence, as the more immediately alarming ones; with this material difference between them, that the one may be the consequence of a mere concussion of the brain, and may by means of quietude and evacuation go quite off; whereas, the other being most frequently owing to an extravasation of lymph, (though sometimes of blood also) within the substance of the brain, are very seldom removed by art." (*Pott*.)

The case of extravasation, between the cranium and dura mater, is almost the only one, which admits of relief from trephining. Mr. Abernethy informs us, that, in the cases, which he has seen, of blood extravasated, between the dura and pia mater, on a division of the former membrane being made for its discharge, only the serous part of it could be evacuated: for, the coagulum was spread over the hemisphere of the brain, and had descended, as low as possible, towards its inferior part, so that very little relief was obtained by the operation. (*P. 32.*)

Fractures of the cranium, which take place across the lower and front angle of the parietal bone, and the rest of the track of the trunk, and large branches of the spinous artery of the dura mater, are cases very apt to be attended with a copious extravasation. This vessel, and others more deeply seated, however, may be ruptured, pour out a considerable quantity of blood, and induce urgent symptoms of pressure on the brain, not only without the co-existence of a fracture, but even of any external mark of violence on the scalp.

The effused blood is, more frequently, situated below the part, on which the violence has operated, and, hence, when such part is pointed out by a wound, or discolouration of the scalp, and the symptoms of pressure are considerable, there cannot be two opinions, respecting the propriety of immediately trephining, and the place, where to make the perforation. But, what is to be done, when dangerous symptoms of pressure prevail, without

any external mark to denote, what part of the head received the blow, or whether any at all; for, a general concussion of the head may produce an effusion of blood within the cranium. Under these circumstances, Mr. Pott was against the operation, and says that "the only chance of relief is from phlebotomy, and an open belly; by which we may hope so to lessen the quantity of the circulating fluids as to assist nature in the dissipation or absorption of what has been extravasated. This is an effect which, although not highly improbable in itself, yet is not to be expected from a slight or trifling application of the means proposed. The use of them must be proportioned to the hazard of the case. Blood must be drawn off freely and repeatedly, and from different veins; the belly must be kept constantly open, the body quiet, and the strictest regularity of general regimen must be rigidly observed. By these means, very alarming symptoms have now and then been removed, and people in seemingly very hazardous circumstances have been recovered."

If the symptoms, however were urgent, it certainly might be proper to perforate the cranium in the course of the spinous artery of the dura mater. If no blood should be found under one parietal bone: the operation might be done on the other. This situation, we know, is the chief one for copious extravasations between the cranium and dura mater, and if the blood be more deeply effused, we have the consolation of knowing, that the patient had the chance of that benefit, which might have resulted from the operation, had the pressure originated from an extravasation in one of the most common places, between the dura mater and the skull.

This part of, practice, however, is exceedingly doubtful and obscure. But, should the mode of judging, whether blood lies immediately under the skull, suggested by Mr. Abernethy, prove, invariably correct, our line of conduct may be hereafter more easily determined, respecting whether the trephine should be applied in such dubious cases, or not. Even when the injured scalp shews where the violence has operated, the criterion, we are about to notice, may inform us, whether we should perforate the bone, or not; for, though the extravasation is sometimes found immediately under the external mark, yet, it often is not so; but, is in a part distant from that mark, to which we have nothing to lead us, and to which, indeed, if we knew it, we could not reach. Mr. Abernethy has observed, "that unless one of the large arteries of the dura mater be wounded, the quantity of blood,

poured out, will probably be inconsiderable; and the slight compression of the brain, which this occasions, may not be attended with any peculiar symptoms, or perhaps, it may occasion some stupor, or excite an irritation, disposing the subjacent parts to become inflamed. It is indeed highly probable, that, in many cases, which have done well without an operation, such an extravasation has existed. But, if there be so much blood on the dura mater, as materially to derange the functions of the brain, the bone, to a certain extent, will no longer receive blood from within, and by the operation, performed for its exposure, the pericranium must have been separated from its outside. I believe, that *a bone, so circumstanced, will not be found to bleed*." In some cases, related by this gentleman, there was no hemorrhage; twice he was able, by attending to this circumstance, to tell how far the detachment of the dura mater extended; and often, when symptoms seemed to demand a perforation of the skull, he has seen the operation contra-indicated by the hemorrhage from the bone, and as the event shewed, with accuracy. (P. 33.)

Pott justly remarks, that "if the extravasation be of blood, and that blood be in a fluid state, small in quantity, and lying between the skull and dura mater, immediately under or near to the place perforated, it may happily be all discharged by such perforation, and the patient's life may thereby be saved; of which many instances are producible. But if the event does not prove so fortunate, if the extravasation be so large or so situated that the operation proved insufficient, yet the symptoms having been urgent, general evacuation having been used ineffectually, and a wound or bruise of the scalp having pointed out the part which most probably received the blow: although the removal of that part of the scalp should not detect any injury done to the bone, yet the symptoms still subsisting, I cannot help thinking, that perforation of the cranium is in these circumstances so fully warranted, that the omission of it may truly be called a neglect of having done that which might have proved serviceable, and, *rebus sic stantibus*, can do no harm. It is very true, that no man can beforehand tell whether such operation will prove beneficial or not, because he cannot know the precise nature, degree, or situation of the mischief; but, this uncertainty properly considered, is so far from being a dissuasive from the attempt, that it is really a strong incitement to make it; it being fully as impossible to know, that the extravasated fluid

does *not* lie between the skull and dura mater, and that under the part stricken, as that it *does*; and if the latter should be the case, and the operation be not performed, one, and most probably the only means of relief, will have been omitted."

When there is no interval of sense, between the blow, and the coming on of perilous symptoms, it is frequently impossible to determine, whether the mischief be owing to the largeness and suddenness of the extravasation, to the violence of the shock, which the brain has received, or to both these causes at once, which, unfortunately, is too often the case. In this latter complication, indeed, trephining will frequently be of no avail, even though it serve for the entire removal of all pressure off the brain; for, the patient cannot recover from the violence of the concussion, and never regains his senses. This is no reason, however, why the chance of the operation doing good should not be taken, when there are evident symptoms of pressure. Let us in these darkened cases, call to mind the sentiments of Pott, who says: "No man, who is at all acquainted with this subject, will ever venture to pronounce or promise success from the use of the trephine, even in the most apparently slight cases; he knows that honestly he cannot; it is enough that it has often been successful where and when every other means have failed. The true and just consideration is this: does the operation of perforating the cranium in such case add at all to that degree of hazard which the patient is in before it is performed? or can he in many instances do well without it? If it does add to the patient's hazard, that is certainly a very good reason for laying it aside, or for using it very cautiously; but, if it does not, and the only objection made to it, is, that it frequently fails of being successful, surely it cannot be right to disuse that, which has often been, not only salutary, but the *causa sine qua non* of preservation, merely, because it is also often unsuccessful, that is, because it is not infallible."

Mr. Pott thought, that, whenever the dura was detached from the inner surface of the skull by blood, as well as matter, the pericranium covering the outer part of the same bone would generally become detached also, and this spontaneous separation of the latter membrane he very justly regards, as a positive indication for the operation. However, it is very certain, that if, in cases of extravasation, the surgeon were to wait for this criterion, the operation would be done too late, and, therefore, whenever unequivocal symptoms of pressure on the brain

exist, trephining should never be delayed. Giving vent to the confined blood "may produce a cure, or it may prove only a temporary relief, according to the different circumstances of different cases. The disappearance, and even the alleviation of the most pressing symptoms is undoubtedly a favourable circumstance, but is not to be depended upon as absolutely portending a good event. Either a bloody, or limpid extravasation may be formed, or forming between the meninges, or upon, or within the brain, and may prove as certainly pernicious in future, as the more external effusion would have done, had it not been discharged; or the dura mater may have been so damaged by the violence of the blow as to inflame and suppurate, and thereby destroy the patient." (*Pott*.)

"If the disease (says the same eminent surgeon) lies between the dura and pia mater, mere perforation of the skull can do nothing; and, therefore, if the symptoms are pressing, there is no remedy but division of the outer of these membranes. The division of the dura mater is an operation, which I have several times seen done by others, and have often done myself; I have seen it, and found it now and then successful; and, from those instances of success, am satisfied of the propriety, and necessity of its being sometimes done." He next states, however, his sentiment, that wounding the dura mater is itself attended with dangerous consequences. Mr. Abernethy's opinion of such operation has already been given.

"Upon the removal of a piece of bone by means of the trephine; if the operation has been performed over the part where the disease is situated, and the extravasation be of the fluid kind, and between the cranium and dura mater; such fluid, whether it be blood, water, or both, is immediately seen, and is partly discharged by such opening; if, on the other hand, the extravasation be of blood in a coagulated or grumous state, it is either loose, or in some degree adherent to the dura mater; if the former of these be the case, it is either totally or partially discharged at the time of, or soon after, the operation, according to the quantity or extent of the mischief; if the latter, the perforation discovers, but does not immediately discharge it. In both instances, the conduct of the surgeon, with regard to repetition of the operation, must be determined by the particular circumstances of each individual case; a large extravasation must necessarily require a more free removal of bone than a small one; not only on account of freedom of discharge, but on account of larger de-

tachment of dura mater; and a grumous or coagulated extravasation requires a still more free use of the instrument, not only because the blood in such state is discharged with difficulty, but because the whole surface of the dura mater so covered is always put under the necessity of suppurating, which suppuration has but one chance of a happy event, and that derivable from the free use of the perforator.

"When the extravasation is not between the cranium and dura mater, but either between the meninges, or in the ventricles of the brain, the appearances are not only different from the preceding state of the case, but from each other.

"When the extravasated fluid lies between the skull and dura mater; as soon as that extravasation is discharged, or the grumous blood has been wiped off, the dura mater appears flaccid, easily yields to or does not resist the impression of a finger, and (the discharge being made) enjoys that kind of motion, that elevation and depression, which our fathers supposed it to have naturally and always, but which is only the consequence of the circulation through the brain, and the artificial removal of the piece of bone. But when the extravasation is situated between the meninges, or on the surface of the brain, the appearance is not the same. In this case, there is no discharge upon removing the bone; and the dura mater, instead of being flaccid and readily obeying the motion of the blood, appears full and turgid, has little or no motion, and pressing hard against the edges of the perforation, rises into a kind of spheroidal form in the hole of the perforated bone. If the extravasation be of the limpid kind, the membrane retains its natural colour; but if it be either purely fluid blood, or blood coagulated and the subject young, the colour of the membrane is so altered by what lies under it, that the nature of the case is always determinable from this circumstance.

"Be the extravasated fluid what it may, it has no natural outlet; absorption was the only chance the patient had whereby to get rid of it without an operation, and that we must now suppose to have failed; an artificial opening therefore must be made, by the division of the dura mater, and perhaps of the pia also. This operation, under the circumstances and appearances already mentioned, is absolutely necessary, and has been successful; it is performed to give discharge to what cannot be got rid of by any other means, and consists in a division of the membrane or membranes, made in a crucial form with a point of a lancet. The

operation in itself is extremely simple and easy, but the patient is thereby put into the state of one whose meninges have been wounded, with only this difference, that the wound made for this purpose is smooth and simple, and inflicted with the least possible violence: whereas an accidental wound of the same parts may be lacerated, contused, and attended with circumstances which must aggravate the evil, and may induce worse consequences." (Pott.)

All cases of pressure on the brain are attended with hazard of inflammation of this organ, and membranes. This danger must be averted as much as possible, by the antiphlogistic means, recommended in speaking of fractures of the skull.

CONCUSSION, OR COMMOTION OF THE BRAIN.

"Very alarming symptoms, followed sometimes by the most fatal consequences, (Pott remarks,) are found to attend great violence offered to the head; and, upon the strictest examination both of the living and the dead, neither fissure, fracture, nor extravasation of any kind can be discovered. The same symptoms, and the same event, are met with, when the head has received no injury at all *ab externo*, but has only been violently shaken; nay, when only the body, or general frame, has seemed to have sustained the whole violence." And the same writer afterwards accurately observes, that "the symptoms attending a concussion are generally in proportion to the degree of violence, which the brain itself has sustained, and which, indeed, is cognizable only by the symptoms. If the concussion be very great, all sense and power of motion are immediately abolished, and death follows soon: but, between this degree, and that slight confusion (or stunning, as it is called) which attends most violences, done to the head, there are many stages." I think Mr. Abernethy has particularly excelled other writers, in his description of the symptoms of concussion, which, he is of opinion, may be properly divided into three stages.

"The *first* is, that state of insensibility and derangement of the bodily powers, which immediately succeeds the accident. While it lasts, the patient scarcely feels any injury that may be inflicted on him. His breathing is difficult, but in general without stertor; his pulse intermitting, and his extremities cold. But such a state cannot last long; it goes off gradually, and is succeeded by another, which I consider as the *second* stage of concussion. In this, the pulse and respiration

become better, and, though not regularly performed, are sufficient to maintain life, and to diffuse warmth over the extreme parts of the body. The feeling of the patient is now so far restored, that he is sensible if his skin be pinched; but he lies stupid, and inattentive to slight external impressions. As the effects of concussion diminish, he becomes capable of replying to questions put to him in a loud tone of voice, especially when they refer to his chief suffering at the time, as pain in the head, &c.; otherwise, he answers incoherently, and as if his attention was occupied by something else. As long as the stupor remains, the inflammation of the brain seems to be moderate; but as the former abates, the latter seldom fails to increase; and this constitutes the *third* stage, which is the most important of the series of effects proceeding from concussion.

"These several stages vary considerably in their degree and duration; but more or less of each will be found to take place in every instance where the brain has been violently shaken. Whether they bear any certain proportion to each other or not, I do not know. Indeed this will depend upon such a variety of circumstances in the constitution, the injury, and the after-treatment, that it must be difficult to determine.

"With regard to the treatment of concussion, it would appear, that in the first stage very little can be done; and perhaps, what little is done, had better be omitted, as the brain and nerves are probably insensible to any stimulants that can be employed. From a loose, and, I think, fallacious analogy between the insensibility in fainting, and that which occurs in concussion, the more powerful stimulants, such as wine, brandy, and volatile alkali, are commonly had recourse to, as soon as the patient can be got to swallow. The same reasoning which led to the employment of these remedies in the *first* stage, in order to recall sensibility, has given a kind of sanction to their repetition in the *second*, with a view to continue and increase it.

"But here the practice becomes more pernicious, and less defensible. The circumstance of the brain having so far recovered its powers, as to carry on the animal functions in a degree sufficient to maintain life, is surely a strong argument that it will continue to do so, without the aid of means which probably tend to exhaust parts already weakened, by the violent action they induce.

"And it seems probable, that these stimulating liquors will aggravate that inflammation which must sooner or later

ensue." (*Essay on Injuries of the Head*, p. 59.)

The following passage, extracted from a writer, who has already been of material assistance to us in this subject, cannot be too deeply impressed on the memory of every surgical practitioner:

"To distinguish between an extravasation and a commotion, by the symptoms only, is frequently a very difficult matter, sometimes an impossible one. The similarity of the effects in some cases, and the very small space of time which may intervene between the going off of the one and accession of the other, render this a very nice exercise of the judgment. The first stunning or deprivation of sense, whether total or partial, may be from either, and no man can tell from which; but when these first symptoms have been removed, or have spontaneously disappeared; if such patient is again oppressed with drowsiness, or stupidity, or total or partial loss of sense, it then becomes most probable, that the first complaints were from commotion, and that the latter are from extravasation; and the greater the distance of time between the two, the greater is the probability not only that an extravasation is the cause, but that the extravasation is of the limpid kind, made gradatim, and within the brain.

"Whoever seriously reflects on the nature of these two causes of evil within the cranium, and considers them as liable to frequent combination in the same subject, and at the same time considers, that in many instances no degree of information can be obtained from the only person capable of giving it (the patient), will immediately be sensible, how very difficult a part a practitioner has to act in many of these cases, and how very unjust it must be to call that ignorance; which is only a just diffidence arising from the obscurity of the subject, and the impossibility of attaining materials to form a clear judgment.

"When there is no reason to apprehend any other injury, and commotion seems to be the sole disease, plentiful evacuation by phlebotomy and lenient cathartics, a dark room, the most perfect quietude, and a very low regimen, are the only means in our power; and are sometimes successful." (*Pott*)

The reader, who wishes to acquire the most accurate information, concerning injuries of the head, may consult, with advantage, various dissertations in the *Mem. de l'Acad. de Chirurgie; Traité des Opérations de Chirurgie par Le Dran; Dease on Wounds of the Head; Pott on Injuries of the Head from External Violence; Hill's Cases in Surgery; O'Halloran on the dif-*

ferent Disorders arising from External Injuries of the Head; Some Cases in Desault's Parisian Chirurgical Journal; Mémoire sur les Plaies de Tête, in Œuvres Chirurgicales de Desault, par Bichat, Tom. 2; Lassus, Pathologie Chirurgicale, Tom. 2, p. 252, &c. Edit. 1809.)

HECTIC FEVER. See *Fevers, Surgical*.

HEMERALOPIA. According to M. Dujardin, this term is derived from *ημέρα*, the day, *ἄλως*, blind, and *ὤψ*, the eye, and its right signification is therefore inferred to be *diurna cæcitas*, or *day-blindness*. (See *Journal de Médecine*, Tom. 19, p. 348.) In the same sense, Dr. Hillary (*Obs. on the Diseases of Barbadoes*, p. 298, Edit. 2,) Dr. Heberden (*Med. Transactions*, Vol. 1, Art. 5.) have employed the term.

Hemeralopia then, which is of very rare occurrence, stands in opposition to the *nyctalopia*, of the ancients, or *night-blindness*. Modern writers in general, however, have used these terms in the contrary sense; considering the *hemeralopia*, as denoting sight during the day, and blindness in the night, and *nyctalopia*, as expressing night-seeing, owl-sight, as the French call it, and blindness during the day-time.

Hemeralopia, in the meaning of day-blindness, is a very uncommon affection. Dr. Hillary had never met with but two examples. He mentions a report, however, that there are a people in Siam, in the East Indies, and also in Africa, who are subject to the disease of being blind in the day time, and seeing well by night. (*Mod. Univ. Hist. Vol. 7.*)

Sauvages affirms, that the *hemeralopia*, in his nomenclature called *amblyopia crepuscularis*, had, about two years before, been in some degree epidemic in the neighbourhood of Montpellier, in the villages, in damp situations adjoining the rivers, and that it particularly affected the soldiers, who slept in the open damp air. They were cured, he says, by blistering, together with emetics and cathartics, and other evacuates. (*Nosol. Method. Class 6, Gen. 3, Spec. 1.*)

See some ingenious observations on this subject in Dr. Rees's *Cyclopædia*, Art. *Hemeralopia*.

Scarpa, with the generality of modern writers, has considered the *hemeralopia*, as an affection, in which the patient sees very well in the day, but, not in the night-time.

The following observations are offered by this celebrated Professor upon the disease, in the sense of night-blindness.

"*Hemeralopia*, or *nocturnal blindness*, (says Scarpa) is properly nothing but a

kind of imperfect periodical amaurosis, most commonly sympathetic with the stomach. Its paroxysms come on towards the evening, and disappear in the morning. The disease is endemic in some countries, and epidemic, at certain seasons of the year, in others.

"At sunset, objects appear to persons affected with the complaint, as if covered with an ash-coloured veil, which gradually changes into a dense cloud, which intervenes between the eyes, and surrounding objects. Patients with hemeralopia have the pupil, both in the day and night-time, more dilated, and less moveable, than it usually is in healthy eyes. The majority of them, however, have the pupil more or less moveable in the day-time, and always expanded and motionless at night. When brought into a room faintly lighted by a candle, where all the bystanders can see tolerably well, they cannot discern at all, or in a very feeble manner, scarcely any one object; or they only find themselves able to distinguish light from darkness; and at moon-light their sight is still worse. At day-break they recover their sight, which continues perfect, all the rest of the day, till sunset."

This disease (according to Scarpa) may commonly be completely cured, and oftentimes in a very short time, by treating it on the same plan by which the imperfect amaurosis is remedied; (see *Amaurosis*;) viz. by employing emetics, the resolvent powders, and pills, and a blister on the nape of the neck; and, topically, the vapours of the caustic volatile alkali: lastly, by prescribing, towards the end of the treatment, bark conjoined with valerian. In cases, in which the disease has been preceded by plethora, and suppressed perspiration, bleeding and sudorifics are also indicated.

In this manner, Scarpa has succeeded in curing three subjects, affected with the complaint. The first was a boy, fourteen years old, who, for several weeks, had, in vain, made use of the fumigation of a sheep's liver, which had been fried. The second was a waterman; the third a countryman, living in the rice-fields in the vicinity of Pavia. The two last were between thirty and forty years of age, and emaciated, with bloated, sallow countenances. After the boy had vomited a good deal, in consequence of taking, at repeated doses, in the space of two hours, a grain and a half of tartar emetic, dissolved in four ounces of water, he took on the following days, the resolvent powders, mentioned in *Amaurosis*. They produced nausea, and two or three copious stools, regularly every day. On the evening of

the fifth day, the patient began to discern surrounding objects by the faintest light of a lantern. Even since the emetic was administered, he continued the topical use of the vapours of the spirit of sal-ammoniac, and, on the sixteenth day, was perfectly cured. The waterman thrice vomited up a considerable quantity of a yellowish, viscid matter. Afterwards, he took the resolvent powders, which made him vomit again on the third day, and, in the day-time, he regularly exposed his eyes, every four hours, to the action of the ammoniacal vapours. It was not till the eleventh day, that he began to distinguish objects in the night-time by a weak candle-light. The countryman vomited only once copiously, but afterwards experienced considerable nausea during the nine following days, on which he took the resolvent powders, and he daily discharged by stool a considerable quantity of greenish matter. From the beginning, this patient also employed the ammoniacal vapours, as a topical application, and, on the evening of the fourteenth day, he began to see by candle-light. From this period, he continued to regain the faculty of seeing objects in the night-time regularly more and more, until he was completely cured. Towards the conclusion of the treatment, Scarpa gave these patients bark and valerian.

But, the most expeditious cure was that which Scarpa effected on Mauro Bonini, a robust husbandman, of Donalasco, aged two-and-twenty. This man began in March to perceive, that, at sunset, he could only distinguish objects very imperfectly. The complaint increased to such a degree, that, in the beginning of May, he was almost totally blind in the evening. On the tenth of May, he came to the hospital at Pavia. Having examined both his eyes in the day-light, Scarpa found both the pupils very much dilated, and almost motionless. In the evening, he repeated the examination, and assured himself, that the patient could not see objects, which were visible to the by-standers, consequently, that he was affected with hemeralopia. He also complained of bitterness in his mouth, heaviness in his head, and his tongue was foul.

On the eleventh, Scarpa ordered him an emetic, which did not produce so much effect as was expected, and therefore a stronger one was prescribed the next day. It was composed of a dram and a half of ipecacuanha, and two grains of tartar emetic. This dose made him vomit up a considerable quantity of yellow, greenish matter. The patient found his head relieved immediately afterwards, and the bitterness in his mouth was no longer per-

ceptible; the pupils of his eyes contracted a little, and became somewhat moveable in a vivid light. The ammoniacal vapours were now externally applied. The same evening, the patient's sight seemed amended, and, on the thirteenth, all internal medicines were discontinued, the vapours alone being used.

On the fourteenth, the patient complained again of bitterness in his mouth, and his tongue appeared furred. Scarpa ordered him to take the resolvent powders every three hours. These produced nausea, and some evacuations from the bowels. The use of the vapours was continued. In the evening, Scarpa exposed the patient to the same degree of light, as when the preceding examinations were made, and the patient was able to distinguish all objects which were presented to him, exceedingly well. On the sixteenth, the symptoms of foulness in the stomach entirely disappeared, and the pupil of each eye contracted in a moderate light, as in healthy persons. The man left the hospital, on the seventeenth, perfectly cured.

Scarpa notices, that the ancients have strongly recommended, for the cure of this disease, the fumigations of a sheep's liver fried. These were directed against the eyes through a funnel; and the liver, thus prepared, was also directed to be eaten. Even in Italy, according to Scarpa, this remedy in general obtains confidence not only with the vulgar, but also with surgeons. Some writers add, that it is productive of wonderful success among the Chinese, who are said to be very liable to this complaint. Scarpa says, he has no observations of his own to offer in support of this account; but, the case of the above-mentioned boy seems to be repugnant to it. If, however, the efficacy of this remedy should be a matter of fact, surgeons will possess another means of curing nocturnal blindness, besides that which we have been explaining.

Celsus, in the chapter on Mydriasis, has the following words: *Quidam sine ullâ manifestâ causâ subito obcæcati sunt. Ex quibus nonnulli, cum aliquandiu nihil viderent, repentinâ profusione alvi lumen recuperant. Quò minus alienum videtur, et recenti re, et interposito, tempore medicamentis quoque moliri dejectiones, quæ omnem noxiam materiam per inferiora depellant.* This passage, Scarpa thinks, refers not only to the treatment of the dilated pupil, but also to that of the imperfect amaurosis, which occurs suddenly; and it appears to him to merit the attention of practitioners.

The first part of what Celsus has stated, viz. that persons who have been for some time affected with amaurosis, have

regained their sight on being attacked by a diarrhœa, seems to Scarpa to be corroborated by the case, related by Doctor Pye. (*Med. Obs. and Inq. Vol. 1.*) A man, forty years of age, says he, had been affected for two months with periodical amaurosis, which, for a certain time, had occurred regularly every evening, but afterwards came on irregularly, at different intervals, with considerable dilatation of the pupil, and such obscuration of sight on the approach of night, that even the light of a candle could not be discerned. The man was seized with a diarrhœa. Doctor Pye ordered him to take, for eight successive days, a potion with the *kali præparatum*; then he prescribed an electuary, composed of bark, nutmeg, and sirup of orange-peel. The two latter ingredients were added to the bark, on account of the continuance of the diarrhœa. The second day after the electuary was taken, the diarrhœa increased, and the patient vomited copiously; after which he suddenly recovered his sight, so as to see equally well by day and by night. As the diarrhœa continued, the electuary was omitted, after having been taken two days. A violent fever succeeded the diarrhœa, and, it was remarked that, during the highest stage of the former, the patient became rather deaf, but without losing his sight in the night or day-time. Doctor Pye does not mention what steps were taken to moderate the fever, which proved fatal to the patient. At all events, adds Scarpa, it is a fact, that this spontaneous laxness of the bowels entirely freed the man from the imperfect periodical amaurosis. Scarpa entertains no doubt, that, by looking attentively into the numerous collection of medical observations, one might find in them a great many facts similar to the preceding one, shewing the influence of what he terms morbid gastric stimuli over the organ of sight, and, consequently, the great utility of a spontaneous looseness of the bowels in the cure of the imperfect amaurosis.

But, says Scarpa, even if such examples of the incomplete amaurosis being dissipated in consequence of spontaneous vomiting, or copious evacuations from the bowels, produced entirely by nature, were rare, and noticed by few, we now have so many observations, evincing the successful cure of this disease by means of such evacuations, artificially produced by emetics, and internal resolvents, that no doubt whatever can be entertained, concerning the accuracy of the second part of Celsus's admonition, relative to the present view of the imperfect amaurosis: *et recenti re, interposito tempore, medicamentis quoque moliri dejectiones, quæ*

omnem noxiam materiam per inferiora depellant. Of this Scarpa remarks, we undoubtedly have numerous, satisfactory proofs, in the accurate observations, related by Schmucker and Richter; but our confidence, says Scarpa, in the above method of curing the imperfect and periodical amaurosis, must increase, when we take notice, that the most respectable practitioners of past times, have, in the majority of cases, cured this disease only by means of emetics, and internal resolvents, though, in their writings, they may have imputed the success of the treatment to other causes, or the efficacy of other remedies, which they prescribed conjointly with emetics, and resolvents.

Scarpa, after several valuable remarks on amaurosis in general, refers to the *Mercur de France*, for February, 1756, where there is an account of the cures performed by Fournier, on several subjects, affected with hemeralopia. The first were three soldiers, to whom an emetic was administered, after bleeding them. The next day, as they also complained of a heaviness in their head, and nausea, the bleeding and emetic were repeated. This expedient removed all the above symptoms, and these three soldiers were no longer unable to see in the night-time. Fournier met with equal success, in treating eight other soldiers upon the same plan, who were affected with the same disease, and belonged to the same garrison.

Scarpa notices, that Pellier (*Recueil de Mem. et Obs. sur l'Œil. Obs. 132.*) cured Captain Micetti of an hemeralopia by repeated doses of tartar-emetic, a seton in the nape of the neck, and cooling, aperient beverages. Pellier also assures us, that he has several times cured the recent imperfect amaurosis, by means of small doses of tartar-emetic, and topical aromatic fumigations. (*Observ. 136—138.*) (See Scarpa sulle Malattie degli Occhi. Venezia, 1802.)

HEMIOPIA. (from *ἡμισυς*, half, and *ὤψ*, the eye.) A certain disorder of the eye, in which the patient cannot see the whole of any object, which he is looking at, but only a part of it. Sometimes, he sees the middle, but not the circumference; sometimes the circumference, but not the centre; while, on other occasions, it is only the upper, or lower half, which is discerned. Sometimes objects are seen thus imperfectly, whether distant, or near; sometimes, only when they are near, and not at a great distance.

The causes of the hemiopia are divided by Richter into four kinds.

To the first belong opacities of the cornea and crystalline lens, especially,

such as destroy the transparency of only a certain portion of these parts.

The cure of this species of hemiopia depends upon the removal of the partial opacity from which it originates. (See *Cataract*, and *Cornea, Opacities of.*)

Under certain circumstances, persons, whose upper eyelid cannot be properly raised, are affected with hemiopia. They can only discern the lower half of an object, which is near and of large size, unless they go further from it, draw their heads backward, or turn their eyes downward. The pupil, in particular instances, becomes drawn away from the middle of the iris. This may also be a cause of hemiopia: it is a case, that does not admit of a cure. The affection may likewise proceed from a separation of the iris from the margin of the cornea by external violence, or other causes. Here the cure is equally impracticable.

The foregoing species of hemiopia are merely effects of other diseases. The fourth and last kind is the most important, being generally regarded as an independent disorder. Sometimes, it appears rather to be the effect of a sudden and transient irritation, producing a morbid sensibility in the optic nerve.

The causes of this sort of case, if we can credit Richter, are mostly seated in the abdominal viscera. When the affection is more durable, forming what has been termed *amaurosis dimidiata*, the same treatment is indicated, as in the paralytic affections of the retina and optic nerve, in which last disorders, indeed, it often terminates. (See Richter's *Anfangsgründe der Wundarzn. Band. 3. Kap. 17.*)

HEMORRHAGE, (from *αἷμα*, blood, and *ῥήγνυμι*, to break out.) *Hæmorrhagia, Bleeding.*

This is doubtless one of the most important subjects in Surgery. The fear of hemorrhage in fact retarded the improvement of our profession for ages; for the ancients, ignorant how to stop bleeding, were afraid to cut out the most trivial tumour, or they did so with terror. They generally performed operations slowly and imperfectly, by means of burning-irons, or ligatures, which the moderns execute quickly and safely with a knife. If the old surgeons ventured to amputate a limb, they only did so, when it had mortified, by dividing the dead parts, and so great was their apprehensions of bleeding, that they only dared to cut parts which could no longer bleed. (*John Bell's Principles of Surgery, Vol. I. p. 142.*) But, not only as a consequence of surgery, is hemorrhage to be feared; it is also one of the most alarming accidents, which surgery is call-

ed upon to relieve. "*Un sentiment naturel attache à l'idée de perdre son sang ; un terreur machinale, dont l'enfant, qui commence à parler, et l'homme le plus décidé, sont également susceptibles. On ne peut point dire, que cette peur soit chimérique. Si l'on comptoit ceux, qui perdent la vie dans une bataille, on verroit, que les trois quarts ont péri par quelque hemorrhagie ; et dans les grandes opérations de chirurgie cet accident est presque toujours le plus formidable.*" (Morand. *Mem. de l'Acad. Royale de Chirurgie*, Vol. 5. 8vo. See Jones on Hemorrhage.)

As the blood circulates in the arteries with much greater impetus and rapidity, than in the veins, it necessarily follows, that their wounds are generally attended with much more hemorrhage, than those of the latter vessels, and that such hemorrhage is more difficult to suppress. However, as the blood also flows through veins, of great magnitude, with great velocity, bleedings from them are frequently highly dangerous, and sometimes unavoidably fatal. When an artery is wounded, the blood is of a bright scarlet colour, and gushes from the vessel *per saltum*, in a very rapid manner. The blood issues from a vein in an even, unbroken stream, and is of a dark purple red colour. It is of great practical use to remember, these distinguishing differences, between arterial and venous hemorrhage, because, though the oozing of blood may be in both cases equal in quantity, yet, in the latter instance, one is often justified in bringing the sides of a wound together, without taking farther means to suppress the bleeding, while it would not be proper to adopt the same conduct, were there an equal oozing of arterial blood.

Dr. Jones has favoured the world with a matchless work, on the present subject ; and as one grand object of this Dictionary is to convey a careful account of all the latest improvements in surgical science, I shall first endeavour to make the reader acquainted with the more accurate ideas, which this gentleman has lately published, relative to the doctrines of hemorrhage. Afterwards, we shall consider the surgical means to be practised in different cases.

The sides of the arteries are divisible into three coats. The *internal one* is extremely thin, and smooth. It is elastic, and firm, (considering its delicate structure) in the longitudinal direction, *but so weak in the circular as to be very easily torn by the slightest force applied in that direction.* Its diseases shew, that it is vascular, and it is also probably sensible.

The *middle coat* is the thickest, and is composed of muscular fibres, all arranged in a circular manner ; they differ, how-

ever, from common muscular fibres in being more elastic, by which they alone keep a dead artery open, and of a cylindrical form. As this middle coat has no longitudinal fibres, *the circular fibres are held together by a slender connexion, which yields readily to any force, applied in the circumference of the artery.*

The external coat is remarkable for its whiteness, density, and great elasticity. When an artery is surrounded with a tight ligature, its middle and internal coats are as completely divided by it, as they could be by a knife, while the external coat remains entire.

Besides these proper coats, all the arteries, in their natural situations, are connected, by means of fine cellular substance, with surrounding, membranous sheaths. *If an artery be divided, the divided parts, owing to their elasticity, recede from each other, and the length of the cellular substance, connecting the artery with the sheath, admits of its retracting a certain way within the sheath.*

Another important fact is : *that when an artery is divided, its truncated extremities contract in a greater, or less, degree, and the contraction is generally, if not always, permanent.*

Arteries are furnished with arteries, veins, absorbents, and nerves ; *a structure, which makes them susceptible of every change to which living parts are subjected in common ; enables them to inflame, when injured, and to pour out coagulating lymph by which the injury is repaired, or the tube permanently closed.* (See Jones on Hemorrhage.)

M. Petit, the surgeon, was the first, who, in 1731, endeavoured to explain the means, which nature employs for the suppression of Hemorrhage. He thought, that bleeding from a divided artery is stopped by the formation of a coagulum of blood, which is situated partly *within*, and partly *without* the vessel. The clot, he says, afterwards adheres to the inside of the artery, to its orifice, and to the surrounding parts ; and, he adds, that when hemorrhage is stopped by a ligature, a coagulum is formed above the ligature, which only differs in shape, from the one, which takes place when no ligature is employed. His opinion leads him to recommend compression to support the coagulum.

In 1736, M. Morand published additional interesting remarks. He allowed, that a coagulum had some effect in stopping hemorrhage ; but, contended, that a corrugation, or plaiting, of the circular fibres of the artery which diminish its canal, and a shortening and consequent thickening of its * *longitudinal ones*, which

* Anatomists do not acknowledge that such exist.

heavily rendered it impervious, had some share in the process. He thought that the cavity of an artery might be obliterated, by the puckering, or corrugation, when circular pressure, as that of a ligature, is made.

Morand erred chiefly in explanation; for, the contraction and retraction of divided arteries are indisputable facts, and, as Dr. Jones remarks, this does not affect the truth of his general conclusion, that the change, produced on a divided artery, contributes with the coagulum to stop the flow of blood.

Mr. Samuel Sharp (2d. Edit. of *Operations of Surgery*, 1739,) supported the same doctrine. "The blood-vessels, immediately upon their division, bleed freely, and continue bleeding, till they are either stopped by art, or, at length contracting, and withdrawing themselves, into the wound, their extremities are shut up by coagulated blood."

Pouteau (*Mélanges de Chirurgie*, 1760,) denied, that a coagulum is always found after an artery is divided; and, when it is, he thought it only a feeble and subsidiary means towards the suppression of hemorrhage. He contended, that the retraction of the artery had not been demonstrated, and could not be more effectual, than a coagulum. His theory was, that the swelling of the cellular membrane, at the circumference of the cut extremity of the artery, forms the principal impediment to the flow of blood; and that a ligature is useful in promoting a more immediate and extensive induration of the cellular substance.

Gooch, White, Aikin, and Kirkland, all oppose Petit's doctrine of coagulum. The first blends some of Pouteau's theory with his own, by observing, that "when a small artery is totally divided, its retraction may bring it under the surrounding parts, and with the natural contraction of the diameter of its mouth, assisted by the compressive power of those parts, increased by their growing tumid, the efflux of blood may be stopped."

White was convinced, from what Gooch had suggested, and Kirkland confirmed, that the arteries, by their natural contraction, coalesce, as far as their first ramification.

Dr. Jones admits, that an artery contracts after it has been divided, and his experiments authorize him to say, that the contraction of an artery is an important means, but, certainly not the only, nor even the chief means, by which hemorrhage is stopped. The impetuous flowing of the blood through the wound of the artery would resist the contraction

of the vessel in such a degree, that would, in almost every instance, be attended with fatal consequences, when the artery is above a certain size, were it not for the formation of a coagulum. (Jones.)

Mr. J. Bell thinks, that when hemorrhage stops of its own accord, it is neither from the retraction of an artery, nor the constriction of its fibres, nor the formation of clots, but, by the cellular substance, which surrounds the artery, being injected with blood.

We must refer the reader to Dr. Jones' work for a complete exposure of the inconsistencies and absurdities in Mr. Bell's account of his own theory. (See *P. 25, &c.*)

Dr. Jones very accurately concludes his criticisms on Mr. Bell with observing, that if this gentleman really means to confine his doctrine of the natural means of suppressing hemorrhage to the injection of the cellular substance, round the artery, with blood, he dwells improperly on one of the attendant circumstances to the exclusion of the retraction, and contraction of an artery, and the formation of a distinct clot, all primary parts of the process.

The blood, besides filling the cellular substance round the artery, also fills the cellular substance at the mouth of the artery in a particular manner; for, the divided vessel, by its retraction within its cellular sheath, leaves a space of a determinate form, which, when all the circumstances necessary for the suppression of hemorrhage operate, is gradually filled up by a distinct clot. (Jones.)

MEANS OF NATURE IN STOPPING BLEEDING FROM DIVIDED ARTERIES.

Dr. Jones has given a faithful and accurate detail of a series of experiments on animals, which demonstrate "that the blood, the action, and even the structure of the arteries, their sheath, and the cellular substance connecting them with it," are concerned in stopping bleeding from a divided artery of moderate size, in the following manner: "An impetuous flow of blood, a sudden and forcible retraction of the artery within its sheath, and a slight contraction of its extremity, are the immediate, and almost simultaneous, effects of its division. The natural impulse, however, with which the blood is driven on, in some measure counteracts the retraction, and resists the contraction of the artery. The blood is effused into the cellular substance, between the artery and its sheath, and passing through that canal of the sheath, which had been formed by

the retraction of the artery, flows freely externally, or is extravasated into the surrounding cellular membrane, in proportion to the open, or confined state of the wound. The retracting artery leaves the internal surface of the sheath uneven, by lacerating, or stretching the cellular fibres, that connected them. These fibres entangle the blood, as it flows, and thus the foundation is laid for the formation of a coagulum at the mouth of the artery, and which appears to be completed by the blood, as it passes through this canal of the sheath, gradually adhering and coagulating, around its internal surface, till it completely fills it up from the circumference to the centre." (*Jones, p. 53.*)

The effusion of blood into the surrounding cellular membrane, and between the artery and its sheath; but, in particular, the diminished force of the circulation from loss of blood, and a speedy coagulation of this fluid in this circumstance, most essentially contribute, says Dr. Jones, to the desirable effect.

It appears then, that a coagulum, which Dr. Jones calls the *external* one, at the mouth of the artery, and within its sheath, forms the first complete obstacle to the continuance of bleeding, and though it seems externally like a continuation of the artery, yet, on slitting open this vessel, its termination can be plainly observed, with the coagulum shutting up its mouth, and contained in its sheath. (*Jones, p. 55.*)

No collateral branch being very near the impervious mouth of the artery, the blood just within it is at rest, and usually forms a slender conical coagulum, which neither fills up the canal of the artery, nor adheres to its sides, except by a small portion of the circumference of its base, near the extremity of the vessel. This coagulum is distinct from the former, and what Dr. Jones calls the *internal* one.

The cut end of the artery next inflames, and the vasa vasorum pour out lymph, which fills up the extremity of the artery, is situated between the internal and external coagula, is somewhat intermingled with them, or adheres to them, and is firmly united all round to the internal coat of the vessel. Dr. Jones further states, that the permanent suppression of the hemorrhage chiefly depends on this coagulum of lymph; but, that the end of the artery is also secured by a gradual contraction, which it undergoes, and by an effusion of lymph between its tunics, and into the surrounding cellular substance; whereby these parts become thickened, and so incorporated with each other, that one cannot be discerned

from the other. Should the wound in the integuments not heal by the first intention, the coagulating lymph, soon effused, attaches the artery firmly to the subjacent and lateral parts, gives it a new covering, and entirely excludes it from the outward wound. (*Jones, p. 55.*)

The same circumstances are also remarkable in the portion of the vessel, most remote from the heart. Its orifice, however, is usually more contracted, and its external coagulum smaller, than the one, which attaches itself to the other cut end of the artery. (*Jones on Hemorrhage, p. 56.*)

The impervious extremity of the artery, no longer allowing blood to circulate through it, the portion, which lies between it and the first lateral branch gradually contracts, till its cavity is completely obliterated, and its tunics assume a ligamentous appearance. The external coagulum, which, in the first instance, had stopped the hemorrhage, is absorbed in a few days, and the coagulating lymph, effused around it, and by which the parts were thickened, is gradually removed, so that they resume again their cellular texture. (*Jones, p. 57.*)

At a still later period, the ligamentous portion is reduced to a filamentous state, so that the artery is, as it were, completely annihilated from its cut end to the first lateral branch. Long, however, ere this final change is accomplished, the inosculating branches have become considerably enlarged, so as to establish a free communication, between the disunited parts of the main artery. (*Jones, p. 58.*)

When an artery has been divided at some distance from a lateral branch, three coagula are formed: one of blood externally, which shuts up its mouth; one of lymph, just within the extremity of its canal; and one of blood, within its cavity, and contiguous to that of lymph. But, when the artery has been divided near a lateral branch, no internal coagulum of blood is formed. (*Jones, p. 63.*)

The external coagulum is always formed, when the divided artery is left to nature; not so, however, if art interferes, for under the application of the ligature it can never form. If agaric, lycoperdon, or sponge, be used, its formation is doubtful, depending entirely upon the degree of pressure, that is used; but, the internal coagulum of blood will be equally formed, whether the treatment be left to art, or nature, if no collateral branch is near the truncated extremity of the artery; and lastly, effused lymph, which, when in sufficient quantity, forms a distinct coagulum, just at the mouth of the artery, will

be always found, if the hemorrhage is permanently suppressed. (Jones, p. 74.)

MEANS, WHICH NATURE EMPLOYS FOR SUPPRESSING THE HEMORRHAGE FROM PUNCTURED OR PARTIALLY DIVIDED ARTERIES.

The suppression of hemorrhage by the natural means is much more easily accomplished, when an artery is completely divided, than when merely punctured, or partially divided. Completely dividing a wounded artery was one means practised by the ancients in order to stop hemorrhage: the moderns frequently do the same thing, when bleeding from the temporal artery proves troublesome.

Dr. Jones has related many experiments, highly worthy of perusal, and which were undertaken to investigate the present part of the subject of hemorrhage. This gentleman, however, owns, that, in regard to the temporary means by which bleeding from a punctured artery is stopped, he has but little to add to what Petit has explained, in his third publication on hemorrhage. (*Mem. de l'Acad. des Sciences*; 1735.) The blood is effused into the cellular substance, between the artery and its sheath, for some distance, both above and below the wounded part; and when the parts are examined, a short time after the hemorrhage has completely stopped, we find a stratum of coagulated blood between the artery and its sheath, extending from a few inches below the wounded part to two, or three inches above it, and somewhat thicker, or more prominent over the wounded part, than elsewhere.

Hence, rather than say the hemorrhage is stopped by a coagulum, it is more correct to say, that it is stopped by a thick lamina of coagulated blood, which, though somewhat thicker at the wounded part, is perfectly continuous with the coagulated blood lying between the artery and its sheath. (Jones, p. 113.)

When an artery is punctured, the hemorrhage, immediately following, by filling up the space, between the artery and its sheath, with blood, and consequently, distending the sheath, alters the relative situation of the puncture in the sheath to that in the artery, so that they are not exactly opposite to each other; and by that means a layer of blood is confined by the sheath over the puncture in the artery, and, by coagulating there, prevents any further effusion of blood.

But, this coagulated blood, like the external coagulum of a divided artery, affords only a temporary barrier to the hemorrhage: its permanent suppression

is effected by a process of reparation, or of obliteration.

Dr. Jones's experiments shew, that an artery, if wounded only to a moderate extent, is capable of reuniting and healing so completely, that, after a certain time, the cicatrization cannot be discovered, either on its internal, or external surface; and that even oblique and transverse wounds (which gape most) when they do not open the artery to a greater extent, than one-fourth of its circumference, are also filled up and healed by an effusion of coagulating lymph from their inflamed lips, so as to occasion but little, or no obstruction to the canal of the artery. The utmost magnitude of a wound, which will still allow the continuity of the canal to be preserved, is difficult to be learnt; for, when the wound is large, but yet capable of being united, such a quantity of coagulating lymph is poured out, that the canal of the vessel, at the wounded part, is more or less filled up by it. And when the wound is still larger, the vessel becomes either torn or ulcerated completely across, soon afterwards, by which its complete division is accomplished.

The lymph, which fills up the wound of an artery, is poured out very freely both from the vessel and the surrounding parts, and it accumulates around the artery, particularly, over the wound, where it forms a more distinct tumour. The exposed surrounding parts at the same time inflame, and pour out coagulating lymph, with which the whole surface of the wound becomes covered, and which completely excludes the artery from the external wound. This lymph granulates, and the wound is filled up and healed in the usual manner. (See Jones on Hemorrhage, p. 113, &c.)

SURGICAL MEANS OF SUPPRESSING HEMORRHAGE.

It must be plain to every one, who understands the course of the circulation, that pressure, made on that portion of a wounded artery, which adjoins the wound towards the heart, must check the effusion of blood. The current of blood in the veins, running in the opposite direction, requires the pressure to be applied to that side of the wound, which is most remote from the heart. As pressure is the most rational means of impeding hemorrhage, so it is the most effectual; and almost all the plans, employed for this purpose, are only modifications of it. The tourniquet, the ligature, the application of a roller and compresses, even

agaric itself, only become useful in the suppression of hemorrhage, on the principle of pressure, the cautery, caustics, and styptics excepted.

MEANS EMPLOYED BY THE ANCIENTS.

In order to prevent a wounded person from dying of hemorrhage, Celsus advises the wound to be filled with dry lint, over which is to be laid a sponge dipped in cold water, and pressed on the part with the hand. If, notwithstanding this, the hemorrhage should continue, he recommends repeatedly applying fresh lint, wet with vinegar; but, he is against the use of corroding escharotic applications, on account of the inflammation, which they produce; or only sanctions the employment of the mildest ones. When the hemorrhage resists these methods, he advises two ligatures to be applied to the wounded part of the vessel, and then to divide the portion situated between them:—"Quòd si illa quoque profluvio vincunt, vena, quæ sanguinem fundunt, apprehendende circaque id, quod ictum est, duobus locis deligande, intercidendæque sunt, ut et in se ipsæ coeant, et nihilominus ora præclusa habeant." Lib. 5. cap. 26. When the ligature is impracticable, he proposes the actual cautery, if the wound should bleed sufficiently, and there should be no nerves, nor muscles at the bleeding part.

Galen also mentions tying the vessels to stop the hemorrhage from wounds; and there are some traces of the same information in other authors, who lived before him, as Archigenes, and Rufus. However, it is more than probable, that, in their days, the ligature was little used, as we must infer from the multitude of topical astringents, caustics, and other applications, which they have advised for stopping bleeding, and in which they would have put less confidence, had they been familiarly acquainted with the use of the ligature. No one can doubt, that they would very soon have tied the vessels after amputations, had they had many opportunities of seeing the advantages of the ligature; but, so far were they from adopting such practice, that, Albucasis, a long while afterwards, refused to amputate a wrist, lest he should see his patient bleed to death.

Paré passes for the first, who employed the ligature after amputation. His method having been attacked, he modestly defends it in the part of his works intitled, *Apologie*. He takes great care to impute the origin of it to the ancients, and cites many of them, who have made mention of it. However, he thinks its utility in amputations of such high con-

sequence, that he considers himself as inspired by the Deity in having first adopted this practice.

The method, in which the ancients placed most confidence, for stopping hemorrhage after the amputation of a limb, was the cauterization of the cut vessel, and part of the surrounding flesh. The parts, thus affected by the heat, formed an eschar, of greater, or less thickness, which blocked up the opening of the vessel, and hindered the blood from escaping. The separation of the eschar, however, which frequently took place too soon, occasioned a return of the hemorrhage, and rendered it the more dangerous, as its suppression became more difficult, than before the cautery was applied. The instrument being too much heated, even, sometimes, immediately brought away with it the eschar, which it had just formed. At the present time, the cautery is never employed, as a means of suppressing hemorrhage, or, at most, only in a few very unusual cases, in which neither compression, nor the ligature can be made use of. In Great Britain, the cautery may be said to be entirely exploded; but, in France, the best hospital surgeons now and then employ it to stop bleedings from the antrum, and the mouth.

It was once a practice, to apply pledgets, dipped in boiled turpentine, to the mouths of the bleeding vessels: of this it is only necessary to say, that the method now has long been most justly abandoned.

ASTRINGENTS, STYPTICS, &c.

Le Dran, in his treatise on the operations of surgery, says, that a button of vitriol, or alum, applied and properly confined on the extremity of the vessel, is sufficient to stop the hemorrhage in amputations. Heister recommends the application of vitriol, in preference to the ligature, in the amputation of the forearm. Great praises have also been conferred on agaric, and sponge, for their styptic properties. Solutions of iron, and all the mineral acids in various forms, have been recommended to the publick, as remedies of the same kind, and possessing great efficacy. The ancients, indeed, had already exhausted this class of remedies in such a degree, that the pretended discoveries of the moderns, in this way, may almost all be met with in their writings; and the little success, attending their practice, especially, when bleeding from a considerable artery was to be suppressed, clearly shews what little reliance we ought to place on means

of this description. (*Encyclopédie Méthodique; Partie Chirurgicale.*) Styptics do, indeed, possess the power of stopping some hemorrhages from small arteries; but, they ought never to be trusted, when large ones are concerned.

There is no doubt, that cold air has a styptic property; by which expression I mean, it promotes the contraction of the vessels, for, no styptics can contribute to make the blood coagulate, though such an erroneous idea is not uncommon. We frequently tie, on the surface of a wound, every artery, that betrays the least disposition to bleed, as long as the wound continues exposed to the air. We bring the opposite sides of this wound into contact, and put the patient to bed. Not an hour elapses, before the renewal of hemorrhage necessitates us to remove the dressings. The wound is again exposed to the air, and again the bleeding ceases. This often happens in the scrotum, after the removal of a testicle, and on the chest, after the removal of a breast. The proper conduct, in such cases, is not to open the wound unnecessarily, but, to apply wet linen to the part so as to produce such an evaporation from its surface, as shall create a sufficient degree of cold to stop the bleeding. As all styptics irritate, judicious practitioners seldom apply them to recent wounds. It is sometimes, however, very proper to employ them to suppress hemorrhages from many diseased surfaces, where the vessels seem to have lost their natural disposition to contract.

COMPRESSION.

We have already remarked, that all the best means of checking hemorrhage, operate on the principle of pressure, the actual and potential cautery, and some styptics excepted; the two first of which act by forming a slough, which stops up the mouths of the vessels; while the latter operate by promoting their contraction. Let us next consider the various modifications of pressure.

M. Petit endeavours to shew, in a dissertation on the manner of stopping hemorrhage, printed in the *Mem. de l'Acad. de Sciences*, année 1731, that the different things which have been praised as infallible specifics, would seldom, or never, have succeeded without compression. It was always requisite, even when caustics were employed, to apply compresses, which were bound on with sufficient tightness to resist the impulse of the blood in the artery, and the premature separation of the eschar, occasioned by the actual or potential cautery. Had this

precaution not been taken, there would have been reason to have feared hemorrhage, almost invariably, and which, indeed, did recur but too frequently, when the eschar was detached, notwithstanding the pains taken to avert it by suitable compression. M. Petit has noticed, that the end of the finger, gently compressing the mouth of a vessel, is a sufficient means of stopping hemorrhage from it, and that nothing else would be necessary, if the finger and stump could always be kept in this posture. Hence, he endeavoured to obviate these difficulties by inventing a machine which securely and incessantly executes the office of the finger. This instrument is a double tourniquet, which, when applied, compresses, at once, both the extremity of the divided artery and its trunk above the wound. The compression on the end of the vessel is to be permanent; that on the trunk is only to be made at the time of dressing the wound, or when it is necessary to relax the other. An engraving and particular description of the instrument are to be found in Petit's memoir.

Surgeons used formerly to fill the cavities of the wounds with lint, and then make pressure on the bleeding vessels, by applying compresses and a tight roller over the part. The practitioners of the present day are too well acquainted with the advantages of not allowing any extraneous substance to intervene between the opposite surfaces of a recent wound, to persist in the above plan. They know, that the sides of the wound may be brought into contact, and that compression may yet be adopted, so as both to restrain particular hemorrhages, and rather promote, than retard the union of the wound.

When the blood does not issue from any particular vessel, but from numerous small ones, compression is preferable to the ligature. The employment of the latter would render it necessary to tie the whole surface of the wound. The sides of the wound are to be brought accurately together, and compresses are then to be placed over the part, and a roller to be applied with sufficient tightness to make effectual pressure, but not so forcibly as to produce a danger of the circulation in the limb being completely stopped.

If compression can ever be safely trusted in bleedings from large arteries, it is when these vessels lie immediately over a bone, against which they can be advantageously compressed. Bleedings from the radial and temporal arteries are of this kind. Compression is some-

times tried, when the brachial artery has been wounded in phlebotomy. Here it is occasionally tried, in preference to the ligature, because the latter cannot be employed without an operation to expose the artery.

When there is a small wound in a large artery, the following plan may be tried: a tourniquet is to be applied, so as to command the flow of blood into the vessel. The edges of the external wound are next to be brought into contact. Then, a compress, shaped like a blunt cone, and which is best formed of a series of compresses, gradually increasing in size, is to be placed with its apex exactly on the situation of the wound in the artery. This *graduated compress*, as it is termed, is then to be bound on the part with a roller.

In this manner, I lately healed a wound of the superficial palmar arch, in a young lady in Great Pulteney-street. The outward wound was very small, and though the hemorrhage was profuse, I conceived, that it might be permanently stopped, if compression could be so made as to keep the external wound incessantly and firmly covered for the space of a day or two. At first, I tried a compress of lint, bound on the part with a roller; but this proving ineffectual, I took some pieces of money, from the size of a farthing to that of a halfcrown, and, wrapping them up in linen, put the smallest one accurately over the wound, so as completely to cover it. Then the others were arranged, and all of them were firmly confined with a roller, and the arm kept as quiet as possible in a sling. They were taken off after three days, and no hemorrhage ensued.

It is to be observed, that the palmar fascia, in this instance, would prevent the compression from operating on the vessel; but the case shews, that this artery, when wounded, is capable of healing, if the blood be completely prevented from getting out of the external wound by the proper application of compression. Were the outer wound too large to admit of this plan, it would probably be necessary to dissect for the ends of the artery, in order to tie them. This operation, however, is by no means easy; and, perhaps, upon the whole, it might be better to cut down, at once, to the ulnar artery, and put a ligature round it, though this would only certainly stop the bleeding from one end of the vessel in the hand.

Besides compressing the wounded part of the artery, some surgeons also apply a longitudinal compress over the track of the vessel above the wound, with a view

of weakening the flow of blood into it. Whatever good effect it may have in this way, is more than counterbalanced by the difficulty which it must create to the circulation in the arm. If the graduated compress be properly arranged, an effusion of blood cannot possibly happen, and pressure along the course of the artery must at all events be unnecessary.

After relaxing the tourniquet, if no blood escape from the artery, the surgeon (supposing it to be the brachial artery wounded) should feel the pulse at the wrist, in order to ascertain, that the compression employed is not so powerful as entirely to impede the circulation in the fore-arm and hand. The arm is to be kept quietly in a sling, and, in forty-eight hours, if no bleeding take place, there will be great reason to expect that the case will do well. In another work, I have given an engraving and description of an instrument, invented by Plenck, for making pressure on the wounded brachial artery, at the bend of the arm, without pressing upon the whole circumference of the limb, and consequently stopping the circulation. No one, however, would prefer compression when large arteries are injured, except in the kind of cases, to which we have just adverted, or in those in which the wounded vessel can be firmly compressed against a subjacent bone. The compresses sometimes slip off, or the bandages become slack, so that a fatal hemorrhage may arise. Hence, when this method is adopted, the tourniquet should always remain loosely round the limb, ready to be tightened in an instant. Sometimes the external wound heals, while the opening in the artery remains unclosed, and an aneurism is the consequence. This is particularly apt to occur, when the pressure has not been powerful enough; and, when too great, mortification is apt to come on: such are the objections to placing much confidence in compression, except when the vessels are not of considerable size.

TOURNIQUET.

When hemorrhage takes place from a large artery in one of the limbs, where the vessel can be conveniently compressed above the wound in it, a tourniquet, judiciously applied, never fails in putting an immediate stop to the bleeding.

Before the invention of this instrument, which did not take place till the latter part of the 17th century, surgery was really a very defective art. No important operation could be undertaken on the extremities, without placing the patient in the most imminent peril; and the want

of the aid, afforded by the tourniquet, made many wounds mortal, which otherwise would not have been attended with the least danger.

As the first invention of this instrument has been claimed by different surgeons, and even different nations, we shall not take upon us to determine where it had its origin. But whoever was the inventor, it was first presented to the publick in a form exceedingly simple; so much so, indeed, that it seems extraordinary, that its invention did not happen sooner. A small pad being placed on the principal artery of a limb, a band was applied over it, so as to encircle the limb twice. Then a stick was introduced between the two circles of the band, and twisted: thus the pad was made to compress with quite power enough completely to stop the flow of blood into the lower part of the vessel.

Although, in the *Armamentarium Chirurgicum* of Scultetus, there is a plate of a machine, invented by this author for compressing the radial artery, by means of a screw, M. Petit is universally allowed to be the first, who brought the tourniquet to perfection, by combining the circular band with a screw, in such a manner that the greatest pressure operates on the principal artery.

The advantages of the modern tourniquet are, that its pressure can be regulated with the utmost exactness; that it operates chiefly on the point where the pad is placed, and where the main artery lies; that it does not require the aid of an assistant to keep it tense: that it completely commands the flow of blood into a limb; that it can be relaxed, or tightened in a moment; and that, when there is reason to fear a sudden renewal of hemorrhage, it can be left slackly round the limb, and, in case of need, tightened in an instant. Its utility, however, is confined to the limbs, and as the pressure necessary to stop the flow of blood through the principal artery, completely prevents the return of blood through the veins, its application cannot be made very long without inducing mortification. It is only of use also in putting a sudden stop to profuse hemorrhages for a time, that is, until the surgeon has put in practice some means, the effect of which is more permanent.

LIGATURE.

The ancients were quite unacquainted with the use of the tourniquet, and though some of their writers have made mention of the ligature, they do not seem to have known how to make proper use of it, nor to have possessed any other certain means

of suppressing hemorrhage from wounds. In modern times, it is easily comprehensible, that, when any great operation was undertaken, while surgery was so imperfect, there was more likelihood of harm, than good being done to the patient. Nor can it be wondered at, that the old practitioners should have taken immense pains to invent a great many topical astringents. But now that the ligature is known to be a means which is safe, easy, and much less painful than former methods, we need no longer search for such remedies.

It may, indeed, be set down, as a rule in surgery, whenever large arteries are wounded, never to trust to any styptic application whatsoever; but to have immediate recourse to the ligature, as being, when properly applied, the most simple and safe of all methods.

In order to qualify the reader to judge of the best mode of applying ligatures to arteries, I shall first explain to him their effect on these vessels, as related by Dr. Jones.

This gentleman learnt from Mr. J. Thomson, of Edinburgh, that, in every instance in which a ligature is applied around an artery, without including the surrounding parts, the internal coat of the vessel is torn through by it, and that this fact had been originally noticed by Desault. Mr. Thomson shewed to Dr. Jones, on a portion of artery taken from the human subject, that the internal and middle coats are divided by the ligature. (*Jones, p. 126.*)

This led Dr. Jones to make some experiments on the arteries of dogs and horses, shewing, that when a ligature is applied with sufficient tightness round an artery, to cut through its internal and middle coats, although it be immediately afterwards removed, the vessel always becomes permanently impervious at the part which was tied, as far as the first collateral branches above and below the obstructed part. Dr. Jones thinks it reasonable to expect, that the obstruction produced in the arteries of dogs and horses, in the manner he has related, "might be effected by the same treatment in the arteries of the human subject; and, if it should prove successful, it might be employed in some of the most important cases in surgery. The success of the late important improvements which have been introduced in the operation for aneurism, may perhaps appear to most surgeons to have rendered that operation sufficiently simple and safe; but, if it be possible to produce obstruction in the canal of an artery of the human subject, in the above-mentioned manner, may it

not be advantageously employed in the cure of aneurism; inasmuch as nothing need be done to prevent the immediate union of the external wound?" Dr. Jones next questions, whether this mode of obstructing the passage of blood through the arteries may not also be advantageously practised in cases of bronchocele? (p. 136.)

From Dr. Jones's experiments, it appears, that the first effects of a ligature upon an artery are, a complete division of its internal and middle coats, an apposition of its wounded surfaces, and an obstruction to the circulation of the blood through its canal. There must be a small quantity of stagnant blood, just within the extremity of the artery; but this does not, in every instance, immediately form a coagulum, capable of filling up the canal of the artery. In most cases, only a slender coagulum is formed at first, which gradually becomes larger by successive coagulations of the blood; and hence, the coagulum is always at first of a tapering form, with its base at the extremity of the artery. But, as Dr. Jones remarks, the formation of this coagulum is not material; for soon after the ligature has been applied, the end of the artery inflames, and the wounded internal surface of its canal being kept in close contact by the ligature, adheres, and converts this portion of the artery into an impervious, and, at first, slightly conical sac. It is to the effused lymph that the base of the coagulum adheres, when found to be adherent. Lymph is also effused between the coats of the artery, and among the parts surrounding its extremity. In a little time, the ligature makes the part, on which it is directly applied, ulcerate; and, acting as a tent, a small aperture is formed in the layer of lymph effused over the artery. Through this aperture, a small quantity of pus is discharged, as long as the ligature remains; and, finally, the ligature itself also escapes, and the little cavity, which it has occasioned, granulates and fills up, and the external wound heals, leaving the cellular substance a little beyond the end of the artery, much thickened and indurated. (Jones, p. 159, 161.)

In short, when an artery is properly tied, the following are the effects, as enumerated by Dr. Jones:

1. To cut through the internal and middle coats of the artery, and to bring the wounded surfaces into perfect apposition.
2. To occasion a determination of blood to the collateral branches.
3. To allow of the formation of a coagulum of blood just within the artery,

provided a collateral branch is not very near the ligature.

4. To excite inflammation on the internal and middle coats of the artery, by having cut them through, and, consequently, to give rise to an effusion of lymph, by which the wounded surfaces are united, and the canal is rendered impervious; to produce a simultaneous inflammation on the corresponding external surface of the artery, by which it becomes very much thickened with effused lymph; and, at the same time, from the exposure and inevitable wounding of the surrounding parts, to occasion inflammation in them, and an effusion of lymph, which covers the artery, and forms the surface of the wound.

5. To produce ulceration in the part of the artery, around which the ligature is immediately applied, viz. its external coat.

6. To produce indirectly a complete obliteration, not only of the canal of the artery, but even of the artery itself, to the collateral branches on both sides of the part which has been tied.

7. To give rise to an enlargement of the collateral branches. (Jones, p. 163, 164.)

Every part of an artery is organized in a similar manner to the other soft parts, and its coats are susceptible of the same process of adhesion, ulceration, &c. as the other parts are. Hence, the precautions taken to secure the adhesion of other parts, should be observed for the same purpose, with regard to an artery. The vessel is put in a state to admit of adhesion by the ligature, which, when properly applied, cuts through its internal and middle coats, keeps their cut surfaces in contact, and affords them an opportunity of uniting by the adhesive inflammation, as other cut surfaces do. The immediate stoppage of the bleeding is merely the incipient and temporary part of what the ligature has to accomplish; it has also to effect the adhesion of the internal and middle coats of the artery, which being the thing, on which the permanent suppression of hemorrhage depends, is the most important. The size and form of the ligature, whether completely flat, or irregular, have not been, as Dr. Jones remarks, sufficiently attended to; nor is the degree of force employed in tying the artery, often considered. Some surgeons, wishing to guard against the ligature's slipping off, tie it with very considerable force; while others, apprehensive lest they should cut through the artery, or occasion too early a separation of the ligature, draw it only sufficiently tight to prevent the escape of any blood. A broad

flat ligature is not likely to make such a wound in the internal and middle coats of the artery, as is most favourable to adhesion, because it is scarcely possible to tie it smoothly round the vessel, which is very likely to be thrown into folds, or puckered by it, and, consequently, to have an irregular bruised wound made in its middle and internal coats. By covering also a considerable space of the external coat, it may destroy the very vessels which pass on it in their way to the cut surfaces of the inner coats, and thus render them incapable of inflaming. Even supposing the wound to unite, still such a ligature may cover that part of the external coat, which is directly over the newly-united part, and, consequently, as soon as it has produced ulceration through the external coat, it will cause the same effect on the newly-united parts, and, of course, secondary hemorrhage. (Jones, p. 168.)

When a ligature is of an irregular form, it is apt to cut through the internal and middle coats of an artery more completely at some parts than others; but these coats must be perfectly cut through, in order to produce an effusion of lymph from the inside of the vessel, which seems to adhere only at its cut surfaces.

Also, when the ligature is not applied with sufficient tightness, the inner coats of the artery will not be properly cut through. Dr. Jones thinks, the ligature being sometimes put on so as to deviate from a circle, has a tendency to produce secondary hemorrhage.

Dr. Jones thinks ligatures are best, when they are round, and very firm, and, he adds, that though a very slight force is necessary to cut through the internal and middle coats of an artery, it is better to tie the vessel more tightly than is necessary merely to cut through its inner coats, because the cut surfaces will thus be more certainly kept in contact; the separation of the ligature expedited; and the danger of ulceration spreading to the newly cicatrized part diminished. The external coat will never ulcerate through, before the inner ones have adhered. The limb, however, should be kept in a perfectly quiet state.

I am sincerely glad to find, that so accurate an observer as Dr. Jones, has refuted the idea, that ligatures occasionally slip off the vessels, in consequence of the violent impulse of the blood. In fact, the blood does not continue to be impelled against the extremity of the artery with the same impetuosity with which it circulated through the vessel before it was tied. The blood is immediately de-

termined into the collateral branches, nor is there any pulsation for some way above the ligature.

Dr. Jones much more rationally imputes this occasional occurrence, either to the clumsiness of the ligature, which prevents its lying compactly and securely round the artery; or to its not having been applied with sufficient tightness; or to its having that very insecure hold of the vessel, which the deviation from the circular application must occasion. (P. 173.)

Dr. Jones is of opinion, that, in cases of aneurism, in which the artery has only been tied with one ligature, and left undivided, and in which secondary hemorrhage has arisen, that this has most probably been owing, either to a diseased state of the artery; to various contrivances for compressing a large portion of the vessel, or having a loose ligature above the one, which is tied; or, lastly, to not tying the artery sufficiently tight to cut through the internal and middle coats, so as to fit them for adhesion, but, so as to cause a gradual ulceration through them, and, of course, bring on hemorrhage, which returns with greater violence, as the ulceration advances. (P. 176.)

Dr. Jones seems to consider, that the advantage of the retraction of the *divided* artery within the cellular membrane, is compensated, in the case of the *undivided* artery, by the speedy and profuse effusion of lymph, which takes place over and round the vessel, at the tied part, and even covers the ligature itself. However, he admits the objection, urged by Mr. Abernethy, to using only one ligature, viz. that the vessel cannot be tied, where it lies among its natural connexions, or if tied in this manner either at the upper, or lower part of the wound, the hemorrhage will proceed from that part of the vessel, which has the detached portion of the artery for its extremity. This gentleman concludes this point, with allowing it to be *safest and best to apply two ligatures, and to divide the artery between them.* P. 179. See *Aneurism*. Another cause of secondary hemorrhage is by including other parts in the ligature, together with the artery, by doing which, the division of the inner coats of the vessel may be prevented.

In the valuable publication of Dr. Jones's, to which we have so freely adverted, some secondary hemorrhages are also imputed to the hidden separation, or laceration of the recently united parts of an artery, by premature and extraordinary exertions of the patient. Hence, he

strongly insists on keeping a limb, in which a large artery has been tied, perfectly at rest.

We shall conclude our remarks on the ligature with a few practical rules.

1. Always tie a large artery, as separately as possible, but still let the ligature be applied to a part of the vessel, which is close to where it lies among its natural connexions.

Besides the reasons for this practice, already specified, we may observe, that including other substances in the ligature causes immense pain, and a larger part of a wound to remain disunited. The ligature is also apt to become loose, as soon as the substance between it and the artery sloughs, or ulcerates. Sometimes the ligature thus applied, forms a circular furrow in the flesh, and remains a tedious time, incapable of separation.

The blood-vessels being thus organized like other parts, the healing of the wounded artery can only take place favourably, when that part of the vessel, which is immediately contiguous to the ligature, continues to receive a due supply of blood through its vasa vasorum, which are ramifications of the collateral arteries. Hence, the disadvantage of putting a ligature round the middle of a portion of an artery, which has been separated from its surrounding connexions. Hence, the utility, however, of making the knot, as closely as possible to that part of the vessel which lies undisturbed among the surrounding flesh.

Small arteries neither allow nor require these minute attentions to the mode of tying them.

2. When a divided artery is large, open-mouthed, and very visible, it is best to take hold of it, and raise its extremity, a little way above the surface of the wound with a pair of forceps. When the vessel is smaller, the tenaculum is the most convenient instrument.

3. While one surgeon holds the vessel in this way, another is to place the noose of a ligature round it, and tie it according to the above directions. In order that the noose may not rise too high, and even above the mouth of the artery, when it is tightened, the ends of the ligature must be drawn as horizontally as possible, which is best done with the thumbs. A knot is next to be made.

4. Ligatures always operating in wounds as extraneous bodies, and one end of each being sufficient for its removal, the other should always be cut off close to the knot, and taken away.

5. When a large artery is either partially divided, or completely divided, two ligatures, one to the upper, the other to

the lower part of the vessel, are commonly necessary, in consequence of the anastomosing branches conveying the blood so readily into the part of the artery most remote from the heart, as soon as the first ligature has been applied.

6. When a large artery is only punctured; when compression cannot be judiciously tried; and when the hemorrhage continues; the vessel must be first exposed by an incision, and then a double ligature introduced under it, with the aid of an eye-probe. One ligature is to be tied above; the other below the bleeding orifice; with due attention to the principles already advanced.

7. Ligatures usually come away from the largest artery ever tied, in about a fortnight, and from moderate-sized ones in six or seven days. When they continue attached much beyond the usual period, it is proper to draw them very gently every time the wound is dressed, for the purpose of accelerating their detachment. Great care, however, is requisite in doing this; for, as Dr. Jones remarks, as long as the ligature seems firmly attached, pulling it rather strongly must act, more or less, on the recently cicatrized extremity of the artery, which is not only contiguous to it, but is still united to that portion of the artery, (the external coat) which detains the ligature. (Jones, p. 162.)

For information concerning hemorrhage, consult *Petit's Memoirs, among those of l'Acad. des Sciences for the years 1731, 1732—1735: Morand sur le Changement, qui arrive aux Artères coupées, 1736: Pouteau's Mélanges de Chirurgie: Gooch's Surgical Works, Vol. 1: Kirkland's Essay on the Method of suppressing Hemorrhages from divided Arteries; White's Cases in Surgery: J. Bell's Principles of Surgery, Vol. 1: Partie Chirurgicale de l'Encycl. Meth.; Larrey's Mémoires de Chirurgie Militaire, Tom. 2, p. 379. Pelletan's Clinique Chirurgicale, Tom. 2, p. 240, &c. Mémoire Élémentaire sur les Hemorrhogies. Richerand's Nosographie Chirurgicale, Tom. 4. Sect. sur les Maladies des Artères, p. 31, &c. Edit. 2. Levéillé, Nouvelle Doctrine Chirurgicale, Tom. 1, Chap. 3 and, particularly, Jones on the Process employed by Nature, in suppressing the Hemorrhage from divided and punctured Arteries, 1805.*

HEMORRHOIDS. (from *αἷμα*, blood, and *ῥέω*, to flow.) *Hæmorrhoides. Piles.* The etymological meaning of the word is evidently only a discharge of blood. Surgeons, however, sanctioned by long custom, always imply by the term, *hæmorrhoids*, either a bleeding from the veins of the lower part of the rectum, or else a considerable distention of these vessels,

so as to form tumours, but quite unattended with hemorrhage. When the dilated veins do not bleed, the swellings are called *blind piles*; but, when they are attended with occasional discharges of blood, they are named *open piles*. These tumours vary in number, size, form, and situation: some are *external*, others *internal*. In general, the inconvenience which they occasion, is very supportable; but, sometimes they bring on very serious complaints, either by bursting and discharging blood so profusely as dangerously to reduce the patient; or by exciting inflammation of the adjacent parts, and causing abscesses and fistulæ; or, lastly, by becoming strangulated by the contraction of the sphincter ani, so as to occasion very acute pain. Piles, which bleed but little, are not of much consequence; but those which bleed profusely, cause violent pain, or which induce inflammation, and all its effects, demand the greatest attention. Lieutaud makes mention of a person, who lost three quarts of blood from some open piles in the course of a couple of days; and the heretic Arius, and the celebrated philosopher Copernicus are said to have bled to death in this manner.

When piles are situated far up in the rectum, they are commonly less painful, than when low down. In the former case, the veins are surrounded by soft and yielding substances, which do not make any painful pressure on the swellings; but, piles, situated towards the anus, are apt to suffer a very painful constriction from the action of the sphincter muscle. Hence, when such tumours are very high up in the rectum, the patient has sometimes no warning of his disorder, till he discharges blood from the rectum, and, so violent a bleeding may at once ensue, as to prove fatal.

With regard to the cause of hemorrhoids, any thing capable of retarding the return of blood through the hemorrhoidal veins, may occasion the disease. The pressure of the gravid uterus, costiveness, and the frequent retention of hardened feces in the rectum, are very frequent causes. Persons, who lead sedentary lives, are often troubled with the complaint. From what has been stated, we may easily discern the reason, why women are more subject to piles, than men are, though the disease is so common, that the latter are also very frequently troubled with it.

The pressure of an enlarged liver, or of water accumulated in the cavity of the peritonæum, is said sometimes to be the occasion of piles.

When these tumours are produced by

the pressure of the gravid uterus, no cure can be expected till after delivery, when one generally follows spontaneously. Also, when piles are an effect of dropsy, they can only get well, after the pressure of the fluid in the abdomen has been removed by tapping. Gently laxative medicines, and an horizontal position of the body, commonly alleviate the uneasiness resulting from hemorrhoids. The application of an ointment, composed of equal parts of the powder of oak-galls, and of elder-ointment, or hog's lard, contribute to the same beneficial effect. Applying warm water to the tumours, by means of a bidet, or semicupium, is also frequently productive of great ease. When piles are constricted by the sphincter ani muscle, the pain thus arising, may often be at once removed, by pushing the swellings with the finger a little higher up the rectum. Leeches applied to the vicinity of the anus, and puncturing the dilated hemorrhoidal vessels with a lancet, for the purpose of taking away blood, are measures occasionally employed to procure ease. Mr. Ware seems to give the preference to leeches; Petit preferred the lancet.

When the number and size of hemorrhoids are so considerable, as materially to obstruct the discharge of the feces; when they are very painful, and subject to profuse bleedings; when the patient is disabled from following his usual occupations; and when all the above means are not of sufficient avail, the surgeon should recommend the removal of the tumours.

Extirpating piles with the actual cautery and caustics, as practised by the old surgeons, is now very properly altogether relinquished by modern practitioners. The only plan ever followed in the present state of surgery, is either to cut the tumours off with a pair of scissors or knife, or to apply a tight ligature round their bases, so as to make them slough away.

When piles are to be cut off, and they are not sufficiently visible, the patient must first strain, as at stool, in order to make the swellings more apparent. With the aid of a pair of dissecting forceps, the skin, covering the hemorrhoids, is then to be separated from them with the knife, but not cut away, and the tumours are to be removed. Sabatier states, that saving the skin is very essential; for, any hemorrhage which may arise, can then be more easily suppressed; and, when there are several hemorrhoids to be extirpated, the loss of substance about the anus will be less, and, of course, the patient will not be so liable to a contrac-

tion of this part, which is sometimes a very great affliction.

Mr. Ware thinks it unnecessary to remove all the swellings, when there are several of them. He remarks, that though the number of hemorrhoidal tumours, protruded through the anus, is often considerable, yet the pain which the patient suffers, is not produced equally by all of these; but, that he will point to one, or at most to two, of the tumours, whence all his pain proceeds. These will be found to be much harder and more inflamed than the rest; but, generally smaller and less prominent, protruding only just low enough to be compressed by the sphincter muscle.

Hence, Mr. Ware contends, that cutting off the whole number of hemorrhoids with a scalpel, or scissors, and tying a ligature round them, in order to make them die and fall off, are unnecessary. He says, we have only to direct our attention to the hard inflamed tumour, which is the cause of the pain, and which is not unfrequently situated in the centre of the rest. This is often not larger than the end of the little finger, and the removal of it almost instantly abates the pain, and soon makes the rest of the tumours, collapse and disappear. Mr. Ware operates as follows: having secured with a common dissecting-hook, or forceps, the little hard tumour, which is often in the middle of the rest, and much darker coloured, he snips it off, as close to its basis as possible, with a sharp pair of curved scissors. The pain is trifling, and the hemorrhage so slight, that Mr. Ware says, he has rarely had occasion to use any application to check it. If the hemorrhoids are constantly protruded, the operation may be performed at any time; but, if they only appear after the feces are voided, that opportunity must be taken.

When the pain of hemorrhoids is not violent, but there is a constant distressing uneasiness, with frequent returns of a profuse debilitating hemorrhage, Mr. Ware states, that his method of operating will frequently produce a radical cure.

The excision of piles is occasionally followed by a very dangerous bleeding, as a case, related by Mr. Petit, confirms. A patient had some hemorrhoids, which were supposed to be external ones, though in fact they were not, and had only become protruded. Almost immediately after they had been cut off, the skin which had supported them, became drawn inward. An inward hemorrhage ensued, which could not be suppressed, and proved fatal in less than five hours. The rectum and colon were found full of black, coagulated blood.

After the operation, Mr. Ware advises a thick compress to be applied, wet either with cold brandy and water, or with a cold saturnine lotion, and retained on the part with the T bandage.* The patient should be kept quietly in a cooler temperature than usual, and be enjoined to eat and drink nothing of a stimulating quality.

Certainly, if the bleeding should prove troublesome, and proceed from vessels within the rectum, the best plan would be to distend the gut with a suitable piece of sponge, so as to make pressure on the wound, observing to adopt at the same time the means above recommended.

Tying hemorrhoids is free from the danger of hemorrhage; but, still it has its inconveniences, though they are not constant ones. Petit frequently practised this method, without any ill effects. In other instances, he had reason to repent having adopted it. A woman, for whom he had tied three hemorrhoids with narrow pedicles, which were favourably situated for the operation, did not at first experience a great deal of pain. However, five hours afterwards he was informed, that she suffered violent colic pains, which extended along the colon. The woman was bled four times, without relief. At last, Petit cut the ligatures, which could not be loosened, in consequence of their being concealed so deeply in the substance of the swollen parts. The pain very soon subsided. The ligatures had only been applied four and twenty hours, but the piles had become black, and the skin covering their bases was cut through. Petit removed them, without the least effusion of blood.

M. Petit also relates a case, in which a patient, after having some piles tied, died of symptoms resembling those, which take place in cases of strangulated herniæ, notwithstanding the ligatures were cut as in the foregoing instance. After these two cases, Petit abandoned the plan of curing hemorrhoids by tying them.

I believe, on the whole, that it is best to remove hemorrhoids with a knife, unless they are situated high up the rectum, where the veins are of large size, and likely to bleed profusely. If a tumour so situated should absolutely require removal, a ligature might be put round its base with the aid of a double cannula, in the way we shall relate in speaking of *Polypi*. When the base of the tumour, however, is large, admits of being brought into view, and the surgeon prefers tying it, he should pass a needle, armed with a strong double ligature, through the root of the hemorrhoid, and tie one part of this ligature firmly over one side of the

swelling, and the other over the opposite one. When the base of the tumour is narrow, and the ligature is preferred, the part may be tied at once, without passing a double ligature through its middle.

As piles very seldom prove fatal, an opinion has commonly prevailed, that they are of a salutary, or critical nature. They have not unfrequently been regarded, as an evacuation, by which some peccant, or morbid matter, is thrown off from the body; and hence, patients have frequently been taught to submit to all the pain, and uneasiness, which the disease occasions, rather than seek a cure. This opinion, however, is neither founded upon impartial and mature observation, nor upon solid reasoning; for, granting that there was any morbid matter in the body, it is impossible to explain why it should be collected in the blood, which fills the dilated veins about the rectum, more than any where else.

For information on hemorrhoids, consult *L'Encyclopédie Méthodique; Partie Chirurgicale. Sabatier, De la Médecine Opératoire, Tom. 2. Latta's System of Surgery, Vol. 2. Ware on the Treatment of Hemorrhoids. Abernethy on Hemorrhoidal Diseases in his Surgical Works, Vol. 2, p. 231, &c.*

HERNIA. (from *επρος*, a branch, from its protruding forward.) Surgeons understand by the term *hernia*, a tumour, formed by the protrusion of some of the viscera of the abdomen, out of that cavity, into a kind of sac, composed of the portion of peritoneum, which is pushed before them. However, there are certainly some cases which will not be comprehended in this definition; either because the parts are not protruded at all, or have no hernial sac, as the reader will learn in the course of this article.

GENERAL REMARKS ON HERNIE.

"The brilliant progress, which surgery has made in modern times, (says Scarpa) is, properly speaking, only the results of pathological anatomy, that is to say, of exact comparisons of the natural state of our organs with their different diseases, which may depend upon an alteration of texture, a derangement of functions, a solution of continuity, or a change of situation. It is from these important results, that the most rational curative methods, with which modern surgery is enriched, are deduced as so many corollaries; methods, to which we are also indebted for the perfection of operations.

"There are indeed a certain number

of surgical operations, for the prompt and safe execution of which, mere anatomical knowledge will suffice; but, in many others, the surgeon cannot promise himself success, even though he be well acquainted with anatomy, unless he has particularly studied the numerous changes of position, and alterations of texture, of which the parts, upon which he is about to operate, are susceptible. If he has not the requisite information upon all these points, false appearances may deceive his judgment, and make him commit mistakes, sometimes of a very serious and irreparable kind.

"In order to have a convincing proof of this truth, it will be sufficient to take a view of the different species of herniæ, and their numerous complications. Assuredly, no anatomist would believe, that the intestine cæcum, naturally fixed in the right ilium, and the urinary bladder, situated at the bottom of the pelvis, could undergo, without being torn, so considerable a displacement as to protrude through the abdominal ring, and descend even into the scrotum; that the same intestine the cæcum could pass from the right iliac region to the umbilicus, so as to protrude at this opening, and form an umbilical hernia; that the right colon could have been seen protruding from the abdomen at the left abdominal ring, and the left colon through the right one; that the liver, the spleen, and ovary could sometimes be the parts contained in the umbilical, inguinal, and femoral herniæ; that the cæcum could engage itself within the colon, and even protrude at the anus; that the stomach, forced through the diaphragm, could form a hernia within the chest; that the omentum, or intestine, or both these parts together, could sometimes make their escape from the belly through the foramen ovale, or sacro-ischiatic notch, of the pelvis; that a noose of small intestine, after being engaged in the abdominal ring, or under the femoral arch, could suffer the most violent strangulation, without the course of the intestinal matter being intercepted; lastly, that, in certain circumstances, the intestine and omentum could be in immediate contact with the testicle, within the tunica vaginalis, without the least laceration of this latter membrane. These and several other analogous facts, says Scarpa, are so surprising, that they would yet be regarded as incredible, had they not been proved by numerous observations on individuals affected with hernia: their possibility, (repeats this experienced professor) would not even have been suspected either by the anatomist,

or physiologist." (See Scarpa's *Traité des Hernies*, Pref.)

CAUSES OF HERNIE.

The places, in which these swellings, most frequently make their appearance, are the groin, the navel, the labia pudendi, and the upper and forepart of the thigh; they do also occur at every point of the anterior part of the abdomen; and there are several less common instances, in which hernial tumours present themselves at the foramen ovale in the perinæum, in the vagina, at the ischiatic notch, &c. These rarer species of hernia will be noticed in their proper place.

The parts, which, by being thrust forth from the cavity, in which they ought naturally to remain, mostly produce herniæ, are either a portion of the omentum, or a part of the intestinal canal, or both together. But, the stomach, the liver, spleen, uterus, ovaries, bladder, &c. have been known to form the contents of some hernial tumours.

From these two circumstances of situation and contents, are derived all the different appellations, by which herniæ are distinguished. If a portion of intestine only forms the contents of the tumour, it is called *enterocele*; if a piece of omentum only, *epiplocele*; and if both intestine and omentum contribute mutually to the formation of a tumour, it is called *entero-epiplocele*. When the contents of a hernia are protruded at the abdominal ring, but only pass as low as the groin, or labium pudendi, the case receives the name of *bubonocele*, or *inguinal hernia*; when the parts descend into the scrotum, it is called an *oscheocele*, or *scrotal hernia*. The *crural*, or *femoral hernia*, is the name given to that which takes place below Poupart's ligament. When the bowels protrude at the navel, the case is named an *exomphalos*, or *umbilical hernia*; and *ventral* is the epithet given to the swelling, when it occurs at any other promiscuous part of the front of the abdomen. The *congenital rupture* is a very particular case, in which the protruded viscera are not covered with a common hernial sac of peritonæum, but are lodged in the cavity of the tunica vaginalis, in contact with the testicle, and, as must be obvious, it is not named, like herniæ in general, from its situation, or contents, but from the circumstance of its existing from the time of birth.

When the hernial contents lie quietly in the sac, and admit of being readily put

back into the abdomen, it is termed a *reducible hernia*; and, when they suffer no constriction, yet cannot be put back, owing to adhesions, or their large size in relation to the aperture, through which they have to pass, the hernia is termed *irreducible*. An *incarcerated*, or *strangulated hernia*, signifies one, which not only cannot be reduced, but suffers constriction; so that, if a piece of intestine be protruded, the pressure, to which it is subjected, stops the passage of its contents onward towards the anus, makes the bowel inflame, and brings on a train of most alarming, and often fatal consequences.

The causes of herniæ are either *pre-disposing* or *exciting*. Of the former kind, writers mention a preternaturally large size of the openings, at which the bowels protrude; a weakness and relaxation of the margins of these apertures; a preternatural laxity of the peritonæum; an unusually long mesentery, or omentum, &c. It is very certain, that, with regard to the abdominal ring, the transverse tendinous fibres, which naturally cross and strengthen its upper and outer part, are much weaker in some subjects than others. No idea seems more prevalent in books, than, that taking a good deal of oil with one's food, is conducive to the occurrence of ruptures. Some of the alleged pre-disposing causes, may justly excite scepticism; but there are several circumstances which tend to prove, that a natural deficiency of resistance, in any part of the parietes of the abdomen, is certainly a cause of this kind. We need only mention, how very liable persons are, who have had the peritonæum wounded, to the present disease; and how much more liable men are than women to the inguinal hernia, owing evidently to the larger size of the abdominal ring in the former, than the latter subjects. These, however, having a larger space for the protrusion of the viscera, below Poupart's ligament, are more exposed than men to femoral herniæ.

With regard to the *exciting* causes, our knowledge is involved in less doubt. The grand cause of this kind, is the powerful action of the abdominal muscles and diaphragm on the viscera. In feats of agility, such as jumping, &c. the pressure which the contents of the abdomen must often encounter, sufficiently accounts for their protruding at any part, where the abdominal parietes do not make adequate resistance. The same consideration explains, why herniæ very often take place in lifting and carrying heavy weights, running, vomiting, straining at stool, parturition, &c. and in people who inhabit mountainous countries.

This diminution of the capacity of the abdomen, by the action of the abdominal muscles and diaphragm, on many occasional exertions, must take place in every one, by reason of the common habits and necessities of life. But, as only a certain number of persons meet with the disease, it is fair to infer, that, either the exciting causes must operate with greater force in them than in the generality of people, or else their abdominal parietes have not been capable of the ordinary degree of resistance. Many patients who meet with hernia, in making violent efforts and exertions, may be in the former circumstance; while others, who have their viscera protruded from such trivial things as coughing, sneezing, crying, &c. must be considered as being under the influence of some predisposing cause. A gentleman, who has gained great honour by a late publication on hernia, remarks, that, "hernia, which originate in predisposition, generally come on gradually, and almost imperceptibly; while those which are produced by bodily exertion, are formed suddenly, and by the immediate action of the exciting cause. The occurrence of the complaint is often indicated, in the first instance, by a fulness, combined with a sense of weakness, about the abdominal ring. The swelling is increased by any action of the respiratory muscles, and disappears on pressure, and in the recumbent position of the body. It gradually finds its way through the tendon of the external oblique muscle, into the groin, and afterwards into the scrotum. When a hernia takes place suddenly, it is generally attended with a sensation of something giving way at the part, and with pain." (*Lawrence on Hernia*; 1807; p. 11.)

Upon the subject of the immediate cause of hernia, it is observed by Scarpa, that several of the most celebrated modern surgeons, as, for instance, Warton, (*Adenograph. cap. 11.*) Benevoli, (*Dissertationi Chirurgiche*, 1.) Rossius, (*Acta Natur. Tom. 2, Obs. 178.*) Brendel (*de herniarum natalibus*) and Morgagni, (*de sed. et caus. morb. epist. 43, art. 13.*) consider a relaxation and elongation of the mesentery, as the principal cause of hernia in general, and of the bubonocoele in particular. Hence it happens, say they, that the whole mass of intestines, or only a portion of an intestine, descends against the inner orifice of the inguinal ring, comes into contact with this opening, and gradually makes its way out of the abdomen. In examining this pathological point without prejudice, it is incontestable, says Scarpa, that an intestine cannot be moved beyond its natural limits, unless that part of the mesentery,

which retains and fixes the bowel in its proper place, be at the same time elongated. But, it does not follow from this, that a relaxation of the mesentery must precede the displacement of the intestine. It appears to Scarpa much more probable, that these two events are simultaneous, and depend upon one and the same cause.

"In the healthy state, (observes this interesting writer) the abdomen, considered altogether, is submitted to two opposite forces, which reciprocally balance each other. One is the pressure of the viscera against the abdominal parietes; the other is the reaction of these same parietes upon the viscera, which they contain. If these two forces were in perfect equilibrium in all individuals, and under all the circumstances of life, we should not be in the least subject to hernia. If, when the equilibrium has been broken, every point of the parietes of the belly were to yield equally to the impulse of the viscera, an increase of the volume of the whole abdomen would be the consequence; but, a true hernia would never happen. The cavity of the abdomen is always completely full. The containing and contained parts react upon, and reciprocally compress one another. It is by the effect of this moderate, but equal and unremitting pressure, that all the viscera mutually support each other. Without it, the ligaments of the liver, those of the spleen, and the various membranous bands of the intestines in general, would only be feeble means for fixing such parts in their respective situations. But, there are certain points of the abdominal parietes, which naturally present much less resistance, than others, and which react with much less power against the pressure made from within outwards by the abdominal viscera. Such is particularly the part, which extends from the pubes to the anterior superior spinous process of the ilium. This relative weakness of some points of the abdominal parietes is very marked in certain individuals, in consequence of a defect of organization. It may also be increased by internal or external causes, which are as various as they are numerous. When, in one of these cases, the pressure made by the viscera is unusually increased, as happens in a violent effort, a defect in the equilibrium between the two forces above mentioned is occasioned; that is to say, the reaction of the abdominal parietes is no longer proportioned, at least at certain points, to the force of the impulse of the viscera. The conjoined powers of the abdominal muscles, diaphragm, and levator ani, are then directed and concentrated against

the most feeble point of the abdomen, towards which they propel the nearest viscus, or that, which, from its moveableness, is the most liable to displacement. If such viscus should happen to be the noose of an intestine, it is evident, that the power, which tends to make it protrude from the belly, must at the same time act upon the corresponding portion of the mesentery; and the intestine, in passing through the parietes of the abdomen, drags the mesentery after it, and makes this membrane yield and become elongated. When the displaced viscera meet with little resistance on the part of the parietes of the abdomen, the hernia is quickly formed, and the elongation of the mesentery occurs with equal celerity. We have an example of this in the inguinal congenital hernia: in this case, the intestine is, in some measure, precipitated into a sac previously prepared for its reception. On the contrary, in the ordinary inguinal hernia, a totally different disposition of the parts renders the progress of the disease much slower. In most instances, the hernia is not formed immediately the equilibrium between the impulse of the viscera and the reaction of the abdominal parietes, is broken. But in the groin, a slight elevation is first observed, which reaches from the anterior superior spinous process of the ilium to the inguinal ring. Some time afterwards, when the intestine has made its appearance on the outside of the ring, the enlargement of the hernia, and the elongation of the mesentery, make much more rapid, though always simultaneous progress.

"Numerous practical observations, (says Scarpa) concur in proving the foregoing account, that we must not search for the immediate cause of hernia in the relaxation of the mesentery, but rather in a want of equilibrium between the pressure of the viscera and the resistance of one or several points of the abdominal parietes. Indeed, hernia are seen occurring from the slightest causes in infants, in whom the neck of the tunica vaginalis is not speedily obliterated, and in individuals, who, from being fat have all on a sudden become extremely thin. Such women as have had children, are more subject to the disease than others. Persons also of both sexes, who carry considerable burdens, or who play upon wind instruments, or who have suffered a forcible contusion of the abdomen, are particularly exposed to the disorder, even though there is not the least reason for suspecting in them a relaxation of the mesentery. Vaginal hernia, which arises after difficult labours, afford another proof of the same truth:

their cause is owing to a laxity and weakness of the parietes of the vagina, which not being capable of making any further resistance to the pressure of the viscera situated in the cavity of the pelvis, at length suffer these parts to protrude.

"With respect to the second proposition, that during the formation of a hernia, the combined force of all the abdominal muscles is, as it were, directed and concentrated against the most feeble point of the parietes, we see a proof of it in a fact that occurs to our observation every day. In order to convince ourselves of this, it is enough to notice the individuals afflicted with hernia: if they cough, or sneeze; in a word, if they make the slightest effort, they instantly find the size of the swelling increased, and hasten to support the part with their hand. During the slightest shocks, which render the hernia larger, it is also indisputable, that the mesentery is elongated in the same proportion as the intestine protrudes. All the viscera have such a tendency to be displaced and carried towards the weakest point of the parietes of the abdomen, that even those, which are naturally the most distant from it, and are the most firmly fixed by the folds of the mesentery, may in their turn descend into the hernia. Anatomical knowledge alone would never have led us to have a suspicion of the possibility of these occurrences. Sandifort and Paletta have found, in an umbilical hernia, the cæcum, with a portion of the ilium and colon. (*Obs. Pathol. cap. 4, & Nova Gubernaculi testis Descriptio.*) Mauchart, Camper, and Bose, have met with the cæcum in an inguinal hernia of the left side. (*De Hern. Incarc. in Halleri Disput. Chirurg. Tom. 3. Demonstrat. anat. patholog. lib. 2, p. 18, & Animadvers. de hern. inguin. p. 5.*) Lassus has seen the left colon protrude at the right inguinal ring. (*Médecine Opératoire, Tom. 1, p. 173.*) If it be proved by all these facts, that such viscera, as are the most closely united to the great sac of the peritoneum and neighbouring parts, are nevertheless liable to form hernia; and if such displacements cannot happen without a considerable elongation of the membranous bands fixing these bowels in their natural situation, how can we refuse to admit, that a noose of intestine, pushed by degrees through the inguinal ring, drags along with it the corresponding portion of the mesentery? In order to explain this event, there is no necessity for supposing a partial relaxation of the mesentery." (*Traité Pratique des Hernies, Par A. Scarpa, trad. de l'Italien, p. 37—43.*)

The general symptoms of a hernia, which is reducible, and free from strangulation, are, an indolent tumour at some point of the parietes of the abdomen; most frequently descending out of the abdominal ring, or from just below Poupart's ligament, or else out of the navel; but, occasionally, from various other situations, as will be presently explained. The swelling often originates suddenly, except in the circumstances above related, and, it is subject to a change of size, being smaller when the patient lies down on his back, and larger when he stands up, or holds his breath. The tumour frequently diminishes when pressed, and grows large again when the pressure is removed. Its size and tension often increase after a meal, or when the patient is flatulent. Patients with hernia, are apt to be troubled with colic, constipation, and vomiting, in consequence of the unnatural situation of the bowels. Very often, however, the functions of the viscera seem to suffer little or no interruption.

If the case be an *enterocele*, and the portion of intestine be small, the tumour is small in proportion; but, though small, yet, if the gut be distended with wind, inflamed, or have any degree of stricture made on it, it will be tense, resist the impression of the finger, and give pain upon being handled. On the contrary, if there be no stricture, and the intestine suffers no degree of inflammation, let the prolapsed piece be of what length it may, and the tumour of whatever size, yet the tension will be little, and no pain will attend the handling it; upon the patient's coughing, it will feel as if it were blown into; and, in general, it will be found very easily returnable. (Pott.) A gurgling noise is often made when the bowel is ascending.

If the hernia be an *epiplocele*, or one of the omental kind, the tumour has a more flabby, and a more unequal feel; it is in general perfectly indolent, is more compressible, and (if in the scrotum) is more oblong, and less round, than the swelling occasioned in the same situation by an intestinal hernia; and, if the quantity be large, and the patient adult, it is, in some measure distinguishable by its greater weight. (Pott.)

If the case be an *entero-epiplocele*, that is, one consisting of both intestine and omentum, the characteristic marks will be less clear than in either of the simple cases; but the disease may easily be distinguished from every other one, by any body in the habit of making the examination. (Pott, p. 28.)

On the subject of prognosis, Mr. Pott remarks, "that the same kind of rup-

ture, in different people, and under different circumstances, wears a very various face; the age and constitution of the subject, the date of the disease, its being free, or not free from stricture, or inflammation, the symptoms which attend it, and the probability or improbability of its being returnable, necessarily producing much variety; the degree of hazard attending this complaint will be also more or less, as it shall happen to be circumstanced.

"If the subject be an infant, the case is not often attended with much difficulty, or hazard; the softness and ductility of their fibres generally rendering the reduction easy as well as the descent; and though from neglect, or inattention, it may fall down again, yet it is as easily replaced, and seldom produces any mischief; I say seldom, because I have seen an infant, one year old, die of a strangulated hernia, which had not been down two days, with all the symptoms of mortified intestines.

"If the patient be adult, and in the vigour of life, the consequences of neglect, or of mal-treatment, are more to be feared than at any other time, for reasons too obvious to need relating. The great and principal mischief to be apprehended, in an intestinal hernia, is an inflammation of the gut, and an obstruction to the passage of the aliment and feces through it; which inflammation and obstruction are generally produced by a stricture made on the intestine. In very old people, the symptoms do not usually make such rapid progress, both on account of the laxity of their frame, and their more languid circulation; and also that their ruptures are most frequently of ancient date, and the passage a good deal dilated; but then, on the other hand, it should also be remembered, that they are by no means exempt from inflammatory symptoms; and that, if such should come on, the infirmity of old age is no favourable circumstance in the treatment, which may become necessary.

"If the disease be recent, and the patient young, immediate reduction, and constant care to prevent its pushing out again, are the only means whereby it is possible to obtain a perfect cure.

"If the disease be of long standing, has been neglected, or suffered to be frequently down, and has given little or no trouble, the aperture in the abdominal muscle, and the neck of the hernial sac, may both be presumed to be large; which circumstances in general render immediate reduction less necessary and less difficult, and also frustrate all rational expectation of a perfect cure. On the

contrary, if the rupture be recent, or, though old, has generally been kept up, its immediate reduction is more absolutely necessary, as the risk of stricture is greater from the supposed smallness of the aperture, and narrowness of the neck of the sac. If the rupture be very large and ancient, the patient far advanced in life, the intestine not bound by any degree of stricture, but does its office in the scrotum regularly, and no other inconvenience be found to attend it, but what proceeds from its weight, it will in general be better not to attempt reduction, as it will, in these circumstances, most probably prove fruitless, and the handling the parts in the attempt, may so bruise and injure them as to do mischief; but this must be understood to be spoken of those only in which there is not the smallest degree of stricture, nor any symptom of obstruction in the intestine; such circumstances making reduction necessary at all times, and in every case.

"With regard to the contents of a hernia, if it be a portion of omentum only, and has been gradually formed, it seldom occasions any bad symptoms, though its weight will sometimes render it very troublesome. But if it be produced suddenly, by effort or violence, that is, if a considerable piece of the caul by accident slip down at once, it will sometimes prove painful, and cause very disagreeable complaints; the connexion between the omentum, stomach, duodenum, &c. being such as to render the sudden descent of a large piece of the first sometimes productive of nausea, vomiting, colic, and all the disagreeable symptoms arising from the derangement of these viscera. When the piece of caul is engaged in such a degree of stricture as to prevent the circulation of blood through it, it will sometimes, by becoming gangrenous, be the occasion of very bad symptoms, and even of death, as I have more than once seen; and thus, as a mere omental hernia, it may sometimes be subject to great hazard. But even though it should never be liable to the just mentioned evil, that is, though the portion of the caul should remain uninjured in the scrotum, yet it renders the patient constantly liable to hazard from another quarter: it makes it every moment possible for a piece of intestine to slip into the same sac, and thereby add to the case all the trouble and all the danger arising from an intestinal rupture. It is by no means an uncommon thing for a piece of gut to be added to a rupture, which had for many years been merely omental, and for that piece to be strangulated, and require immediate help.

"An old omental hernia, is often rendered not reducible, more by an alteration made in the state of the prolapsed piece of caul, than by its quantity. It is very common for that part of the omentum which passes through the neck of the sac, to be compressed into a hard, smooth body, and lose all appearance of caul, while what is below in the scrotum is loose and expanded, and enjoys its natural texture; in this case, reduction is often impossible, from the mere figure of the part: and I have so often seen this, both in the living and the dead, that I am satisfied, that for one omental rupture, rendered irreducible by adhesions, many more become so from the cause above-mentioned.

"In the sac of old omental ruptures that have been long down, and only suspended by a bag truss, it is no very uncommon thing to have a pretty considerable quantity of fluid collected: this, in different states and circumstances of the disease, is of different colour and consistence, and seldom so much in quantity as to occasion any particular attention to it; but on the other hand, it sometimes is so much in quantity as to become an additional disease to the original one. I have more than once been obliged to let it out, in order to remove the inconvenience arising from its weight, and the distention of the scrotum, which I have also seen become gangrenous by the neglect of this operation.

"If the hernia be of the intestinal kind, merely, and the portion of gut be small, the risk is greater, strangulation being more likely to happen in this case, and more productive of mischief, when it has happened: for the smaller the portion of gut is which is engaged, the tighter the tendon binds, and the more hazardous is the consequence. I have seen a fatal gangrene, in a bubonocoele, which had not been formed forty-eight hours, and in which the piece of intestine was little more than half an inch. There are few practitioners, who have seen business, but know the truth of this; but perhaps the reason of it is not sufficiently explained to the unknowing: it is this; when a considerable portion of intestine passes out from the belly in a hernial sac, it necessarily and unavoidably carries with it a proportional quantity of the mesentery, which every body knows is a strong double membrane. When the prolapsed part is at all considerable, this double membrane is again in some measure folded on itself, and takes off a good deal of the effect of the stricture on the intestine. Now although this circumstance will not prevent the

effect, if the means of relief be totally neglected, yet it will most certainly retard the evil, and give more time for assistance; whereas, when there is little or none of the mesentery got through the tendon, and the thin, tender intestine bears all the force of the stricture, it is immediately brought into hazard.

"The practical inference to be drawn from hence, is too obvious to need mentioning.

"In the intestinal, as in the omental hernia, they which have been often or long down, are in general more easily returned, and do not require such immediate assistance, as they which have seldom been down, or have recently descended; and in the one kind of hernia, as well as in the other, the state of the hernial sac, with regard to size, thickness, &c. depends very much on the date of the disease, and the regard that has been paid to it.

"If the hernia be caused by a portion of the intestine ileum only, it is in general more easily reducible than if a part of the colon has descended with it, which will also require more address and more patience in the attempt. The reduction of a mere intestinal hernia too (*ceteris paribus*) will always remain more practicable than that of a mere omental one, after it has attained to a certain size and state, as the part contained within the former is liable to less alteration of form than that within the latter; which alteration has already been mentioned as no unfrequent hindrance of the return of an old caul rupture.

"Not that the parts within a mere intestinal hernia are absolutely exempt from such an alteration as may render their return into the belly impracticable, even where there is no stricture; for I have seen that part of the mesentery, which has lain long in the neck of the sac of an old rupture, so considerably hardened and thickened, as to prove an insuperable obstacle to its reduction.

"Upon the whole, every thing considered, I think it may be said, that an intestinal rupture is subject to worse symptoms, and a greater degree of hazard, than an omental one, though the latter is, by no means, so void of either as it is commonly supposed to be; that bad symptoms are more likely to attend a recent rupture than one of ancient date; that the descent of a very small piece of intestine is more hazardous than that of a larger: that the hernia, which consists of gut only, is in general, attended with worse circumstances than that which is made up both of gut and caul; and that no true judgment can be formed of any

rupture at all, unless every circumstance relating to it be taken into consideration." (*Pott on Ruptures*.)

Mr. Hey coincides with Pott, in thinking the prognosis more unfavourable when the tumour is small. "I think it is not a bad general rule, that the smaller the hernia, the less hope there is of reducing it by the taxis. Long-continued efforts to reduce a prolapsed intestine, are most likely to succeed in old and large hernias, when no adhesions have taken place." (*Pract. Observ. in Surgery*, p. 203.)

"The opening (says Mr. Lawrence) through which the parts protrude, is narrower in some situations than in others; the progress of the case will therefore be more rapid, and the danger of the patient more urgent. The aperture is generally very small in femoral hernia; this kind of rupture in men, and the bubonocoele in women, have a particularly narrow entrance." (*Treatise on Hernia*, p. 29.)

GENERAL OBSERVATIONS ON THE TREATMENT OF HERNIA.

1. *Treatment of those which are capable of easy and immediate reduction and are not attended by any troublesome or bad symptoms.*

"This case," says Pott, "is very frequently met with in infants, and some times in adults, and is too often neglected in both. In the former, as the descent seldom happens but when the infant strains to cry, and the gut is either easily put up, or returns *sua sponte*, as soon as the child becomes quiet, it often is either totally unattended to, or an attempt made to restrain it only by a bandage made of cloth, or dimity, and which being ineffectual for such purpose, lays the foundation for future trouble and mischief.

"This is, in great measure, owing to a common opinion, that a young infant cannot wear a steel truss: a generally prevailing error, and which ought to be corrected. There is no age at which such truss may not be worn, or ought not to be applied; it is, when well made, and properly put on, not only perfectly safe and easy, but the only kind of bandage that can be depended upon: and as a radical cure depends greatly on the thinness of the hernial sac, and its being capable of being so compressed as possibly to unite, and thereby entirely close the passage from the belly, it must therefore appear to every one who will give himself the trouble of thinking on the subject, that the fewer times the parts have made

a descent, and the smaller and finer the elongation of the peritoneum is, the greater the probability of such cure must be.

"The same method of acting must, for the same reasons, be good in every age in which a radical cure may reasonably be expected; that is, the prolapsed parts cannot be too soon returned, nor too carefully prevented from falling down again, every new descent rendering a cure both more distant and more uncertain.

"As soon as the parts are returned, the truss should be immediately put on, and worn without remission, care being taken, especially if the patient be an infant, to keep the parts on which it presses constantly washed, to prevent galling.

"It can hardly be necessary to say, that the surgeon should be careful to see that the truss fits, as his success and reputation depend on such care. A truss which does not press enough, is worse than none at all, as it occasions loss of time, and deceives the patient, or his friends; and one which presses too much, or on an improper part, gives pain and trouble, by producing an inflammation and swelling of the spermatic chord, and sometimes of the testicle.

"In adults, whose ruptures are of long standing, and accustomed to frequent descent, the hernial sac is generally firm and thick, and the aperture in the tendon of the abdominal muscle large; the freedom and ease with which the parts return into the belly, when the patient is in a supine posture, and the little pain which attends a rupture of this kind, often render the persons who labour under it careless: but all such should be informed, that they are in constant danger of such alteration in their complaint, as may put them into great hazard, and perhaps destroy them. The passage from the belly being open, the quantity of intestine in the hernial sac is always liable to be increased, and when down, to be bound by a stricture. An inflammation of that portion of the gut which is down, or such obstruction in it as may distend and enlarge it, may at all times produce such complaints as may put the life of the patient into imminent danger; and therefore, notwithstanding this kind of hernia may have been borne for a great length of time, without having proved either troublesome or hazardous, yet as it is always possible to become so, and that very suddenly, it can never be prudent or safe to neglect it.

"Even though the rupture should be of the omental kind, (which considered

abstractedly is not subject to that degree or kind of danger to which the intestinal is liable) yet it may be secondarily, or by accident, the cause of all the same mischief; for while it keeps the mouth of the hernial sac open, it renders the descent of a piece of intestine always possible, and consequently always likely to produce the mischief which may proceed from thence.

"They who labour under a hernia thus circumstanced, that is, whose ruptures have been generally down while they have been in an erect posture, and which have either gone up of themselves, or have been easily put up in a supine one, should be particularly careful to have their truss well made, and properly fitted; for the mouth of the sac, and the opening in the tendon being both large and lax, and the parts having been used to descend through them, if the pad of the truss be not placed right, and there be not a due degree of elasticity in the spring, a piece of intestine will, in some posture, slip down behind it, and render the truss productive of that very kind of mischief which it ought to prevent.

"It is scarcely credible how very small an opening will serve for a portion of gut or caul to insinuate themselves into at some times. Now, though in persons of mature age it most frequently proves impracticable so to compress the mouth of the hernial sac, as absolutely to close it, yet by the constant use of a well-made truss, it may be so lessened, as to render the descent of a piece of intestine into it much more difficult: from whence we may learn the great consequence of having the part completely reduced before the truss is applied, and the danger that may be incurred by laying such bandage aside after it has been worn some time; since the same alteration which renders the descent of the gut less easy, will also make the reduction more difficult, if a piece should happen to get down: and hence also we may learn why the bandage should be long and unremittingly worn by all those whose time of life makes the expectations of a perfect cure reasonable, many of the ruptures of adults being owing to the negligent manner in which children at school are suffered to wear their trusses.

"I know a gentleman who has for some years had an omental rupture, which was neglected while he was young, and he having naturally a lax habit, and the abdominal opening being much dilated, he finds it extremely difficult to keep it up, even with the best truss he

can get, behind which it will sometimes slip down: when this happens, it gives him such immediate and acute pain at his stomach, and makes him so intolerably sick, that he is obliged immediately to throw himself on his back, and procure the return of the piece of omentum." (*Pott on Ruptures.*)

When we have considered the anatomy of particular herniæ we shall be better able to judge of the proper construction of trusses. (See *Truss.*)

TREATMENT OF IRREDUCIBLE HERNIÆ, FREE FROM INFLAMMATION, AND UNATTENDED WITH TROUBLESOME, OR DANGEROUS SYMPTOMS.

"This incapacity of reduction may be owing to several causes, but most frequently arises either from the largeness of the quantity of the contents, from an alteration made in their form and texture, or from connexions and adhesions, which they have contracted with each other, or with their containing bag.

"I have already mentioned it as my opinion that ruptures are sometimes rendered difficult to be reduced, by that portion of the intestinal canal which is called the cæcum, or the beginning of the colon, being contained in the hernial sac. Of which fact I am as much convinced as the nature of such kind of things will permit; that is, by observations made both on the living and the dead.

"When a hernia of this kind (*viz.* one containing such a part of the intestinal tube) has been long neglected, and suffered to remain in the scrotum without any bandage at all to support its weight, the hernial sac being constantly dragged down, and kept in a state of distention, necessarily becomes thick, hard, and tough; by this means the diameter of its neck is lessened, and the return of the intestine back from the scrotum into the belly rendered more and more difficult, as the parts through which it is to pass become harder, and less capable of yielding. This will, indeed, in time prove an obstruction sufficient to hinder any part of the intestine, or even of the omentum, from being returned; but the more the difficulty is, which proceeds from the mere figure and size of the portion of gut, the greater will be the obstruction when added to that arising from the just-mentioned cause.

"An alteration produced by time, and constant, though gentle, pressure in the form and consistence, or texture of the omentum, is also no infrequent cause, why neglected omental ruptures become irreducible.

"The cellular membrane in all parts of the body, however loose and light its natural texture may be, is capable of becoming hard, firm, and compact, by constant pressure. Of this there are so many, and so well known instances, that it is quite unnecessary to produce any.

"The omentum, from its texture, is liable to the same consequence. When a portion of it has been suffered to remain for a great length of time in the scrotum, without having ever been returned into the belly, it often happens that although that part of it which is in the lower part of the hernial sac preserves its natural soft, adipose, expansile state, yet all that part which passes through what is called the neck of the sac is, by constant pressure, formed into a hard, firm, incompressible, carnosous kind of body, incapable of being expanded, and taking the form of the passage in which it is confined, exactly filling that passage, and rendering it impossible to push up the loose part which fills the scrotum.

"This is no theoretic opinion, but a fact, which I have seen and proved often; and whoever will reflect on it, will immediately find in it one insuperable objection to the return of some old omental ruptures.

"The same reason for incapacity of reduction is also sometimes met with in ruptures of the intestinal kind, from an alteration produced on that part of the mesentery which has been suffered to lie quiet for a great length of time in the neck of an old hernial sac.

"The other impediment, which I mentioned, to the return of old ruptures, is the connexion and adhesion of the parts, either with each other, or with the bag containing them. This is common to both the intestinal and omental hernia, and is produced by slight inflammations of the parts, which have been permitted to lie long in contact with each other, or perhaps in many cases from the mere contact only. These adhesions are more or less firm in different cases, but even the slightest will almost always be found an invincible objection to the reduction of the adherent parts, by the hand only.

"Many, or perhaps most of these irreducible ruptures become so by mere time and neglect, and might at first have been returned; but when they are got into this state, they are capable of no relief from surgery but the application of a suspensory bag, to take off or lessen the* incon-

* I am not unaware (says Pott) that most of these are capable of being cured by the operation for the bubonocoele, as it

venience arising from the weight of the scrotum.

"People in this situation should be particularly careful not to make any attempts beyond their strength, nor aim at feats of agility; they should take care to suspend the loaded scrotum, and to keep it out of the way of all harm from pressure, bruise, &c. When the tumour is very large, a soft quilted bolster should be worn at the bottom of the suspensory to prevent excoriation, and the scrotum should be frequently washed for the same reason; a loss of skin in this part, and in such circumstances, being sometimes of the utmost importance. They ought also to be particularly attentive to the office of the intestinal canal, to see that they do not by any irregularity of diet disorder it, and keep themselves from being costive, for reasons too obvious to need relating. By these means, and with these cautions, many people have passed their lives for many years free from disease, or complaint, with very large irreducible ruptures.

"On the other hand, it is fit that mankind should be apprised, that the quiet, inoffensive state of this kind of hernia is by no means to be depended upon; many things may happen to it, by which it may be so altered, as to become hazardous, and even fatal: an inflammation of that part of the gut which is down, any obstruction to the passage of the aliment or feces through it, a stricture made by the abdominal tendon, either on what has been long down, or on a new portion which may at any time be added to it, are always capable of so altering the state of the case, as to put the life of the patient into danger.

"Indeed the hazard arising from a stricture made on a piece of intestine contained in the sac of an old irreducible hernia, is in one respect greater, than that attending one that has been found at times reducible; since from the nature of

is called; but as I should never think of proposing it in any case, in which there are not symptoms, that threaten the life of the patient, so I have not mentioned it in this place as a means of cure. I also am not unapprised what influence a successful operation or two of this sort has had on the unknowing; but I also know, that such accidental successes have emboldened the same operators to commit more than one or two murders, in similar cases; and that, from the prevalence of fashion, some of these rupture-doctors have been largely rewarded, when they ought to have been hanged.

the case it will hardly admit of any attempt toward relief, but the operation, and that in these circumstances must necessarily be accompanied with additional difficulty.

"Among the ruptures which have been thought not reducible, and treated as such, there have been some which, upon more judicious and more patient attempts, have been found capable of reduction.

"When this is suspected to be the case, the proper method is by absolute rest, in a supine posture, for a considerable length of time, by great abstinence, and the use of evacuates, so to lessen the size of the parts in the hernial sac, as to render them capable of passing back again into the belly." (*Pott on Ruptures.*)

Fabricius Hildanus gives an account of a man, who was radically cured of a rupture, of twenty years' date, by six months' confinement to bed. (*Cent. 5, Obs. 54.*)

Le Dran and Arnaud relate instances of monstrous bubonocoeles, which disappeared entirely, after the patients had been long confined to bed, and become much emaciated, by tedious illnesses. Some of the moderns have imitated this operation of nature, and by frequent bleedings, and repeated purges, have sometimes so far reduced the size of the hernia, that it has been returned into the abdomen. Mr. Hey has several times succeeded in this way. (*P. 219.*) But, this practice cannot prove successful, when the viscera adhere to the sac, or to the peritoneum, just within the abdomen. The greatest objection to this method of cure, is the want of an absolute criterion, by which to distinguish, when the parts do, or do not adhere to the hernial sac, and, in advanced years, though one were sure, that the viscera were free from the sac, the possibility of hurting the body by the necessary evacuations, is also another objection. (*Sharp's Critical Enquiry, p. 15*)

Were the plan to be thought worthy of trial, keeping up a constant pressure on the tumour, by means of a suspensory bandage, made to lace in front, would be proper for promoting the absorption of the thickened parts in the hernial sac. Mr. A. Cooper has reduced such herniæ, after applying ice to them, the good effects of which he imputes to its producing a contraction of the scrotum, which performs the office of a strong and permanent compression of the tumour.

Whenever any attempts of this kind succeed, "a truss should be immediately put on, and worn constantly without remission; for, in these people, the largeness of the abdominal aperture, the thick-

ness of the hernial sac, and the relaxation of the mesentery, make a new descent always to be apprehended, and guarded against." (Pott.)

There are instances, however, on record, in which the capacity of the abdomen had become so adapted to the diminished quantity of the viscera, that when the contents of the hernia were reduced, serious complaints arose from their introduction into the belly. Schmucker has met with several such cases, in which he has been obliged to take off the truss. Petit has known the reduction of a hernia of this kind prove fatal, the parts not descending again when the truss was removed, the nausea and vomiting, which arose, continuing, and peritonitis taking place. (*Chirurgische, Wahrnehmungen*, Vol. 2, p. 243. *Traité des Maladies Chirurgicales*, Tom. 2, p. 392.)

Mr. Pott remarks, that "an omental rupture, which has been so long in the scrotum as to have become irreducible, is very seldom attended with any bad symptoms, considered abstractedly; but, it is constantly capable of being the occasion of an intestinal hernia, and all its consequences; neither is that all, for the omentum, either so altered in form and texture, or so connected as to be incapable of reduction, may by accident inflame, and either become gangrenous, or suppurate, and the occasion of a great deal of trouble." In a few instances, epiploceles produce very bad symptoms indeed, cases of which are to be found in Garengéot, Dionis, &c.

Sometimes, in old cases of entero-epiplocele, the intestine is reducible, but the omentum is not, in which case some have advised keeping up the piece of bowel with a truss, the pad of which must be so contrived as not to press on the omentum. Mr. Pott, however, contends, that this is not often practicable, and, should such a truss be used, he advises its being particularly attended to, lest a small piece of gut slip down, and, being pressed on by the truss, produce fatal mischief.

"Irreducible herniæ must of course be exposed to all the consequences of external injury and violence; hence, various cases are recorded, in which the bowels have been burst by blows, falls," &c. (*Lawrence on Hernia*, p. 53.)

SYMPTOMS AND TREATMENT OF A STRANGULATED, OR AN INCARCERATED, HERNIA.—MEANS TO BE TRIED, BEFORE AN OPERATION.

"Difficulty of reduction (says Pott) may be owing to several causes. The size

of the piece of omentum, or the inflamed state of it; the quantity of intestine and mesentery, an inflammation of the gut, or its distention by feces, or wind; or the smallness of the aperture of the tendon, through which the hernia passes. But, to whatever cause it be owing, if the prolapsed body cannot be immediately replaced, and the patient suffers pain, or is prevented thereby from going to stool, it is called an *incarcerated hernia*, a *strangulated hernia*, or a *hernia with stricture*.

"The symptoms are a swelling in the groin, or scrotum, resisting the impression of the fingers: if the hernia be of the intestinal kind, it is generally painful to the touch, and the pain is increased by coughing, sneezing, or standing upright. These are the very first symptoms, and, if they are not relieved, are soon followed by others, viz. a sickness at the stomach, a frequent retching, or inclination to vomit, a stoppage of all discharge per anum, attended with a frequent, hard pulse, and some degree of fever."

A patient, thus circumstanced, is in some danger, and demands immediate assistance. A stricture made on the prolapsed part of the gut, by the aperture, through which it passes, is the immediate cause of all the bad symptoms; and of course, the removal of such stricture is the only thing, which can bring relief. This object can only be accomplished by returning the bowel back into the abdomen, or dividing the parts, which form the stricture. The former plan is always the most desirable, when practicable.

We next proceed to notice the various measures to be adopted for the relief of a strangulated hernia, so as to obtain the best chance of doing away the necessity of an operation. After treating of the merits of each plan, a few remarks will be offered on the order in which the means should be put in practice, a subject that has been most lamentably neglected, even by the latest writers on this interesting disease.

Taxis.—This is the term applied to the operation of reducing a hernia with the hand. It is much promoted by the position of the patient's body; Winslow thought it advantageous to have it placed in an inclined plane, and the thighs bent towards the trunk. Mr. A. Cooper advises the same practice, observing, that this posture, by relaxing the fascia of the thigh, relaxes also the aperture, through which the hernia passes. Every degree of tension, and relaxation of the femoral fascia must undoubtedly be attended with a corresponding change in the abdominal ring. But flexion of the thigh, besides

relaxing this fascia, also relaxes the abdominal, internal iliac, and psoas muscles. The pressure, which is made on the tumour by the hands of the surgeon, should always be directed upwards and outwards, in cases of inguinal hernia, along the course of the spermatic cord, and Mr. A. Cooper advises it to be continued from a quarter to half an hour. (*On Inguinal and Congenital Hernia.*)

As the femoral hernia passes downwards, and then forwards, the pressure must be directed first backwards, and then upwards. No violence should ever be used, for, besides being unavailing, it must greatly aggravate the inflamed state of the contents of the hernial sac, and, it has even made the intestine burst.—(*See Cooper on Inguinal Hernia, &c. p. 23.*)

Besides bending the thigh, care should also be taken to rotate it inwards, which will have great effect in relaxing the femoral fascia, and tendon of the external oblique muscle. Suspension of the patient over the shoulders of an assistant has been thought to facilitate reduction: "I have tried it often, (says Mr. Hey;) but have not found it to be of such superior efficacy, as some authors have represented." (*P. 144.*)

The return of a piece of intestine is generally preceded by a peculiar noise, caused by the passage of air through the stricture. It recedes at first gradually, and then slips up suddenly. The omentum goes up slowly to the very last portion, which must be actually pushed through the opening. If the taxis should not succeed at first, it will often do so after the warm bath, bleeding, or cold applications. Small herniæ, being attended with the closest stricture, are the most difficult to reduce, and, for the same reason; crural ones do not so often yield to the taxis, as inguinal ones in the male subject. The taxis becomes less likely to succeed, the longer the inflamed viscera have been down, because adhesions are likely to have formed. Mr. Lawrence observes, (*p. 63*) "When the rupture becomes painful, we are no longer justified in persevering in attempts at reduction by the hand. A sufficient pressure cannot now be endured; and the force which is employed only tends to increase the inflammation, and accelerate the approach of gangrene. *At this period, the operation is required, and should be performed without delay.*" Desault even proscribed the taxis altogether in the inflammatory strangulation, until the previous use of other means had produced a change in the state of the swelling. However, I should never advise the reader to lose too much time in this way, on the supposition, that

he can diminish the inflammation of a strangulated hernia in any other way, than by delivering the bowels from the pressure of the stricture. Bleeding may check, but cannot stop, much less diminish, the inflammation, that prevails.

That, however, the taxis is frequently abused, and the cause of serious mischief, is a truth, which cannot be doubted. "Strangulated herniæ, (says Scarpa) very frequently mortify from the negligence of the patients, and their repugnance to submit to an operation, and, perhaps, still more frequently from the effect of the taxis, unskilfully exercised by uninformed surgeons, who are determined, at any price whatsoever, to accomplish the speedy reduction of the viscera. The majority of them make no distinction between the *acute*, and the *chronic* strangulation. In both cases, no sooner are the symptoms of strangulation evinced, than they begin to handle the swelling roughly, and to push the viscera with all their force, in order to make them return into the abdomen; whilst, when the strangulation is *acute*, and the patient young and strong, the taxis ought never to be practised, before all the means proper for diminishing the strength, calming spasm, and relaxing parts, which are to be reduced, have been employed for a certain time. These means, we know, are bleedings, fomentations, emollient glysters, and, especially, the warm bath, which, next to bleeding, holds the first rank. At this school of surgery, I have frequently had opportunities of observing the salutary effect of this treatment. My pupils have, more than once, seen herniæ, which had been painfully handled without any good, reduced, as it were, spontaneously, after a bleeding, or whilst the patient was in the bath. If, what I have said upon the subject of the *acute* strangulation, and the treatment that it requires, were generally known by surgeons, I think, that the operations for strangulated herniæ would be less frequent. Things are different, with regard to the *chronic* strangulation of old large herniæ, in feeble, or aged persons; for, in these cases, it is of great importance to support the patient's strength. Bleedings, the warm bath, and other weakening means, should also be avoided, which, in producing a general atony, might bring on gangrene of the intestine, either during the strangulation, or after the reduction of the viscera. It is ascertained, that these kinds of strangulation are almost always occasioned by an accumulation of fecal matter, or an extraordinary quantity of air in the hernia. Nothing is more efficacious, than cold appli-

cations, for provoking the action of the bowel on the matter, which distends it, or for lessening the volume of the air. They produce a corrugation of all the scrotum, and contractions of the cremaster, which alone sometimes suffice for reducing the viscera, in a much better manner, than could be done by the hands of the most experienced surgeon." (*Scarpa, Traité des Hernies*, p. 244—247.)

Bleeding.—The inflammation, which attacks the protruded viscera, and spreads thence over the whole abdomen, and the temporary weakness and often fainting, which the sudden loss of blood induces, and which is a peculiarly favourable opportunity for reducing the hernia by the hand, are the reasons in favour of bleeding in the present disease. Sharp, Pott, B. Bell, Sabatier, Richter, Callisen, and Scarpa, names which can never be surpassed in respectability, are all subscribed in favour of bleeding. Wilmer, Alanson, and A. Cooper have published against the practice. Mr. Hey has related two cases, which strongly evince the manner, in which bleeding facilitates the return of a hernia: the protruded viscera, in one instance, went up spontaneously, on blood being taken away; in the other, the taxis succeeded immediately afterwards, though the attempt before had been made in vain. (P. 125, 126.) Mr. Hey's experience, however, leads him to concur so far with Wilmer and Alanson, as to declare, that bleeding has generally failed to procure a reduction of the strangulated intestine, though he is persuaded that, in many cases, it may be used with advantage. But he cannot agree with Wilmer, that it generally renders the subsequent operation more dangerous. (P. 126.)—The majority of candid practitioners, I believe, will allow, that bleeding is always proper, when the hernia is small and recent; the abdomen tense and painful; and the patient young, strong, and plethoric.

Purgative Medicines.—My experience, (says Mr. Hey) leads me to condemn almost universally the use of purgatives taken by the mouth, while an intestine remains firmly strangulated. In the entero-epiplocele, when the intestine has retired, and the omentum remains strangulated; or in a simple strangulation of the omentum, where the intestine has not been prolapsed, purgatives are of great utility. So likewise in very large and old hernias, where there is reason to doubt, whether the disease is not to be considered as a morbid affection of the intestinal canal, rather than the effect of strangulation, purgatives may be as useful as in the simple ileus without hernia.

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While the intestine remains firmly strangulated, they usually increase the vomiting, and add to the distress of the patient. If they are to be tried at any time with hope of success, the trial would appear to have the greatest advantage when the vomiting has been removed by means of an opiate; yet I have repeatedly given them in vain during such an interval of relief." (*Practical Observations in Surgery*, p. 128.)

Purgatives are supposed to operate by exciting the peristaltic action of the intestine, and thereby extricating it from the stricture. Besides the above eminent surgeon, Pott and Richter have joined in their condemnation in general, and, to all appearances, with very great reason. Purgative glysters, certainly have not the objection of increasing the irritation; but, their efficacy is not deserving of much confidence. Mr. Hey says, he has never seen one case, in which either purgative, or emollient glysters produced a return of a strangulated hernia. Such injections will empty the large intestines; but, they have seemed to him to do no more. It is common also for a natural evacuation to be the immediate consequence of a strangulation. (P. 131.)

Warm Bath.—"Many instances (says Hey) are upon record of the good effect of warm bathing in procuring the reduction of a strangulated hernia. I have often seen it useful; but I have also often seen it fail of success. Whenever it is used in this disease, the patient should be placed, if possible, in a horizontal position. Gentle efforts with the hand to reduce the prolapsed part are perhaps attended with less danger, and with greater prospect of success, while the patient lies in the bath, than in any other position. The free use of opiates coincides with that of warm bathing, and under some circumstances, these means deserve to be tried in conjunction." (P. 132.)

Cold Bath, and Cold Applications.—The cold bath, and dashing of cold water on the patient are little to be depended upon, though success seems sometimes to have been obtained in this manner. (*Petit Traité des Mal. Chir. Tom. 2, p. 325. Hey, p. 136.*)

Wilmer has strongly recommended the application of cold to the tumour itself, and this plan has acquired the approbation of the most celebrated modern surgeons. It is generally tried in conjunction with the effect of tobacco glysters, which will be presently noticed. Cold applications, in the form of ice, were, indeed, particularly recommended by B. Bell. The best way is to pound the ice, tie it up in a bladder, and place it on the rupture. When ice cannot be procured, Mr. A. Cooper employs a mixture of equal

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parts of nitre and sal-ammoniac. To one pint of water, in a bladder, ten ounces of the mixed salts are to be added. "If, after four hours, (says this distinguished surgeon) the symptoms become mitigated, and the tumour lessens, this remedy may be persevered in, for some time longer; but, if they continue with unabated violence, and the tumour resist every attempt at reduction, no farther trial should be made of the application." (*On Inguinal and Congenital Hernia.*) When ice has not been at hand, æther has occasionally been found a good substitute, when allowed to evaporate from the surface of the swelling.

Care must be taken, that the cold be not so applied as to freeze the scrotum, and bring on sloughing. (*A. Cooper, p. 15.*)

Opiates.—Mr. Hey has seen several cases, in which opiates, given freely, (in athletic persons after bleeding) have procured a reduction of strangulated hernia.

He cannot say, however, that this remedy is generally successful; but, it has the advantage of removing, for a time, the pain and vomiting usually attendant on strangulation, even though it prove ultimately inefficacious. Opiates should be given in large doses, when it is wished to try their effect in procuring reduction; and whenever the symptoms of strangulation return, after having been removed by opiates, the operation should be performed without delay. (*P. 134, 135.*)

Tobacco Glysters.—For this purpose, some surgeons prefer a decoction of tobacco, made by infusing, or boiling, one dram of the plant, for ten minutes, in a pint of water; others employ the smoke, which is prepared, and introduced into the rectum, by means of a well-known apparatus for the purpose. Perhaps, both methods are equally efficacious; but, as one requires an apparatus, while the other does not, and is equally proper, the decoction may be entitled to most recommendation. The machine for the smoke is also frequently found out of order. Tobacco glysters are, next to the operation, the most certain means of bringing about the reduction of the strangulated parts. They not only excite the action of the intestines, they also exert a peculiar depressing influence on the whole system, reducing the pulse, and causing nausea and sickness, cold sweats and fainting, under which circumstances the parts recede spontaneously, or may be easily reduced. Mr. A. Cooper prudently advises injecting half the above quantity at first; for he has seen two drams, and even one, when used as an infusion, and introduced at once, prove

fatal. (*P. 24.*) The rest should presently be injected when it appears, that the tobacco does not operate with the extraordinary violence, with which it does in a few particular constitutions.

Poultices and Fomentations. We only make mention of these, to say, they have not the least confidence of any experienced, or intelligent surgeon. Whoever wastes time, in these urgent cases, in trying the effects of such applications, merits censure for his credulity, ignorance, and unfitness to undertake the treatment of a rapid disease, in which, as Pott remarks, if we do not get forward, we generally go backward; and whatever does no good, if it be at all depended upon, certainly does harm, by occasioning an irremediable loss of time.

[*Placing the patient on an inclined plane, with his feet highest.*—Winslow and Cooper recommended this position of the body during the efforts to reduce the hernia by taxis. I would recommend it however, to be continued longer; from having seen two cases in which this simple measure succeeded after several of those, already recited, had been tried in vain. The patient should lie upon his back, and the foot of the bed be elevated about twenty inches higher than the head. This posture need not interrupt the administration of other remedies, and in some cases will be found powerfully to aid them.]

OF THE ORDER, IN WHICH THE PRECEDING METHODS AND REMEDIES SHOULD BE TRIED, AND OF THE TIME, WHEN THE OPERATION SHOULD NOT BE DELAYED.

In the treatment of a strangulated hernia, a surgeon cannot be too deeply impressed with the danger of spending time in the trial of methods of inferior efficacy, or of such as are evinced to be ineffectual in the cases before them.

The rapidity, with which gangrenous mischief sometimes arises, and the patient loses his life, has been proved in a multitude of unfortunate examples, and should operate as a warning to all practitioners against the danger of deferring the operation too long. In the course of my reading, however, I have not met with so remarkable an instance of the sudden mortification, and rapidly fatal termination of an hernia, as the following case recorded by Mr. Larrey, in speaking of the fatiguing and forced marches performed by the French soldiers in Egypt. These marches, he says, brought on in one of the military "a hernia which formed suddenly, and became at the same time stran-

gulated. He was immediately brought to my ambulance; but, a spontaneous gangrene, which had all on a sudden attacked the intestine, and extended to the other abdominal viscera, caused the patient's death in the space of two hours, and made it impossible for me to do the operation for him. This is the second example, that I have been acquainted with, in which the effects of the accident were thus rapid." (*Larrey, in Mémoires de Chirurgie Militaire, Tom. 1, p. 196.*)

The taxis is generally among the first things to be tried, and Mr. A. Cooper thinks the attempts should be continued for a quarter, or half an hour. When these have been ineffectual, the patient, if the circumstances do not forbid, should be immediately bled, and have a large opening made in the vein, so that the suddenness of the evacuation may be most likely to bring on fainting. The taxis should be tried once more as soon as this operation is finished.

In cases, where the strangulation is very acute, and the patient young and strong, perhaps, it may be most advisable to follow the advice delivered by Scarpa and Desault, and bleed the patient, and put him in the warm bath, before attempting the taxis.

If bleeding alone has been practised, and the manual efforts at reduction should not now succeed, the warm bath may be employed, *provided it can be got ready in a very short time*, but none should ever be lost in waiting for it to be prepared. When the bath is used, the taxis may be attempted, as the patient lies in the water; a situation, in which I have succeeded myself in reducing several herniæ.

Certainly not more than one hour should ever be allotted for putting in practice the first attempts at reduction, bleeding, and the warm bath.

The plan should be, while the trial of one thing is going on, another should be preparing. So when the preceding measures have been tried in vain, the application of a bladder filled with ice, or the solution of salts, and the injection of tobacco, in the form of smoke, or decoction, should never be delayed for want of due previous preparation of all the requisites. Both these measures should be practised at the same time, immediately after the failure of the taxis, bleeding, and the warm bath. Mr. A. Cooper states, that four hours are enough for the trial of the tobacco glyster, together with cold applications.

In omental herniæ, the necessity for operating may frequently be obviated, by the good effects of bleeding, purgative medicines, and glysters, and leeches ap-

plied to the tumour. Mr. Lawrence has justly observed, that "when, as it very frequently happens, the aid of the surgeon is not required, until the complaint has lasted for some time, a trial of the tobacco, together with the topical use of cold, should be immediately resorted to, as circumstances will not admit of delay in the previous use of less powerful remedies." (*P. 87.*)

Every man who has seen much of herniæ, will immediately recognize the propriety of the following sentiments of the experienced Mr. Hey:

"I can scarcely press in too strong terms the necessity of an early recourse to the operation, as the most effectual method of preserving life in this dangerous disease. If Mr. Pott's opinion be true, that the operation, when performed in a proper manner, and in due time, does not prove the cause of death oftener than perhaps once in fifty times; it would undoubtedly preserve the lives of many, to perform it almost as soon as the disease commenced, without increasing the danger by spending much time in the use of means, which cannot be depended upon for a cure.

"I have twice seen this disease prove fatal in about twenty-four hours. In such cases it is evident there is little time for delay. A surgeon, who is competent to perform the operation, is not perhaps consulted till the intestine is on the point of being mortified, or is actually in a state of mortification. The dilemma into which he is then cast, is painful indeed. But when the fullest opportunity is afforded him of using the best mode of treatment, I am satisfied that his success will be the greatest when the operation is not long delayed. This, at least, has been my own experience. When I first entered upon the profession of surgery, in the year 1759, the operation for the strangulated hernia had not been performed by any of the surgeons in Leeds. My seniors in the profession were very kind in affording me their assistance, or calling me into consultation when such cases occurred; but we considered the operation as the last resource, and as improper until the danger appeared imminent. By this dilatory mode of practice, I lost three patients in five upon whom the operation was performed. Having more experience of the urgency of the disease, I made it my custom, when called to a patient who had laboured two or three days under the disease, to wait only about two hours, that I might try the effect of bleeding (if this evacuation was not forbidden by some peculiar circumstances of the case) and the tobacco glyster. In this mode of practice I lost about two patients in nine

upon whom I operated. This comparison is drawn from cases nearly similar, leaving out of the account those cases in which a gangrene of the intestine had taken place.

"I have now, at the time of writing this, performed the operation thirty-five times; and have often had occasion to lament that I had performed it too late, but never that I had performed it too soon. There are some cases so urgent, that it is not advisable to lose any time in the trial of means to produce a reduction. The delay of a few hours may cut off all hope of success, when a speedy operation might have saved the life of the patient." (P. 141, &c.)

To determine the exact moment, when to give up the trial of the preceding measures, and to have immediate recourse to the operation, is certainly difficult; but, no one can doubt, that this should rather be resorted to too early, than too late.

All directions must be general ones, liable to many exceptions: in rapid cases little, or no time should be allotted to the trial of any plan, and the operation should be done without the least delay. In other instances, we have full time to try the effects of every thing at all likely to succeed. The symptoms, which ought to guide us, in having recourse to the operation, arise from an attack of inflammation in that part of the intestine contained in the hernial sac, and from its spreading into the abdominal cavity. It is in proportion to their violence, that we ought to urge the performance of the operation. Mr. A. Cooper considers pain on pressing the belly, and tension, as the symptoms, which point out its immediate necessity. He adds, "Indeed, there is scarcely any period of the symptoms, which should forbid the operation; for, even if mortification has actually begun, the operation may be the means of saving life, by promoting the ready separation of gangrenous parts." (*On Inguinal and Congenital Hernia*, p. 27.)

Whenever the surgeon has succeeded in reducing the parts, without having recourse to the knife, if the symptoms of pain, inflammation, &c. ran high before such reduction, they will not always cease immediately afterwards. As they probably depend on the reduced bowel having been inflamed by the stricture, the body should be kept open, and the diet and regimen should be low and sparing, while the least degree of pain and tension remain; in short, till all complaint is absolutely removed from the abdomen, and the intestines do their office freely, and without trouble. (Pott.)

PROGRESS OF THE SYMPTOMS OF A STRANGULATED HERNIA.

The earliest symptoms have been already related, viz. "tumour in the groin, or scrotum, attended with pain, not only in the part, but all over the belly, and creating a sickness and inclination to vomit, suppression of stools, and some degree of fever. These are the first symptoms, and, if they are not appeased by the return of the intestine, that is, if the attempts, made for this purpose, do not succeed; the sickness becomes more troublesome, the vomiting more frequent, the pain more intense, the tension of the belly greater, the fever higher, and a general restlessness come on, which is very terrible to bear. When this is the state of the patient, no time is to be lost; a very little delay is now of the utmost consequence, and if the one single remedy which the disease is now capable of being not administered immediately, it will generally baffle every other attempt. This remedy is the operation, whereby the parts engaged in the stricture may be set free. If this be not now performed, the vomiting is soon exchanged for a convulsive hiccough, and a frequent gulping up of bilious matter; the tension of the belly, the restlessness and fever having been considerably increased for a few hours, the patient suddenly becomes perfectly easy, the belly subsides, the pulse from having been hard, full, and frequent, becomes low, languid, and generally interrupted; and the skin, especially that of the limbs, cold and moist; the eyes have now a langour and a glassiness, a lacklustre not easy to be described; the tumour of the part disappears, and the skin covering it, sometimes changes its natural colour for a livid hue; but whether it keeps or loses its colour, it has an emphysematous feel, a crepitus to the touch, which will easily be conceived by all who have attended to it, but is not so easy to convey an idea of by words: this crepitus is the too sure indicator of gangrenous mischief within. In this state, the gut either goes up spontaneously, or is returned with the smallest degree of pressure; a discharge is made by stool, and the patient is generally much pleased at the ease he finds; but this pleasure is of short duration, for the hiccough and the cold sweats continuing and increasing, with the addition of spasmodic rigors and subsultus tendinum, the tragedy soon finishes." (Pott.)

ANATOMY OF THE BUBONOCLE, OR INGUINAL HERNIA.

This subject must necessarily precede

the account of the operation, which would otherwise be unintelligible. It is chiefly in the anatomical information, relative to herniæ, and the mode of operating, that modern surgeons have a decided superiority over their predecessors; for, before Gimbernat, Camper, Hey, and A. Cooper, published their several works on herniæ, the anatomy of the disease was only imperfectly understood.

The tendinous-fibres of the aponeurosis of the external oblique muscle, as they run downwards and forwards towards the pubes, separate from each other, so as to leave a triangular opening, called the abdominal ring. The upper and inner pillar (as it is termed) of this aperture is inserted into the symphysis of the pubes; the lower and outer one, which is only the continuation of Poupart's ligament, is fixed into the angle and crista of the same bone. Some tendinous fibres cross the upper and outer angle of the ring, so as to diminish the triangular appearance of the whole aperture: these are said to be very strong in old herniæ. The anterior and thicker layer of the aponeurosis of the internal oblique muscle joins the tendon of the external oblique; the posterior and thinner one joins that of the transversalis; but the lower portion of this tendon, together with the corresponding part of the transversalis, goes wholly in front of the rectus muscle. Thus the inferior border of the obliquus internus and transversalis, which originates from the upper part of Poupart's ligament, lies behind the outer pillar of the abdominal ring. Mr. A. Cooper was the first, who noticed, that a thin fascia proceeded from the inner edge of Poupart's ligament, and spread itself over the posterior surface of the transversalis. This forms the only partition between the peritoneum and the outer opening of the abdominal ring, and were it not for its existence, inguinal herniæ would probably be much more frequent.

The spermatic vessels joined by the vas deferens, proceed before the epigastric artery, very near the place where it arises. They then run through the above fascia, go under the edge of the internal oblique and transverse muscles, and next obliquely downwards and forwards between the above fascia, and aponeurosis of the external oblique to the opening of the ring.

Thus we see, that the spermatic cord runs through a kind of canal, before it actually emerges at what is named the abdominal ring. This oblique passage of the cord, through the abdominal parietes, was well known to, and elegantly deline-

ated by Albinus; Gimbernat makes distinct mention of it in his *Account of a new Method of Operating for Femoral Hernia*, p. 19—32; but, no one, before Mr. A. Cooper, considered the thing with due attention.

The abdominal ring is then only the outer opening of the canal, or passage, through which the spermatic cord passes before it emerges. The inner one, at which the viscera in cases of inguinal hernia first protrude, is situated about an inch and a half from the abdominal ring, in the direction towards the anterior spinous process of the ilium. This inner opening is rather nearer the pubes, than the ilium, and its upper border is formed by the lower edge of the internal, oblique, and transverse muscles, which can be plainly felt with the finger, introduced upward and outward into the abdominal ring.

"The precise point, at which the hernia most commonly commences, (says Scarpa) is that which corresponds, in the fœtus, to the communication of the tunica vaginalis with the peritoneum, and, in the adult, to the passage of the spermatic cord under the transverse muscle. In the sound state, the peritoneum presents at this part a small funnel-like depression, the depth of which increases in proportion as the spermatic cord is pulled from above downwards. It is this small pouch, this sort of digital appendage, whose progressive developement constitutes the hernial sac. Resting upon the anterior surface of the spermatic cord, it first makes its appearance under the inferior edge of the transverse muscle; thence it extends itself in the separation of the inferior fleshy fibres of the internal oblique muscle, always following the spermatic cord, in front of which it is situated; and after having in this manner passed through the whole of the canal, which extends from the iliac region to the pubes, it lastly protrudes at its external orifice, which is the inguinal (or abdominal) ring properly so called. In all this track, the hernial sac, as well as the spermatic cord, is situated above the femoral arch, the direction of which it follows. The canal, which it traverses, is of a conical shape, the apex of which is towards the flank, and the base at the external orifice of the ring." (*Scarpa, Traité des Hernies*, p. 44, 45.)

The epigastric artery runs behind the spermatic cord, along the inner margin of the internal opening of the above canal, then upwards and inwards, so as to pass at the distance of half an inch, or an inch from the upper extremity of the outer opening, or abdominal ring.

In common cases of inguinal hernia,

the viscera, protruded at the inner opening, above described, lie over the spermatic cord, and form a tumour on the outside of the abdominal ring. They may, however, insinuate themselves into the inner opening, without descending sufficiently to protrude through the external one, or abdominal ring. The stricture may take place at either of these openings. In recent and small hernia, according to Mr. A. Cooper, the strangulation is most frequently situated at the inner opening; in large old ruptures, at the abdominal ring. Even when the parts are completely protruded out of the latter opening, the strangulation may exist at the inner one: but, there may occasionally be two strictures, viz. one at each opening. (*Lawrence on Hernia*, p. 103.)

The hernial sac descends through the abdominal ring over the spermatic cord, and is covered by a fascia, sent off from the tendon of the external oblique muscle. Beneath this fascia, the cremaster muscle is also situated over the sac. When this has descended a certain way, it lies on the tunica vaginalis, as well as the spermatic cord.

As the epigastric artery naturally runs first behind the spermatic cord, and then along the inner margin of the internal opening of the ring, and as the viscera are protruded over the cord, they must be situated on the outer side of the artery, which runs first behind the neck of the sac, and then on its inner side. Hence, the inner margin of the sac, when inspected on the side towards the abdomen, seems to be formed, as it were, by the track of the vessel. (See *Lawrence*, p. 106.) That this is the ordinary situation of the epigastric artery, in relation to the inguinal hernia, is confirmed by the concurrent testimonies of Camper, Chopart, Desault, Sabatier, A. Cooper, &c. and by preparations to be seen in almost every museum.

In recent inguinal herniæ, the internal and external openings of the ring are at some distance from each other, the first being situated obliquely upwards and outwards in relation to the former; but, the pressure of the protruded viscera, gradually brings them nearer together, so that in large herniæ of long standing, the opening into the abdomen is almost direct, and the epigastric artery becomes situated nearer the pubes, than in the natural state.

Though such is the ordinary direction, in which a bubonocoele protrudes, there are occasional varieties. In one of these, the viscera, instead of descending through the canal of the ring, are at once thrust through the abdominal ring itself, and the opening into the belly is then direct:

the hernial sac, instead of passing on the external side of the spermatic vessels, as is usual, now lies on their inner, or pubic side; and the epigastric artery, which is commonly situated behind, now pursues its course, in front of the sac, at its usual distance from the upper and outer angle of the abdominal ring.

The following is Scarpa's description of the displacement of the epigastric artery in the greater number of cases of inguinal hernia. "This artery, which, in the natural state, runs about ten lines from the abdominal ring, has its situation and direction so changed, in subjects affected with hernia, that it crosses the posterior part of the neck of the hernial sac, and is pushed from the outer to the inner side of the abdominal ring. In order to comprehend the reason of this displacement, it is necessary to recollect what I have elsewhere said of the formation of inguinal hernia, and of the manner, in which the spermatic cord crosses the epigastric artery. The hernia begins to form at the very place, where the spermatic cord passes under the inferior margin of the transverse muscle; and this place is rather nearer the flank, than that where the epigastric artery passes towards the rectus muscle. In its progressive development, the hernial sac constantly follows the same track as the spermatic cord, since it is situated upon its anterior surface. As has been already explained, this cord crosses the epigastric artery; consequently, the hernial sac must necessarily pass with the cord above this artery, before protruding from the canal of the abdominal ring. At the same time, the internal orifice of the hernia becoming larger, and the inguinal canal shortened by the approximation of its two orifices to each other, it follows, that, at the period, when the hernia begins to make its appearance in the groin, the epigastric artery is unavoidably situated behind the neck of the hernial sac, and is pushed from the outer to the inner side of the ring. Let us suppose a piece of string to be passed from the inside of the abdomen into the scrotum, all through the inguinal canal, and the middle of the hernia; and that this string is pulled so as to bring the internal orifice of the hernia, which is situated beyond the point where the spermatic cord crosses the epigastric artery; this artery will immediately be found to be carried from the outer to the inner side of the neck of the hernial sac. The same thing happens from the effect of the development of the hernia. The removal of the epigastric artery from one side of the ring to the other (says Scarpa) is a phenomenon, which may be regarded as

almost constant in the inguinal hernia. I have examined the bodies of a great number of subjects, affected with this species of hernia; and it has been only in a very few, that I met with the epigastric artery retaining its natural situation on the outer side of the abdominal ring. In investigating the reason of this exception, I have observed, in all the individuals who presented it, a very remarkable weakness and flaccidity of that part of the abdominal parietes, which extends from the flank to the pubes. In all the displaced viscera had passed through the aponeuroses of the transverse and internal oblique muscles, not in the vicinity of the ilium, as is commonly the case, but, at a little distance from the pubes, giving to the upper pillar of the ring a curvature that is extraordinary, and disproportioned to the smallness of the hernia. I observed, also, that the neck of the hernial sac did not pass in an oblique direction from the flank to the pubes, but, that it protruded from the abdomen almost in a direct line from behind forwards. In short, in these individuals, the small cul-de-sac of the peritoneum, which constitutes the origin of the hernial sac, had not begun to be formed under the edge of the transverse muscle, at the point where the spermatic cord runs outward; but, it had passed through the aponeuroses of the internal oblique and transverse muscles, at a little distance from the pubes, and within the point, at which the spermatic cord crosses the epigastric artery. The small hernial sac, having at this part come into contact with and united to the spermatic cord, protrudes at the external orifice of the inguinal canal, without displacing the epigastric artery from its natural situation.

"This species of hernia, properly speaking, is a mixture of the ventral and inguinal. It resembles the former, inasmuch as the hernial sac pierces the aponeuroses of the transverse and internal oblique muscles; the latter, inasmuch as it passes out at the abdominal ring, conjointly with the spermatic cord." (*Scarpa, Traité des Hernies, p. 68, &c.*) In most instances, the spermatic cord lies behind or under the hernial sac. There are cases, however, in which the vas deferens is found on the outer side of the sac, while the rest of the spermatic cord lies, as it usually does, on the inner side, or rather under this part. (*Cooper.*) Le Dran, Schmucker, and Blizard, have found the whole cord situated in front of the sac. Sometimes the vas deferens has run on the front and inner part, and the rest of the cord on the back and external part of the swelling. (*Camper, Hey.*) The cord has been known

to be before, and the vas deferens behind the sac. (*Camper, Cooper.*)

Upon this part of the subject, the reader may deem the following passage interesting. "While the hernia is of moderate size (says Scarpa) the surrounding cellular substance is not very greatly compressed, and no change is observed in the situation of the spermatic vessels. The artery and veins of this name always form, with the vas deferens, one single cord, which is intimately adherent to the posterior surface of the hernial sac. But, in proportion as the tumour increases in size, the cellular substance, which immediately surrounds it and unites it to the spermatic cord, is more and more distended and compressed. At length, at a certain period, the distention is carried to such a pitch, that the spermatic vessels are separated from one another, and change their position with respect to the hernial sac. This kind of gradual decomposition of the spermatic cord is quite similar to that, which would be produced by pulling the surrounding cellular substance in two opposite directions. Such is the reason, why, in scrotal herniæ of large size, the spermatic artery, the vas deferens, and the spermatic veins are found separated upon the posterior surface of the sac. All these vessels, instead of being conjoined in one cord, are divided by interspaces, which are sometimes very considerable. Ordinarily, the vas deferens is less separated from the spermatic artery, than from the vein of this name. In some subjects, Camper has seen it situated on one side of the sac, and the artery and veins on the other. (*Icones Herniarum, tab. 5. L. O. Tab. 8. 1, 2.*) The displacement and decomposition of the spermatic cord take place equally in adults and in children affected with large scrotal herniæ. (*Camper, loco cit.*) In general, towards the upper part and neck of the hernia, the vessels are not much separated; but, as they proceed downwards, they diverge more and more. Sometimes, when the hernia is very old and voluminous, they are no longer found at the posterior part, but rather at the sides, and even on the front surface of the sac; they shew themselves through the cremaster muscle, which covers them, and form a sort of vascular train, which arrests the hand of the operator at the moment, when he is about to open the hernial sac. Le Dran relates, that, in operating upon a large scrotal hernia, he found the spermatic cord on the anterior surface of the hernial sac. (*Operations de Chir. p. 127.*) This fact has been the cause of numerous conjectures, and appeared altogether inconceivable to such surgeons, as have not been acquainted with the changes, to

which the spermatic cord is exposed, in cases of large scrotal hernia. (Lassus, *Med. Operat.* Tom. 1, p. 152, cannot conceive the possibility of the occurrence.) The observation of Le Dran is not the less true and exact: it exemplifies a very important fact, of which it is easy to give a true explanation, when the state of the spermatic cord in ordinary inguinal hernia, and in those, which have obtained a considerable size, has been comparatively examined. In the first, the spermatic cord quite entire is always found situated on the posterior surface of the hernial sac; but, in the second, the spermatic vessels are so separated from one another, that they sometimes extend over the sides and even the forepart of the hernial sac." (*Scarpa, Traité des Hernies, p. 61, &c.*)

The hernial sac is commonly described as an elongation of peritonæum. When more minutely examined, however, it is found, in cases of inguinal hernia, to consist of the portion of peritonæum, pushed out with the viscera; of a layer of cellular substance on the outside of this, which becomes more or less thickened by the pressure of the rupture in different cases; of a fascia, sent off from the tendon of the external oblique muscle; and of the cremaster muscle, which latter parts form the exterior covering, which consisting of several layers, often leads the operator to fancy he has opened into the cavity of the sac, when, in reality, he has not.

It is observed by Professor Scarpa, that "the cremaster muscle, in cases of old large scrotal hernia, acquires a thickness, which is really surprising. Its fibres, which are naturally very thin, become from four to six times more considerable. Being spread over the neck and body of the hernial sac, they sometimes present a remarkable consistence, and a yellowish colour. Such alteration, however, does not prevent the muscular texture from being discovered, and Haller was not mistaken about it. (*Opusc. Patholog. p. 317.*) Pathology furnishes us with several examples of similar changes of organization. In certain cases, the muscular coat of the bladder, that of the stomach and intestines, and even the exceedingly delicate fleshy fibres of the ligaments of the colon, are found to have become yellow, and much thickened.

"In old scrotal hernia (says Scarpa) it is not unusual to find an intimate adhesion of the fibres of the cremaster muscle to the edges of the abdominal ring. This may depend on the pressure, which the contents of the hernia may make on those edges, and perhaps it may also depend on the union of the cremaster mus-

cle with the prolongation of the aponeurosis of the fascia lata, which is continued from the margins of the ring to the groin and scrotum. Howsoever it may be, certain it is, that in old large scrotal hernia, there is much difficulty in introducing a probe between the fleshy fibres of the cremaster and the margin of the abdominal ring; and that, on the contrary, in recent hernia, a probe passes as easily between the edges of the ring and the cremaster, as between this muscle and the hernial sac.

"Few authors (according to Scarpa) have spoken of the sheath, formed by the cremaster muscle, in which are enclosed the hernial sac, the spermatic cord, and the tunica vaginalis of the testicle. Sharp (*In Critical Enquiry*) and Monro, the father, (*Anat. and Chirurg. Works, p. 553.*) were the first to dwell upon this important pathological point. Monro had seen the cremaster muscle covering the hernial sac; but, he did not believe, that the same thing occurred in all individuals affected with inguinal hernia. In this respect, he was mistaken; for, this disposition of the cremaster muscle is one of the essential characters of the disease. Petit has not omitted to describe the relations, which exist between the cremaster and the hernial sac. (*Œuvres Posthum. Tom. 1. p. 288.*) On this subject, he even relates an interesting fact, from which it results, that, in certain cases, this muscle may by its contractions alone cause a reduction of the hernia. Gunz explains, with tolerable perspicuity, how the cremaster and its aponeurosis form one of the coverings of the inguinal and scrotal hernia. (*Libellus de Herniis, p. 50.*) Morgagni once saw its fleshy fibres extended over the hernial sac; (*De sed. et caus. morb. epist. 34, art. 9; epist. 31, art. 15.*) and Neubaver positively assures us, that he has made the same remark upon the dead body of a man affected with an entero-epiplocele. (*Dessert de Epiplo-o-scheocele.*) After these facts, so positive and accurately observed, I cannot comprehend (says Scarpa) how in our time Pott, Richter, and several other authors, should have passed over in silence, or only mentioned vaguely, this point, so important in the history of the inguinal and scrotal hernia." (*Scarpa, Traité des Hernies, p. 48—50.*)

When surgeons speak of a hernial sac being usually thicker and stronger, in proportion to the magnitude and duration of the hernia, they do not imply, that this alteration only occurs in the mere peritonæum.

In very enormous hernia, the pressure of the contents is so great, that, instead of

thickening the sac, it renders it thinner, and even makes it ulcerate. The protruded viscera have been met with immediately beneath the integuments, when the sac has been burst by a blow. (*Cooper; J. L. Petit.*)

The outer surface of the peritoneal part of the hernial sac, is always most closely adherent to the other more external covering by means of cellular substance. This connexion is formed so soon, after the first occurrence of a hernia, that any hopes of returning a hernial sac into the abdomen are now generally considered as merely chimerical. There must, however, be a certain space of time, before adhesions form, though it is, no doubt, exceedingly short.

Upon this point, Scarpa does not adopt the opinion commonly received.

"It has long been disputed, (observes this author) whether it is possible to reduce a hernial sac into the abdomen with the intestine. But, it has happened, as in most discussions, that every one has endeavoured rather to support his own opinion, than appreciate the facts opposed to him. On both sides, they have neglected to consult observation, which alone ought to be the basis of our judgment in similar matters.

"There is no doubt, that, in recent and small inguinal hernia, the intestine, strangulated by the neck of the hernial sac, has been known, in more instances than one, to have been reduced by the taxis, and carried with it the whole of the sac into the abdomen. Observations, not less authentic, inform us, that, after the operation for hernia, when the viscera could not be reduced on account of their adhesions to the sac, they have been seen, notwithstanding such adhesions, to get nearer to the ring daily, and at length, spontaneously to return into the belly together with the hernial sac. Louis was wrong in denying the possibility of these facts. (*Acad. Royale de Chirurgie, Tom. 11 p. 486.*) For my part, (continues Scarpa) I regard them as very correct, according to my own experience, and that of several other surgeons. It appears, that the illustrious secretary of the academy, only refused to put confidence in such well attested cases, because they were contrary to an opinion, that he had set up with great assurance: he pretended that neither art, nor nature, could ever accomplish the reduction of the hernial sac, unless the cellular substance, which unites it to the spermatic cord and surrounding parts, were torn. Apparently he forgot, that, under certain circumstances, the cellular substance will bear, without laceration, a considerable elongation, and afterwards shrink again. It is

thus, that we often see a viscous, which has suffered a considerable displacement, return spontaneously into its natural situation. Pathology would furnish us with a great number of similar examples; but, not to depart from our subject, daily experience proves, that, in the inguinal hernia, the spermatic cord is elongated, and descends farther, than in the natural state. No laceration of the cellular substance, however, is then occasioned; for, if the hernia be kept reduced, the spermatic cord becomes shorter, daily retracts, and at last has only the same length, which it had previously to the disease. When a sarcocele becomes large and heavy, the portion of the spermatic cord, naturally situated within the belly, is by degrees drawn out into the scrotum; but, after the tumour is extirpated, this portion ascends again, and of itself returns into its original situation.

"The same thing happens after the operation for the strangulated inguinal hernia. All practitioners have noticed, that the hernial sac retracts and reascends progressively towards the ring. That alone would prove, that the cellular substance, which surrounds the spermatic cord, and unites it to the hernial sac, is highly endued with the property of yielding, and afterwards returning to its original state. Can the same property be refused to the cellular substance, which unites the sac to the cremaster muscle and other surrounding parts?

"While the inguinal hernia is recent, and not of much size, the cellular substance in question possesses all its elasticity, and hence, the hernial sac and the spermatic cord, may easily ascend towards the abdominal ring. I have had occasion (says Scarpa) to make this observation upon the dead body of a man, who had an incipient inguinal hernia. The small hernial sac was capable of being pushed back into the ring with the utmost facility; and in carefully examining the parts, both within and without the belly, it appeared to me, that the cellular substance, which united the sac to the spermatic cord and cremaster muscle, was disposed to yield equally from without inwards, and in the direction precisely opposite; that is to say, it made an equal resistance to the protrusion and the reduction of the hernial sac. Monteggia has seen a case exactly similar: although, according to his own expressions, (*Instituz. Chirurg. Tom. 3, sez. 2, p. 249.*) the hernial sac was not very small, it adhered very loosely to the surrounding parts, and it admitted of being entirely reduced into the abdomen with great facility. It might indeed be strictly said, that this is not a true reduc-

tion, because in pushing back the hernial sac, we only just squeeze it up behind the ring, whence it is forced out again by the slightest effort. But, whatever we may please to term this *retrocession* of the hernial sac, it is not the less proved, in an evident manner, that, in the small and recent inguinal hernia, the hernial sac, together with the viscera which it contains, may be returned into the abdomen.

"This is not the case with large old scrotal hernia. In these, the cellular substance, which unites the sac to the spermatic cord, and cremaster muscle, has acquired such a density, that it does not oppose less resistance to the further development of the hernia, than to the efforts of the surgeon, who endeavours to effect its reduction." (*Scarpa, Traité des Hernies, p. 57, &c.*)

We shall conclude this anatomical account of the inguinal hernia, with the following explanation of the parts as they appear on dissection: "the removal of the integuments exposes the exterior investment of the hernial tumour, continuous with the margins of the ring, and formed of tendinous fibres, from the aponeurosis, the cremaster muscle, &c. This is connected by cellular substance with the proper hernial sac, formed of the peritonæum. This production of the peritonæum passes through the ring of the external oblique, and then goes upwards and outwards. Behind and above the ring, the inferior margin of the obliquus internus and transversalis crosses the neck of the sac. When these muscles are reflected towards the linea alba, the fascia, ascending from Poupart's ligament, and forming the upper opening of the ring, is exposed, and the epigastric artery is discovered emerging from the inner side of the neck of the hernial sac, (*Camper*;) which, at this precise point, becomes continuous with the peritonæum, lining the abdomen. The removal of the hernial sac will disclose the course of the spermatic cord in its descent towards the testicle; and when this is also elevated, the first part of the course of the epigastric artery, and its origin from the iliac trunk, are laid open." (*Lawrence on Hernia, p. 115, 116*)

In females, the round ligament of the uterus bears the same relation to the tumour, as the spermatic cord in males. In the former subjects, bubonocoeles are uncommon. Mr. Lawrence had a very rare instance pointed out to him, in which a bubonocoele in a female was situated on the inner side of the epigastric artery.

MARKS OF DISCRIMINATION BETWEEN SOME
OTHER DISEASES AND INGUINAL HERNIE.

The disorders in which a mistake may possibly be made, are the *Cirsocele*, *Bubo*, *Hydrocele* and *Hernia Humoralis*, or *Inflamed Testicle*.

For an account of the manner of distinguishing the first complaint from a bubonocoele, see *Cirsocele*.

"The circumscribed incompressible hardness, the situation of the tumour, and its being free from all connexion with the spermatic process, will sufficiently point out the first, at least while it is in a recent state; and when it is in any degree suppurated, he must have a very small share of the *tactus eruditus*, who cannot feel the difference between matter, and either a piece of intestine, or omentum.

"The perfect equality of the whole tumour, the freedom and smallness of the spermatic process above it, the power of feeling the spermatic vessels and the vas deferens in that process, its being void of pain upon being handled, the fluctuation of the water, the gradual formation of the swelling, its having begun below and proceeded upwards, its not being affected by any posture or action of the patient, nor increased by his coughing or sneezing, together with the absolute impossibility of feeling the testicle at the bottom of the scrotum, will always, to an intelligent person, prove the disease to be a hydrocele." Mr. Pott, however, allows, that there are some exceptions, in which the testicle cannot be felt at the bottom of the scrotum in cases of hernia. In recent bubonocoeles, while the hernial sac is thin, has not been long, or very much distended, and the scrotum still preserves a regularity of figure, the testicle may almost always be easily felt at the inferior and posterior part of the tumour. But, in old ruptures, which have been long down, in which the quantity of contents is large, the sac considerably thickened, and the scrotum of an irregular figure, the testicle frequently cannot be felt, neither is it in general easily felt in the *congenital hernia* for obvious reasons." (*Pott*.)

"In the *hernia humoralis*, the pain in the testicle, its enlargement, the hardened state of the epididymis, and the exemption of the spermatic cord from all unnatural fulness, are such marks as cannot easily be mistaken; not to mention the generally preceding gonorrhœa. But, if any doubt still remains of the true nature of the disease, the progress of it from above downward, its different state and size in different postures, particularly lying and standing, together with its descent and ascent, will, if duly attended to; put it out of all doubt, that the tumour is a *true hernia*." (*Pott*.)

When an inguinal hernia does not descend through the abdominal ring, but only into the canal for the spermatic cord, it is covered by the aponeurosis of the external oblique muscle, and the swelling is small and undefined.

Now and then, the testicle does not descend into the scrotum till a late period. The first appearance of this body at the ring, in order to get into its natural situation, might be mistaken for that of a hernia, were the surgeon not to pay attention to the absence of the testicle from the scrotum, and the peculiar sensation occasioned by pressing the swelling.

OPERATION FOR THE STRANGULATED INGUINAL HERNIA, OR BUBONOCELE.

This consists in dividing the integuments; dissecting down to the sac, and opening it; removing the stricture; and replacing the protruded viscera.

The external incision should begin an inch above the external angle of the ring, and extend over the middle of the tumour to its lower part. The advantage of beginning the wound so high, is to obtain convenient room for the incision of the stricture. By this first cut, the external pudic branch of the femoral artery may be divided; it crosses the hernial sac near the abdominal ring, and sometimes bleeds so freely, that it should be immediately tied. In general, however, a ligature is unnecessary.

When carrying this incision low down, we should always bear in mind the caution given by Camper, that there is a possibility of dividing the spermatic vessels, should they happen to be situated, as they sometimes are, in front of the hernia. The division of the integuments brings into view the fascia, which is sent off from the tendon of the external oblique muscle, and covers the hernial sac.

The layers of tendinous fibres, cellular substance, &c. intervening between the skin and sac, should be carefully divided, one after another, with the knife and dissecting forceps, taking care to incline the edge of the instrument horizontally, for fear of cutting too deeply at once, and injuring the viscera contained in the sac.

After making a small opening through a part of the fascia covering the sac, some advise introducing a director, and laying it open upward and downward as far as the tumour extends. The same manner of proceeding, they next recommend in regard to the cremaster muscle. Thus the sac becomes completely exposed. When this method is followed, Mr. A. Cooper advises the incisions not to be carried upward, nearer, than one inch, to

the abdominal ring, for reasons which will be presently explained.

However it may be rationally doubted, whether there is any good in these regular and successive divisions of the whole length of the coverings of the sac: and it is certain, that they protract the operation very much. As the grand object, after dividing the skin, is to make a small opening into the sac, sufficient for the introduction of a director, dissecting down at one particular place, answers every purpose, and enables us, in the end, to lay open the whole of the sac and its coverings in the shortest time. Let the operator only take care to raise the successive layers of fibres with the forceps, and divide the apex of each elevated portion with the knife held horizontally. As there is commonly a quantity of fluid in the sac, and it gravitates to the lower part, to which place the intestine seldom quite descends; this is certainly the safest situation for making the first opening into the sac. The operator, however, relying on the presence of such fluid, should not cut too boldly; sometimes none at all is found, and the viscera are in immediate contact with, nay, adherent to, the inner surface of the sac.

The circular arrangement of the vessels of a piece of intestine, and its smooth polished surface, sufficiently distinguish it from the hernial sac, which has a rough cellular surface, and is always connected with the surrounding parts. (*Lawrence, p. 125.*)

We have mentioned, that Mr. A. Cooper only advises cutting the fascia, and other coverings of the sac, under the skin, to within an inch of the abdominal ring: he also recommends, of course, limiting the division of the sac itself to the same extent. His reasons, for this practice, are to avoid making the closure of the wound more difficult, and to lessen the danger of peritoneal inflammation.

Having laid open the hernial sac, with a probe-pointed bistoury, guided on a director, or the fore-finger, introduced into the opening, which is made at the lower part of the sac, the next desideratum is to divide the stricture, unless the viscera admit of being easily reduced, without such an incision being made, as occasionally happens.

From the anatomical account we have given of the bubonocoele, it appears, that the stricture may either be situated at the abdominal ring, and be formed by the margins of this opening, or else at the inner aperture of the canal, about one inch and a half, in a direction upward and outward, from the outer opening in the tendon of the external oblique

muscle. This latter strangulation is caused by the semicircular edge of the transversalis muscle and its tendon, which pass over the neck of the hernial sac, and by a fascia, arising from Poupart's ligament, the semicircular border of which passes under this part of the sac.

The common, and probably the best, practice is to divide the hernial sac, together with the stricture. When this is situated at the abdominal ring, the surgeon is to introduce the end of a director a little way into the neck of the sac, within the aperture in the tendon, and with a probe-pointed bistoury, guided on the latter instrument, he is to cut the stricture upward and outward, or else directly upward; a manner, which Mr. A. Cooper recommends because it is applicable to all cases, even those less frequent ones, in which the hernia protrudes on the inner side of the epigastric artery. This vessel, as we have already explained, commonly runs upward round the inner side of the neck of the sac; so that cutting the stricture upward and inward would be very apt to divide it.

Cutting upward and outward is, in ordinary cases, perfectly safe; and is only objectionable in a few occasional instances, in which the hernia descends on the inner side of the artery. Mr. A. Cooper's rule of always cutting in one direction, viz. upward, which is proper in every instance, is in my opinion well worthy of universal adoption. No more of the parts, forming the stricture, should be cut, than is just sufficient for allowing the protruded viscera to be reduced, without bruising or otherwise hurting them. The middle of the upper margin of the ring is the safest place for making the necessary incision.

Mr. A. Cooper, in his late work on the Inguinal Hernia, advises a mode of dividing the stricture, considerably different from the usual method. He directs the finger of the operator to be introduced into the sac, (which in his plan, we know is left undivided for the space of one inch below the ring.) When the stricture is felt, a probe-pointed bistoury is to be conveyed over the front of the sac into the ring (between the two parts,) and the latter only is then to be divided, in the direction upward, opposite the middle of the neck of the sac, and to an extent just sufficiently to allow the protruded parts to be returned into the abdomen, without their being hurt. The two chief advantages, which Mr. A. Cooper imputes to this method, are, that the danger of peritoneal inflammation will be less, and that the epigastric artery, if wounded, would not bleed into the abdomen. I am of

opinion, that what Mr. Lawrence has remarked, concerning this proposal, is exceedingly judicious: "An accurate comparative trial of both methods would be necessary, in order to determine the weight of the first reason. The second circumstance cannot be a matter of any importance, if we cut in such a direction as to avoid the risk of wounding the artery. Many circumstances present themselves as objections to this proposal. The manœuvre itself, although perhaps easy to the experienced hand of such an able anatomist as Mr. C. would, I am convinced, be found highly difficult, if not impracticable, by the generality of surgeons. This difficulty arises from the firm manner, in which the sac and surrounding parts are connected, we might almost say, consolidated together. The experience of Richter (*Traité des Hernies*, p. 118) shews, that this objection is founded in reality. He once tried to divide the ring, without cutting the sac, but he found it impracticable. If the stricture is so tight, as to prevent the introduction of the finger, there must be great danger of wounding the protruded parts. The practice would still be not advisable, even if it could be rendered as easy as the common method of operating. Mr. C. leaves an inch of the sac, below the ring, undivided; thus a bag remains ready to receive any future protrusion, and the chance of a radical cure is diminished. It would be better to follow the advice of Richter, and scarify the neck of the sac, in order to promote an adhesion of its sides. He has found this practice so successful in accomplishing a radical cure, that he advises (p. 191.) its employment in every operation for strangulated hernia." (*Treatise on Hernia*, p. 144.)

If the stricture should be felt to exist at the inner opening of the canal for the spermatic cord, Mr. A. Cooper advises the operator to introduce his finger into the sac, as far as the stricture, and then to insinuate a probe-pointed bistoury, with the flat part of its blade turned towards the finger, between the front of the sac and the abdominal ring, till it arrives under the stricture, formed by the lower edge of the transversalis and obliquus internus. Then the edge of the instrument is to be turned forward, and the stricture cut in the direction upward. This plan of not cutting the neck of the sac, is liable to all the objections stated by Mr. Lawrence, in regard to the case, in which the strangulation takes place at the abdominal ring. It should be mentioned, that Mr. A. Cooper's bistoury is a very proper one for dividing the stricture, as it only has a

cutting edge to a certain distance from the point. Perhaps, on the whole, we may infer, that it is both most easy and advantageous to divide the neck of the sac, together with the stricture, whether this be situated at the ring, or more inward. In the latter case, cutting upward and outward would always be perfectly safe, because the hernia always protrudes on the outer side of the epigastric artery; but, as it is easiest for the memory to adhere to one rule, making the incision immediately upward is a very proper plan.

Room being made for the reduction of the protruded parts into the abdomen, by the division of the stricture, they are to be immediately returned, if sound, and free from adhesions. This object is considerably facilitated by bending the thigh. The intestines are to be reduced before the omentum, but, when a portion of mesentery is protruded, it is to be returned before either of the preceding parts. The intestine should always be reduced, unless it be found in a state of actual mortification. It often appears so altered in colour, that an uninformed person would deem it improper to return it into the abdomen. However, if such alteration should not amount to a real mortification, experience justifies the reduction of the part. Mr. A. Cooper has judiciously cautioned the operator not to mistake the dark chocolate-brown discolourations, for a state of gangrene. With these the protruded part is frequently found affected; and, as they generally produce no permanent mischief, they ought to be carefully discriminated from the black-purple, or lead-coloured spots, which usually precede mortification. To determine whether a discoloured portion of intestine be positively mortified, some recommend pressing forward the blood contained in the veins, and, if they fill again, it is looked upon as a proof, that the bowel is still possessed of life.

In returning a piece of intestine into the abdomen, the surgeon should first introduce the part, nearest the ring, into this aperture, and hold it there till another portion has succeeded it. This method is to be followed up, till the whole of the protruded bowel is reduced.

Writers on surgery cannot too severely reprobate the employment of any force, or violence, in endeavouring to return the contents of a hernia in the operation: a method the more pernicious, because such parts are commonly more or less in a state of inflammation. It is always more judicious to enlarge the stricture, than to pinch and bruise the bowel in trying to get it through an opening which is too small. Distention of the intestine

sometimes prevents the reduction: but, the bowel can then be generally returned as soon as its contents are first compressed into the part of the intestinal canal within the stricture. It is better, however, to dilate the strangulation a little more, than to use any force in trying to get the intestine back into the abdomen in the manner just suggested.

Reduction is sometimes impeded by the protruded parts adhering to each other, or to the hernial sac. The intestines are not often found very firmly adherent together. The omentum and inside of the sac are the parts, which are most subject to become intimately connected by adhesions. The fingers will commonly serve for breaking any recent slight adhesions which may have taken place between the intestines and inside of the hernial sac. When these adhesions are firm, and of long standing, they must be cautiously divided with the knife; an object, which can be most easily and safely accomplished, in case they are long enough to permit the intestine to be elevated a little way from the surface of the sac. But, provided their firmness and shortness keep the external coat of the bowel and inner surface of the sac in close contact, the greatest care is requisite in separating the parts with a knife, so as to avoid wounding the intestine. In doing this, the most prudent and safe method, is not to cut too near the bowel, but rather to remove the adherent parts of the sac, and return them with the intestine into the abdomen. Every preternatural connexion should always be separated, before the viscera are reduced: Mr. A. Cooper mentions, that a fatal obstruction to the passage of the intestinal matter has arisen from the mere adhesion of the two sides of a fold of intestine together. (P. 31.) When the adhesions, which prevent reduction, are situated about the neck of the sac, so as to be out of the operator's view, it is the best to make the wound through the skin and abdominal ring somewhat larger, so as to be able to separate the adhesions with more safety.

Having reduced the parts, the operator should introduce his finger, for the purpose of being sure that they are fairly and freely returned into the abdomen, and no longer suffer constriction, either from the inner opening, from the ring, or the parts just within the cavity of the peritonæum.

TREATMENT OF THE OMENTUM.

In an entero-epiplocele, this part, if healthy and free from gangrene, is to be reduced after the intestine. When, how-

ever, it is much diseased, thickened, and indurated, as it frequently is found to be, after remaining any considerable time in a hernial sac, the morbid part should be cut off. Its reduction, in this circumstance, would be highly improper, both because an immediate enlargement of the wound would be necessary, in order to be able to put the diseased mass back into the abdomen, and because, when reduced, it would, in all probability, excite inflammation of the surrounding parts, and bring on dangerous symptoms. (See *Hey*, p. 172.)

The diseased omentum should always be cut off with a knife; and, if any of its arteries should bleed, they ought to be taken up with a tenaculum, and tied separately with a small ligature. An unreasonable apprehension of hemorrhage from the cut end of the omentum has led many operators to put a ligature all round this part, just above the diseased portion, which they are about to remove. This practice cannot be reprobated in terms too severe; for, a frequent effect of it is to bring on a fatal inflammation, and even mortification of the omentum, extending within the abdomen, as high as the stomach and transverse arch of the colon. Mr. A. Cooper has remarked with great truth, that it is surprising, this custom should ever have prevailed. The very object of the operation is to extricate the omentum from its strangulated state, arising from the pressure of the surrounding tendon, and no sooner has this been done, than the surgeon includes it in a ligature, which produces a more perfect constriction, than that which existed before the operation was undertaken.

"When the omentum has suffered strangulation for a few days (says Mr. Lawrence), it often becomes of a dark red, or livid colour; and there is an appearance, on cutting it, as if some blood were extravasated in its substance. This, I believe, is the state, which surgeons have generally described under the term of gangrene." (P. 167.)

When cut in this state, it does not bleed. I need hardly observe, that the dead part must be amputated, and never reduced. Some have advised leaving the omentum in the wound, especially in cases of old hernia, in which it has been a long while protruded. Hey mentions cases, shewing that granulations form very well, and the wound becomes firmly healed, when this plan is followed. (P. 180, &c.) Every one, however, will acknowledge the truth of what Mr. Lawrence says on this subject. The method "is attended with no particular advantage, but certainly ex-

poses the patient to the possibility of ill consequences. The omentum, left in the wound, must be liable to injury, inflammation, or disease; and hence arises a source of danger to the patient. Unnatural adhesions, formed by this part, have greatly impaired the functions of the stomach. Cases are recorded, where the unfortunate patient has never been able to take more than a certain quantity of food, without bringing on instant vomiting: and even where it has been necessary for all the meals to be taken in the recumbent position, with the trunk curved, and the thighs bent. (*Gunz*.) To avoid the possibility of such afflicting consequences, we should, after removing any diseased portion, carefully replace the sound part of the omentum in the abdominal cavity." (*Treatise on Hernia*, p. 181.)

TREATMENT, WHEN THE INTESTINE IN THE SAC HAS MORTIFIED.

Sometimes, on opening the hernial sac, the intestine is found to be in a gangrenous state, although the occurrence could not be previously known, owing to the integuments and the hernial sac itself not being affected with the same mischief. In ordinary cases, however, both the skin and sac become gangrenous at the same time with the contents of the hernia. The tumour, which was before tense and elastic, now becomes soft, doughy, emphysematous, and of a purple colour. Sometimes the parts now become spontaneously reduced; but, the patient only survives a few hours.

Mr. A. Cooper has accurately remarked, that, in other instances, the skin, covering the swelling, sloughs to a considerable extent, the intestine gives way, and, as the feces find vent at the wound, the symptoms of strangulation soon subside. When the patient continues to live in these circumstances, the living part of the intestine becomes adherent to the hernial sac, the sloughs separate and come away, and thus an artificial anus is established, through which the feces are commonly discharged, during the remainder of life. (See *Anus, Artificial*.)

However, though when the patient survives the mortification of an intestinal hernia, he commonly obtains the blessings of life only combined with the loathsome affliction of an artificial anus; yet, things sometimes take a still more prosperous course; the feces gradually resume their former rout to the rectum, and, in proportion as the artificial anus becomes unnecessary, it is shut up. Many instances of this sort have fallen under my own observation in St. Bartholomew's

hospital. The chance of a favourable event is much greater in some kinds of hernia, than in others. When the strangulation only includes a part of the diameter of the gut, the feces are sometimes only partially discharged through the mortified opening. This quantity lessens, as the wound heals, and the patient gets perfectly well. (*Louis; Mem. de l'Acad. de Chir. Tom. 3.*) A small gangrenous spot, or two, may end in the same manner. Mortification of the cæcum and its appendix, in a hernial sac, has happened several times, without much disturbing the usual course of the feces to the anus, and the patients have very soon recovered. (*Meil. Obs. and Inq. Vol. 3, p. 162, &c.*)

The grand thing, on which the establishment of the continuous state of the intestinal canal depends, in all these cases, is the adhesion, which the living portion of the bowel, adjoining the mortified part, contracts with the peritonæum all round. In this manner, the escape of the contents of the bowels into the cavity of the peritonæum becomes in general completely prevented. When the intestine has not already burst, the stricture should be divided; an opening made in the mortified part to let out the feces, and very mild purgatives and glysters administered. (*Lawrence, p. 186.*)

It is an observation of Mr. A. Cooper's, that the degree of danger, attending an artificial anus, depends on the vicinity of the sphacelated part of the intestinal canal to the stomach. Thus, if the opening be in the jejunum, there is such a small extent of surface for absorption, between it and the stomach, that the patient dies of inanition.

Let us now suppose, that the mortified state of the intestine has only been discovered, after laying open the hernial sac in the operation. The mischief may only consist of one, or more spots; or of the whole diameter of the protruded bowel. In the first case, the proper practice is to divide the stricture, and return the intestine into the abdomen, with the mortified spots towards the wound. Mild purgatives and glysters are then to be exhibited. The most favourable mode, in which a case of this kind ends, is, when the intestinal matter gradually resumes its natural course, after being either partly, or entirely discharged from the wound. But, sometimes, an artificial anus continues for life.

The repeated observations of modern surgeons have now decided, that no ligature, passed through the mesentery, to keep the gangrenous part of the bowel near the wound, is at all necessary. The

parts, in the neighbourhood of the ring, have all become adherent together, in consequence of inflammation, at the same time, that the parts in the hernial sac mortify; and, of course, the partially gangrenous bowel, when reduced, is mechanically hindered, by these adhesions, from slipping far from the wound. Desault and De la Faye, both confirm the fact, that the intestine never recedes far from the ring; and, even were it to do so, the adhesions, which it soon contracts to the adjacent surfaces, would, as Petit has explained, completely circumscribe any matter, which might be effused, and hinder it from being extensively extravasated among the convolutions of the viscera. (*Mem. de l'Acad. de Chir. Tom. 1 and 2.*)

Mr. Lawrence, in his late very valuable Treatise on Hernia, has clearly shewn the impropriety of sewing the ends of the intestinal canal together, introducing one within the other, supported by a cylinder of isinglass, &c. put in their cavity, in those cases, in which the whole circle of the intestine has mortified, and been cut away, as is advised by the majority of writers. "By drawing the intestine out of the cavity, in order to remove the dead part, the adhesion behind the ring, on which the prospect of a cure chiefly depends, must be entirely destroyed; and new irritation and inflammation must be unavoidably produced, by handling and sewing an inflamed part."—(P. 199.)

Instead of such practice, this gentleman very judiciously recommends dilating the stricture, and leaving the subsequent progress of the cure entirely to nature. The sloughs will cast off, and the ends of the gut are retained by the adhesive process in a state of apposition to each other, the most favourable for their union. Thus, there is a chance of the continuity of the intestinal canal becoming established again.

However, in recent wounds of the abdomen, attended with a protrusion of a portion of the intestine, cut completely across, the bowel is as yet neither inflamed, nor adherent to the vicinity of wound in the peritonæum, so that, in these cases, it may be proper practice to connect the ends together, (as advised in the article *Abdomen, Wounds of the Intestines*;) by means of a few stitches with silk, or thread, and a small sewing needle; and to confine the wounded part of the intestine, near the breach in the peritonæum, until adhesions have had time to form.

Mr. A. Cooper has recommended this mode of proceeding in cases of hernia, attended with mortification of the whole

diameter of the bowel; but, for reasons, already stated, and many facts, referred to in Mr. Lawrence's work, it is to be hoped, that the plan of sewing the intestines in these cases will be for ever abandoned.

OPERATION FOR VERY LARGE INGUINAL HERNIE.

When the tumour is of very long standing, is exceedingly large, perhaps extending half way down to the knees, and its contents have never admitted of being completely reduced, the indication is to divide the stricture, provided a strangulation takes place; but without laying open the hernial sac, or attempting to reduce the parts.

The reasons, against the common plan of operating, under such circumstances, are, the difficulty of separating all the old adhesions; the hazardous inflammation, which would be excited by laying open so vast a tumour, and the probability that parts, so long protruded, might even bring on serious complaints, if reduced. J. L. Petit, and afterwards, Dr. Monro, advised the sac not to be opened in operating on certain cases. (See *Mal. Chir. Tom. 2, p. 372. Description of Bursæ Mucosæ.*)

OPERATION FOR THE HERNIA, WHEN IT IS SO SMALL THAT IT DOES NOT PROTRUDE EXTERNALLY THROUGH THE RING.

In this kind of case, there is little appearance of external tumour; consequently, the disease is very apt to be overlooked by the patient and surgeon, and some other cause assigned for the series of symptoms. The manner of operating, in this form of the disease, differs from that in the common scrotal hernia; the incision is to be made parallel to the direction of the spermatic cord, and the stricture will be found at the internal ring. (*A. Cooper on Inguinal Hernia.*)

TREATMENT AFTER THE OPERATION.

Evacuations from the bowels should be immediately promoted by means of glysters, oleum ricini, or small doses of any of the common salts, dissolved in peppermint-water. For some time, the patient must only be allowed a low diet. When symptoms of inflammation of the bowels and peritonæum threaten the patient, general bleeding, leeches applied to the abdomen, fomentations, the warm bath, blisters, doses of the oleum ricini, and glysters, are the means deserving of most dependence, and should be resorted to,

without the least delay. When all the danger of peritoneal inflammation is past, and the patient is very low and weak, bark, wine, cordials, and a generous diet, must be directed. The effervescing saline draught, with opium, is the best medicine for quieting sickness, after the operation. Opium and cordials are the most eligible for checking diarrhœa. As the operation does not usually prevent the parts from becoming protruded again, a truss must be applied before the patient gets up again, and worn constantly afterwards.

PROPOSALS FOR THE RADICAL CURE OF THE BUBONOCELE.

We shall just mention the principal plans for this purpose; some of them are perfectly absurd and cruel; others may deserve more extensive trial. Of castrating the patient, applying caustic, or of the operation of the punctum aureum, with this view, I need only say, that they are barbarous, and not at all adapted for the attainment of the desired end. A description of these methods may be found in Paré, Wiseman, &c.

The old operation, termed the *royal stitch*, seems one of the most justifiable. It consisted in putting a ligature, under the neck of the hernial sac, close to the abdominal ring, and then tying it, so as to produce an obliteration of the pervious state of the part, by the adhesive inflammation thus excited. An incision, about two inches long, would be quite large enough for getting at the neck of the sac, which must next be separated from the parts covering it on each side, with a few sweeps of the knife. A single ligature might then, with the aid of a needle, be passed immediately under it, and between it and the spermatic vessels, close to the ring, and then firmly tied, just as surgeons tie an artery. This operation is applicable to reducible hernia. One would not expect *a priori*, that any dangerous constitutional symptoms would be likely to follow so small a wound, or making a ligature on a part of such little importance as a hernial sac. After performing the common operation for the relief of a strangulated bubonocèle, might not this opportunity be taken, to learn whether a radical cure would not more frequently be accomplished, than is at present the case?

The royal stitch, performed in this manner, has actually been attended with success. (*Heister, Vol. II.*) The umbilical rupture was cured by Saviard, on similar principles; and Desault radically

cured nine cases of the exomphalos in children, by tying the hernial sac.

Schmucker cured two irreducible ruptures, free from strangulation, by cutting away the body of the sac, after tying its neck. *Chirurgische Wahrnehmungen, Vol. 2.*) Mr. A. Cooper, found cutting away the sac alone insufficient, in one case.

Dissecting away the whole hernial sac, or even laying it open, must be a formidable operation compared with the simple mode above related. Such severe proceedings would also be quite useless, if the hernia were reducible, and the neck of the sac could be rendered impervious by the ligature. Perhaps the cases recorded by Petit, Sharp, Acrell, &c. against attempting a radical cure, have no real validity against the royal stitch done in the simple way above described, as none of these surgeons operated in this manner.

Richter recommends scarifying the neck of the sac, with the view of producing an adhesion of its sides to each other; a plan, which he says, he has found very successful. It certainly seems free from danger; but perhaps not more so than tying the part, and one, would expect, less likely to be always successful.

From the account we have given of the anatomy of the bubonocoele, it is obvious, however, that all these methods could only obliterate the sac as high as the ring, not more inwardly to the inner opening. Hence there would still remain a certain portion of the entrance of its cavity open for the descent of the viscera.

CRURAL, OR FEMORAL HERNIA.

Verheyen, who wrote in 1710, first demonstrated the distinct formation of crural hernia, which was before generally confounded with bubonocoele.

The parts composing this kind of hernia, are always protruded under Poupart's ligament, and the swelling is situated towards the inner part of the bend of the thigh. The rupture descends on the inside of the femoral artery and vein, between these vessels and the os pubis. Females are particularly subject to this kind of rupture, in consequence of the great breadth of their pelvis, while in them the inguinal hernia is rare. It has been computed, that nineteen out of twenty married women, afflicted with hernia, have this kind; but, that not one out of a hundred unmarried females, or out of the same number of men, have this form of the disease. (*Arnaud.*)

"The crural hernia," says Scarpa, "is frequently observed in women, who have had several children; it very sel-

dom afflicts young girls; and still more rarely men. In the latter, the viscera can more easily escape through the inguinal ring, by following the spermatic cord, than they can descend along the crural vessels, and raise the margin of the aponeurosis of the external oblique muscle, that forms the crural arch. In women, an opposite disposition prevails, in consequence of the smallness of the inguinal ring, which, in them, only gives passage to the round ligament of the uterus, and besides is situated lower down, and nearer the pubes, than it is in men, whilst, on the contrary, the crural arch is more extensive, by reason of the wider form of the pelvis. Morgagni expressly says, that he has never met with the crural hernia in the dead body of any male subject. *Mihi ut verum fatear, nondum nisi in feminis accidit ut eam viderem.* (*De Sed. et caus. morb. Epist. 34—15.*) Camper gives us to understand almost the same thing. (*Icones Herniarum, in Præfat.*) Hévin, often operated for this kind of hernia in females, but only once in the male subject. (*Pathol. et Therap. p. 406.*) Sandifort and Walter have both seen but a single instance of it in the dead body of the male subject. (*Obs. Anat. Pathol. cap. 4, p. 72. Sylloge comment. anat. p. 24. obs. 21.*) Arnaud himself, to whom modern surgery is highly indebted for many important precepts on the operation for the strangulated crural hernia in both sexes, candidly confesses, that he never had an opportunity of dissecting a hernia of this kind in the male subject." (*Scarpa Traité des Hernies, p. 201.*)

Scarpa happened to have at his disposal the dead body of a man affected with a crural hernia, and, he availed himself of the opportunity of examining the parts with the utmost care. He first injected the blood-vessels; he afterwards attentively dissected all the parts concerned in the disease, and, in his valuable treatise, he has published an exact description of all the particulars, accompanied with an engraving. Plate 8.

But, though the occasional occurrence of the crural hernia in men is fully proved, it is chiefly in women, that this form of disease is met with.

According to the observations of Scarpa, and all the best modern writers upon surgery, the crural hernia forms, both in the male and female subject, in the cellular substance, which accompanies the crural vessels below Poupart's ligament. The swelling follows the internal side of those vessels, and gradually descends into the fold of the thigh, between the sartorius, gracilis, and pectinus muscles. "Many surgeons believe, (says Scarpa)

that the hernial sac, and the intestines, which it contains, are ordinarily situated above the crural vessels and trunk of the vena saphena, and sometimes between these vessels and the anterior superior spine of the ilium. But, as far as my knowledge extends, this assertion is not supported by a single accurate description of a crural hernia in the early stage. It is true, that when the tumour has in time acquired a large size, and its fundus is inclined in a parallel manner to the fold of the thigh, it partly or entirely covers the crural vessels, and even the crural nerve, as Walter says he once observed. (*Sylloge comment. anat. p. 24.*) But, it is not thence to be concluded, that the tumour in the beginning descended over the crural vessels, much less betwixt them and the anterior superior spinous process of the ilium. Neither must it be imagined, that the neck of the hernial sac becomes removed from the inner to the outer side of these vessels. If these two cases ever happen, they must be very rare; and the best authors, who have treated of the crural hernia, concur in stating, that in performing the operation, they have constantly found the viscera situated on the inside of the crural vessels, but never on their outside. Even when the tumour, after acquiring a considerable size, was situated transversely over the crural vessels, the neck of the hernial sac has always been found upon their inner side, that is to say, between them and the pubes. Le Dran, (*Observ. de Chir. Tom. 2, p. 2.*) La Faye, (*Cours. d'Opérations de Dionis, p. 358.*) Petit, (*Œuvres Posthumes, Tom. 2, p. 219.*) Morgagni, (*De Sed. et Caus. Morb. epist. 34—15.*) Arnaud, (*Mém. de Chir. Tom. 2, p. 768.*) Gunz, (*De Herniis libellus, p. 78.*) Bertrandi, (*Trattato delle Operazioni, Tom. 1, annot. p. 218.*) Pott, (*Chirurg. Works, Vol. II, p. 152.*) Desault, (*Traité des Mal. Chirurg. p. 191—195.*) B. Bell, (*A System of Surgery, Vol. I, p. 387.*) Richter, (*Traité des Hernies, chap. 34.*) Nessi, (*Institut. Chirurg. Tom. 2, p. 198.*) Lassus, (*Med. Oper. Tom. 1, p. 198.*) and many other writers, all concur upon this point. In support of their opinion (says Scarpa) I could cite a great number of cases of my own, which I have collected either in operating on several individuals for crural hernia, or in dissecting the same kind of hernia in the bodies of many female subjects, and in that of the man, from whom I have taken the plate. Lastly, also, having had an opportunity of dissecting in a female an enormous crural hernia, which descended one-third of the way down the thigh, I observed, that the neck of the sac did not encroach at all

upon the crural vessels, but lay entirely on their inner side." (*Scarpa, Traité des Hernies, p. 203—206.*)

The situation of the tumour makes it liable to be mistaken for an enlarged inguinal gland; and many fatal events are recorded to have happened from the surgeon's ignorance of the existence of the disease. A gland can only become enlarged by the gradual effects of inflammation; the swelling of a crural hernia comes on in a momentary and sudden manner, and, when strangulated, occasions the train of symptoms already described in our account of the inguinal hernia, which symptoms an enlarged gland could never occasion. Such circumstances seem to be sufficiently discriminative; though the feel of the two kinds of swelling, is often not of itself enough to make the surgeon decided in his opinion. A femoral hernia may be mistaken for a bubonocoele, when the expanded part of the swelling lies over Poupart's ligament. As the taxis and operation for the first case ought to be done differently from those for the latter, the error may lead to very bad consequences. The femoral hernia, however, may always be discriminated, by the neck of the tumour having Poupart's ligament above it. In the bubonocoele, the angle of the pubes is behind and below this part of the sac; but, in the femoral hernia, it is on the same horizontal level, and a little on the inside of it. (*Lawrence, p. 218.*)

In the male subject, "the crural hernia, in the early stage, (says Scarpa) is situated so deeply in the bend of the thigh, that it is difficult, even in the thinnest persons, to feel its neck, and in examining its circumference with the extremity of the finger, the tendinous margin of the opening, through which the parts are protruded, can only be perceived with considerable difficulty. On the contrary, the inguinal hernia, however small it may be, is always less deeply situated: it is about half an inch above the bend of the thigh. In carrying the finger round its neck, the tendinous margin of the inguinal ring can be easily felt at its circumference; and at the posterior part of the small tumour, the cord composed of the spermatic vessels is distinguishable. When the crural hernia has acquired a considerable size, its neck is always deeply situated in the bend of the thigh; but, its body and its fundus have assumed an oval form, and their great diameter is situated transversely in the bend of the thigh. Whatever may be the size of the inguinal hernia, it always presents a tumour of a pyramidal form, the base or fundus of which, far from being

directed towards the ilium, follows exactly the direction of the spermatic cord, and descends directly into the scrotum. It may also be added, that, besides the symptoms, common to all hernial swellings, the crural hernia, when it has attained a certain size, presents some others, which are peculiar to it, such as a sense of stupor and heaviness in the thigh, and œdema of the leg, and even, of the foot of the same side.

"In women, however, it is less easy to distinguish the crural hernia from the inguinal. In fact, the absence of the spermatic cord, and the nearer situation of the ring to the crural arch, may easily occasion a mistake. Sometimes, a woman may even be supposed to have a double crural hernia of the same side, whilst, of these two distinct, though neighbouring herniæ, one may be inguinal, and the other crural. Arnaud (*Mém. de Chir. Tom. 2, p. 605.*) relates an instance of such a mistake." (*Scarpa, Traité des Hernies, p. 207—208.*)

This interesting writer takes occasion to observe further, upon this part of the subject, that the portion of the inferior pillar of the abdominal ring, which separates this opening from the internal and inferior angle of the crural arch, is so slender in women, that it is sometimes hard to distinguish the crural from the inguinal hernia, which is not the case in male patients.

Until very lately, the stricture, in cases of femoral hernia, was always supposed to be produced by the lower border of the external oblique muscle, or, as it is termed, Poupart's ligament. A total change of surgical opinion on this subject, has, however, latterly taken place, in consequence of the accurate observations first made in 1768, by Gimbernat, surgeon to the king of Spain. "In the crural hernia, (says he) the aperture through which the parts issue, is *not* formed by two bands, (as in the inguinal hernia) but it is a foramen almost round, proceeding from the internal margin of the crural arch (Poupart's ligament,) near its insertions into the branch of the os pubis, between this bone and the iliac vein; so that, in this hernia, the branch of the os pubis is situated more internally than the intestine, and a little behind; the vein, externally, and behind; and the internal border of the arch, before. Now it is this border which always forms the strangulation." (See *A new Method of Operating for the Femoral Hernia, by Don Antonio de Gimbernat, p. 6. Trans. by Beddoes.*)

Mr. Hey, who attempted to describe some anatomical circumstances, relative

to the femoral hernia, and wrote subsequently to Gimbernat, has certainly rather obscured, than thrown any light upon this part of the subject. The inconsistencies and perplexities of his description, have been clearly explained by M. Lawrence, to whose treatise I shall refer the reader. The latter gentleman makes the ligament described by Gimbernat, perfectly intelligible, in a few words: when Poupart's ligament approaches the pubes, he states that it becomes suddenly broader; that it is fixed by this broad portion, along the whole length of the angle and crista of the pubes; that it has a rounded and strong anterior edge, a thin and sharp posterior margin; and that the former of these is nearer to the surface, while the latter is comparatively deeply seated. The breadth of this part varies, in different subjects: it is generally from three quarters of an inch to an inch. Sometimes, as Gimbernat has stated, it measures more than an inch. Dr. Monro has observed, that it is broader in the male than in the female subject; and, from this structure, he explains in part the more rare occurrence of this rupture in the male." (*P. 220.*)

The great utility of knowing, that it is this part, which produces the strangulation, in cases of femoral hernia, is immense; for we then know, that cutting the lower and outer border of the external oblique muscle, (in other words, Poupart's ligament) is quite erroneous. This proceeding is the more to be reprobated, because the lower pillar of the abdominal ring, in both sexes, will be divided by directing the incision upward, or upward and inward; and thus the abdominal and crural rings, are made into one common aperture, large enough to make the future occurrence of hernia very likely to happen. In the male, also, there is considerable danger of the spermatic cord being cut. Cutting Poupart's ligament obliquely outwards, is attended with still more danger; for the epigastric artery will be infallibly divided at its origin. With all these hazards, the cutting of Poupart's ligament is quite useless, unless the incision be carried on to the internal edge of the crural arch. (*Gimbernat, p. 16.*)

Mr. B. Bell, has the merit of having proposed the safest plan of cutting Poupart's ligament, before surgeons were aware of the part which really formed the strangulation: he introduced his finger below Poupart's ligament, between the ligament and the intestine, (an evident proof, says Gimbernat, very truly, that there was no strangulation there;) he then made a very superficial incision from above downwards, into the thickest

part of the ligament to its lower edge; and, without cutting quite through it, he continued his incision about an inch. He rested the back of the scalpel upon his finger, which served as a guide to the instrument, and, at the same time, as a defence to the intestine. The incision, however, having been continued for an inch, would, as Gimbernat remarks, inevitably cut the internal edge of the crural arch. Now, cutting this, only for a few lines, gives sufficient room for the easy reduction of the parts, and there is no necessity to touch the ligament, as it never occasions the strangulation.—(*Gimbernat, p. 27.*)

The iliacus internus muscle is covered by a thin fascia, called by Mr. A. Cooper, *fascia iliaca*. This is closely connected with the tendon of the psoas parvus, and is inserted into the posterior edge of Poupart's ligament, as far as where the crural vessels pass under this part. It is this fascia which prevents any protrusion of the viscera, on the outside of these vessels. But between the iliac vein, the thin posterior, deep-seated, edge of Poupart's ligament, and the os pubis, a space exists, at which the femoral hernia makes its descent. Sometimes, at this point is situated a lymphatic gland; sometimes only cellular substance.

The fascia lata is not inserted into the whole length of Poupart's ligament; that is, not nearer the pubes than the femoral vessels. Here it is continued over the pectineus muscle; consequently has no connexion with the thin edge of the crural arch, nor with Poupart's ligament opposite the space, left between the vein and that thin margin. (*Lawrence, p. 226.*)

Where the insertion of the fascia lata into Poupart's ligament ends, it forms what Mr. Burns of Glasgow calls the *falciform process*, the upper part of which is attached to the above ligament, while the lower proceeds further down the thigh. Its convexity faces the pubes. This anatomical connexion is one chief cause, why extending the thigh, and rotating it outward, should make the crural arch tense.

Gimbernat named the place where the femoral hernia protrudes the *crural*; Hey, the *femoral ring*.

The hernia, being situated in front of the pectineus, must of course be exterior to the fascia lata. In my opinion, surgeons are very much indebted to Mr. Lawrence for his able explanation of this fact. As for myself, I am candid enough to own that, until I read his clear and concise account of the anatomy of the crural hernia, I could never reap any accurate notions, concerning the relative

situations of the hernial sac and fascia of the thigh, from other more prolix works. This gentleman reminds us, however, that the particular crural hernia, contained in the sheath of the femoral vessels, lies under the fascia; p. 230. Mr. Lawrence describes, that, "the falciform process of the fascia lata, passes along the upper and outer part of the tumour. The iliac vein is placed on the outer side of the neck of the sac; the pubes is directly behind it; and the upper and inner parts are bounded by the thin posterior edge of Poupart's ligament." The falciform process seems to have some inferior share in producing the strangulation: the chief part of which is formed, as Gimbernat first pointed out, by the thin posterior edge of the crural arch.

The sac of the femoral hernia is exceedingly narrow at its neck; and, where its body begins, it becomes expanded in a globular form: the sac of the bubonocoele is generally of an oblong shape. The body of the sac of the femoral hernia, makes a right angle with the neck, by being thrown forward and upward, a circumstance very necessary to be known in trying to reduce the parts by the taxis.

The sac of the femoral hernia is covered by a kind of membranous expansion, consisting of condensed cellular substance, and named by Mr. A. Cooper, the *fascia propria*. According to this gentleman, another covering extends over the swelling, from the superficial fascia of the bend of the thigh. It is of infinite use to remember these circumstances in operating, lest one should think the hernial sac divided, when it is not so.

All late writers on hernia, have remarked how very small the aperture is, through which the viscera protrude in the femoral rupture; how much greater the constriction generally is, than in the bubonocoele; consequently, how much more rapid the symptoms are; how much less frequently the taxis succeeds; and how much more dangerous delay proves. (*See A. Cooper, Hey, Lawrence, &c.*)

Though the crural ring is almost always very small, yet in a few instances, in which the tumour is very large, and of long standing, it becomes very capacious, just as the opening often becomes, through which the inguinal hernia protrudes. Dr. Thomson, of Edinburgh, Mr. Hey, and Mr. Lawrence, have related examples of this kind.

The remarks already made, concerning the treatment of hernia, before having recourse to the knife, are all applicable to the present case, and we need not repeat them. In attempting to reduce the femoral hernia by the taxis, the surgeon

should recollect, however, that relaxing Poupart's ligament, and the femoral fascia, is of the highest consequence. Hence, the thigh should be bent, and rolled inwards. The pressure ought also to be first made downwards and backwards, in order to push the swelling off Poupart's ligament; and afterwards, the parts should be propelled upwards, so as to try to get them through the crural ring.

OPERATION FOR THE FEMORAL, OR CRURAL HERNIA.

Mr. A. Cooper says, "the incision of the integuments is to be begun an inch and a half above the crural arch, in a line with the middle of the tumour, and extended downwards to the center of the tumour below the arch. A second incision, nearly at right angles with the other, is next made, beginning from the middle of the inner side of the tumour, and extending it across to the outer side, so that the form of this double incision will be that of the letter T reversed." The angular flaps are, of course, to be next dissected off, and reflected.

The making of two incisions, however, is not deemed necessary by the majority of surgeons; and, in all the numerous operations I have seen performed by the surgeons of St. Bartholomew's Hospital, during a space of nearly fifteen years, I never knew them have any occasion to make any transverse wound. The division of the skin should begin about an inch above the crural ring, and be continued obliquely downwards and outwards. In this manner, we cut exactly over the place, where the incision of the stricture should be made.

"The first incision (says Mr. A. Cooper) exposes the superficial fascia, which is given off by the external oblique muscle, and which covers the anterior part of the hernial sac; but, if the patient is thin, and the hernia has not been long formed, this fascia escapes observation, as it is then slight and delicate, and adheres closely to the inner side of the skin. When this fascia is divided, the tumour is so far exposed, that the circumscribed form of the hernia may be distinctly seen; and a person, not well acquainted with the anatomy of the parts, would readily suppose that the sac itself was now laid bare. This, however, is not the case, for it is still enveloped by a membrane, which is the fascia, that the hernial sac pushes before it, as it passes through the inner side of the crural sheath. This membrane, the fascia propria, is to be next divided longitudinally from the neck to the fundus of the sac;

and if the subject is fat, an adipose membrane lies between it and the sac, from which it may be distinguished, by seeing the cellular membrane passing from its inner side to the surface of the sac.

"This is, in my opinion, the most difficult part of the operation; for the fascia propria is very liable to be mistaken for the sac itself; so that, when it is divided, it is supposed that the sac is exposed, and the intestine is laid bare: following upon this idea, the stricture is divided in the outer part of the sac, and the intestine, still strangulated, is pushed, with the unopened sac, into the cavity of the abdomen.

"The hernial sac being exposed, is to be next opened; and, to divide it with safety, it is best to pinch up a small part of it between the finger and thumb; to move the thumb upon the finger, by which the intestine is distinctly felt, and may be separated from the inner side of the sac; and then to cut into the sac, by placing the blade of the knife horizontally. Into this opening, a director should be passed, and the sac opened from its fundus to the crural sheath." (*A. Cooper on Crural and Umbilical Hernia.*)

Sometimes the contents of the hernia, thus exposed, admit of being returned, without the further use of the knife. When this object, however, cannot be readily done, the protruded parts should never suffer injury in repeating manual attempts; and it is safest to divide the stricture at once.

Gimbernat's method of dividing the stricture, in cases of femoral hernia, may be regarded as the most effectual, and safest. "Introduce, along the internal side of the intestine, a cannulated or grooved sound, with a blunt end, and a channel of sufficient depth. This is to be directed obliquely inwards, till it enter the crural ring, which will be known by the increased resistance; as also when its point rests upon the branch of the os pubis. Then suspend the introduction; and keeping the sound (with your left hand, if you are operating on the right side, and v. v.) firmly resting upon the branch of the os pubis, so that its back shall be turned towards the intestine, and its canal to the symphysis pubis, introduce gently with your other hand, into the groove of the sound, a bistoury, with a narrow blade and blunt end, till it enter the ring. Its entry will be known, as before, by a little increase of resistance. Cautiously press the bistoury to the end of the canal; and employing your two hands at once, carry both instruments close along the branch to the body of the

pubis, drawing them out at the same time. By this easy operation, you will divide the internal edge of the crural arch at its extremity, and within four or five lines of its duplicature; the remainder continuing firmly attached, by the inferior band, or pillar, of which it is the continuation. This simple incision being thus made, without the smallest danger, the internal border of the arch, which forms the strangulation, will be considerably relaxed, and the parts will be reduced with the greatest ease." (*Gimbernat*, p. 45, 46.)

Mr. A. Cooper recommends the stricture to be divided "obliquely inwards and upwards, at right angles to the crural arch."

After advising us to open the sac of a femoral hernia with particular care, on account of its being much thinner than that of a bubonocoele, and (as might be added) on account of its seldom containing any fluid, and often having no omentum in it covering the intestine, Mr. Hey remarks, "The stricture made upon the prolapsed parts is very great, as I have already observed; but if the tip of the finger can be introduced within the femoral ring, to guide the bubonocoele knife, a small incision (for the ring is narrow) will be sufficient to set the parts at liberty. If the tip of the finger cannot be introduced at the proper place, a director with a deep groove must be used instead of the finger; but I prefer the latter. The finger, or director, should not be introduced very near the great vessels; but on that side of the intestine or omentum which is nearest to the symphysis of the ossa pubis. *The incision may then be made directly upwards.* The surgeon must take especial care to introduce his finger or director within that part where he finds the stricture to be the greatest, which, in this species of hernia, is the most interior part of the wound." (*P.* 155.)

Gimbernat's mode is preferable to Mr. Hey's, because, were the operation done on a male, cutting directly upward would endanger the spermatic cord.

Mr. Lawrence has noticed, "an incision of the most interior part of the stricture is free from all danger, in the ordinary course of the vessels. But that variety, in which the obturator artery, arising from the epigastric, runs along the inner margin of the sac, seems to preclude us from cutting even in this direction. A mode of operating has been lately proposed, (*Edinb. Med. and Surg. Journal*, Vol. 2, p. 205.) with a view of avoiding this danger. We are directed to make an

incision through the aponeurosis of the external oblique muscle, just above the crural arch, and in a direction parallel to that part: to introduce a director under the stricture from this opening, and to divide the tendon to the requisite extent, by means of a curved knife, passed along the groove." (*Treatise on the Hernia*, p. 247.) For reasons which Mr. Lawrence states, this plan is certainly not altogether eligible, and, upon the whole, Gimbernat's method of cutting the stricture is the safest. Monro computes, that the obturator artery may arise from the epigastric, once in twenty-five or thirty subjects. But, allowing that it originates more frequently, it then does not always deviate from its usual course along the outside of the sac. Mr. A. Cooper says: "in all cases, which I have myself dissected, where this variety existed with crural hernia, the obturator has passed into the pelvis, on the outer side of the neck of the sac, entirely out of the reach of any danger of the knife." (*On Crural Hernia*, p. 21.) Mr. Lawrence concludes, that the comparative number of instances, in which it is found on the opposite side, cannot be more than one out of eight, or ten, and consequently it would only be liable to be wounded once in eighty or one hundred operations. (*P.* 252.)

It is observed by professor Scarpa, that "the round ligament of the uterus, in passing through the abdominal muscles, follows precisely the same track as the spermatic cord. It is equally situated behind Poupart's ligament, with the difference, that it does not become so distinct from the internal extremity of this ligament, as the spermatic cord does, because it has not so far to run, in order to get from that ligament to the inguinal ring, the latter opening being situated lower in the female, than the male subject. The round ligament, like the spermatic cord, also crosses the epigastric artery, before reaching the inguinal ring. And as the crural hernia always begins at the internal and inferior angle of the arch of this name, as well in the male as the female, it follows, that in the two sexes, the epigastric artery remains in its natural situation, and invariably corresponds to the external side of the neck of the crural hernia; whilst the spermatic cord, in man, and the round ligament, in women, pass over the extremity of the front of the neck of the hernial sac. In the operation for the crural hernia, in females, the incision of the neck of the hernial sac, and crural arch, when directed upward towards the linea alba, cannot wound the epigastric artery, which it is of the most consequence to avoid;

but it always divides, either totally or partially, the round ligament of the uterus, which cannot lead to any dangerous hemorrhage; for, out of the period of pregnancy, the arteries of the round ligament are very small; they are almost obliterated in women advanced in years; and in general they are quite capillary in the extremity of the ligament adjoining the ring. Hence, it cannot be surprising, that so many crural herniæ have been successfully operated upon in women, by cutting the hernial sac and crural arch directly upward, while not a single instance can be cited of such an incision being made in man without any ill consequence, although in both sexes, the epigastric artery may have been avoided in operating by this process." (*Scarpa, Traité, des Hernies p. 240.*)

In operating for the crural hernia in males, Scarpa recommends us to follow a method which he calls new, but which in fact, is the same as that advised by Gimbernat. "I have found (says Scarpa) that, in man, the neck of the hernial sac may be divided without danger, by giving to the incision a direction exactly contrary to that, which is practised, in the female subject. After having opened the hernial sac, it is to be drawn outward by one of its sides sufficiently to allow the introduction of a small director between its neck and the strangulated intestine, the groove of the instrument being turned downwards towards the internal and inferior angle of the crural arch. A probe-pointed bistoury, the edge of which is also to be directed downwards towards the point of insertion of Poupart's ligament to the pubes, is to be pushed along the groove. By this means, the neck of the hernial sac will be divided its whole length, at its internal and inferior side, and Poupart's ligament will be cut close to its attachment to the top of the os pubis. The epigastric artery will be certainly avoided, because it lies upon the opposite side of the hernial sac. As for the spermatic cord, I have demonstrated, that it is situated on the forepart of the neck of the hernial sac; consequently, it cannot be touched by an incision made from above downwards, whilst it is constantly cut in the ordinary method, since the knife is carried from below upwards. In the first case, this part may be the more easily avoided, as it lies at some distance from the internal and inferior angle of the crural arch. In fact, it is at this place, that it quits, as we have seen, the edge of Poupart's ligament, in order to ascend towards the inguinal ring. The incision, that I propose (says Scarpa) not only has the advantage of slitting

open the neck of the hernial sac its whole length, it also divides a part of the insertion of Poupart's ligament into the upper part of the os pubis, a thing, that greatly contributes to relax the crural arch, and facilitate the reduction of the viscera; of those, at least, which are not adherent to the sac." (*Scarpa, Op. cit. p. 235.*)

Although this accurate anatomist and surgeon appears to be quite unacquainted with many of the late valuable publications on hernia, which have made their appearance in this country, it is curious to find, both in his account of the inguinal and crural hernia, how strongly his doctrines and observations tend to confirm every thing that has recently been insisted upon in modern works, respecting the place where the bubonocoele first protrudes, its passing through a sort of canal before it comes out of the abdominal ring, the advantage of cutting in the crural hernia the internal and inferior angle of Poupart's ligament, or, in other terms, that part of the ligament, which was first particularly pointed out by Gimbernat, as causing the principal part of the strangulation, and about which so much has been said by Mr. A. Cooper, Mr. Hey, &c.

CONGENITAL HERNIA.

Before the beginning of the sixth month of the foetal state, the testicle is situated near the kidney, where it receives a covering from the peritonæum, just like the other abdominal viscera. Between the beginning of the sixth month, and end of the seventh, the testicle has either descended as low as just above the abdominal ring, or else is passing through it, or just below it. (*Wrisberg. Comm. Reg. Societ. Gotting. 1578.*)

When the testicle passes through the abdominal ring into the scrotum, it carries before it a production of the peritonæum, which afterwards constitutes the tunica vaginalis; while that peritoneal investment, which was given to the testicle in the loins, is closely adherent to this body, and forms what is named the tunica albuginea.

After the descent of the testicle into the scrotum, the communication between the cavity of the tunica vaginalis and that of the abdomen, commonly becomes obliterated, which latter event is usually effected before birth, sometimes not till afterwards, and in a few subjects, even as late as the adult state.

In the congenital hernia, the protruded viscera are situated in the tunica

vaginalis, in contact with the testicle; having descended into this position before the closure of the communication with the abdomen. Of course, the tunica vaginalis itself is the hernial sac. The nature of this case was not understood, before it was elucidated by Haller in 1755, and the two Hunters in 1762 and 1764. (See *Hunter's Med. Comment. : Haller's Opuscula Patholog. and Opera Minora, Tom. 3.*) Before that period, surgeons imputed the circumstance of the contents of the hernia and testicle being in contact, to the former parts having made their way, by laceration, through the tunica vaginalis, from the ordinary hernial sac of a bubonocoele. The old surgeons, indeed, frequently cite this instance, in proof of their doctrine, that some herniæ were attended with a laceration of the peritonæum. (See *Sharp's Enquiry.*)

From the term *congenital*, we might suppose, that this hernia always existed at the time of birth. The protrusion, however, seldom occurs till after this period, on the operation of the usual exciting causes of herniæ in general. The congenital hernia does not usually happen till some months after birth; in some instances, not till a late period. Mr. Hey relates a case, in which a hernia congenita was first formed in a young man, aged sixteen, whose right testis had, a little while before the attack of the disease, descended into the scrotum. It seems probable, that in the cases of hernia congenita, which actually take place when the testicle descends into the scrotum before birth, the event may commonly be referred to the testicle having contracted an adhesion to a piece of intestine, or of the omentum, in its passage to the ring. Wrisberg found one testicle, which had not passed the ring, adhering, by means of a few slender filaments, to the omentum, just above this aperture, in an infant, that died a few hours after birth.

Excepting the impossibility of feeling the testicle in hernia congenita, as we can in most cases of bubonocoele, (which criterion Mr. Pott should have mentioned,) the following account is very excellent. "The appearance of a hernia in very early infancy, will always make it probable that it is of this kind; but, in an adult, there is no reason for supposing his rupture to be of this sort, but his having been afflicted with it from his infancy; there is no external mark, or character, whereby it can be certainly distinguished from one contained in a common hernial sac; neither would it be of any material use in practice, if there was,

"When returnable, it ought, like all other kinds of ruptures, to be reduced, and constantly kept up by a proper bandage; and when attended with symptoms of stricture, it requires the same chirurgic assistance as the common hernia.

"In very young children, there are some circumstances, relative to this kind of rupture, which are very well worth attending to, as they may prove of very material consequence to the patient.

"A piece of intestine, or omentum, may get pretty low down in the sac, while the testicle is still in the groin, or even within the abdomen; both which I have seen. In this case, the application of a truss, would be highly improper; for in the latter, it might prevent the descent of the testicle from the belly into the scrotum; in the former, it must necessarily bruise and injure it, give a great deal of unnecessary pain, and can prove of no real use. Such bandage, therefore, ought never to be applied on a rupture in an infant, unless the testicle can be fairly felt in the scrotum, after the gut or caul is replaced; and when it can be so felt, a truss can never be put on too soon.

"As this kind of rupture is subject to stricture, with all its consequences, as much as that which is contained in a common hernial sac, and therefore liable to stand in need of the chirurgic operation; it may be very well worth an operator's while to know, that an old rupture, which was originally congenital, is subject to a stricture made by the sac itself, independent of the abdominal tendon, as well as to that made by the said tendon.

"Whether this be owing to the weight of the testicle at the bottom of the sac, and the endeavours which nature makes to close the upper part of the tunica vaginalis, or to what other cause, I will not pretend to say, but the fact I have several times noticed, both in the dead and in the living. I have seen such stricture made by the sac of one of these herniæ, as produced all those bad symptoms which render the operation necessary; and I have met with two different strictures, at near an inch distance from each other, in the body of a dead boy, about fourteen, one of which begirt the intestine so tight, that I could not disengage it without dividing the sac.

"In this kind of hernia I have also more frequently found connexions and adhesions of the parts to each other, than in the common one; but there is one kind of connexion sometimes met with in the congenital hernia, which can never be found in that which is a common hernial sac, and which may require all the dex-

terity of an operator to set free; I mean that of the intestine with the testicle, from which I have more than once experienced a good deal of trouble.

"When a common hernial sac has been laid open, and the intestine and omentum have been replaced, there can be nothing left in it which can require particular regard from the surgeon; but by the division of the sac of a congenital hernia, the testicle is laid bare, and after the parts composing the hernia have been reduced, will require great regard and tenderness, in all the future dressings, as it is a part very irritable, and very susceptible of pain, inflammation, &c.

"If a large quantity of fluid should be collected in the sac of a congenital hernia, and, by adhesions and connexions of the parts within, the entrance into it from the abdomen should be totally closed, (a case which I have twice seen) the tightness of the tumour, the difficulty of distinguishing the testicle, and the fluctuation of the fluid, may occasion it to be mistaken for a common hydrocele; and if without attending to other circumstances, but trusting merely to the feel and look of the scrotum, a puncture be hastily made, it may create a great deal of trouble, and possibly do fatal mischief.

"By what has fallen within my observation, I am inclined to believe that the sac of a congenital hernia is very seldom, if ever, distended to the degree which a common hernial sac often is: it also, from being less dilated, and rather more confined by the upper part of the spermatic process, generally preserves a pyriform kind of figure, and, for the same reason, is also generally thinner, and will therefore require more attention and dexterity in an operator when he is to open it. To which I believe I may add, that common ruptures, or those in a common sac, are generally gradually formed, that is, they are first inguinal, and by degrees become scrotal; but the congenital are seldom, if ever, remembered by the patient to have been in the groin only." (*Pott on Ruptures, Vol. 2.*)

The reader must not conclude, however, from the above account, that every rupture in children is a congenital one. Mr. Lawrence has related a case of strangulated bubonocoele, which took place in an infant only fourteen months old. (*P. 31.*)

The common inguinal hernia, which first protrudes at the inner opening of the inguinal canal, and which has the epigastric artery on the inner side of its neck, has been named by Hesselbach *external*,

while the less common instance, in which the viscera pierce directly through the aponeuroses of the transverse and internal oblique muscles, and pass directly out of the abdominal ring, leaving the epigastric artery on the outer side of the neck of the sac, is distinguished by the epithet *internal*. (*Anatomisch. Chirurg. Abhandlung. über den Ursprung der Leistenbruch.*) "The inguinal congenital hernia (says Scarpa) cannot be divided into *external* and *internal*: it is evident, that it must always be external, since the neck of the tunica vaginalis invariably corresponds to the point at which the spermatic cord passes under the margin of the transverse muscle. As for other circumstances, the tunica vaginalis lies in its whole course in the same manner as the sac of a common inguinal hernia: like this, it passes completely through the inguinal canal from one end to the other, resting upon the anterior surface of the spermatic cord. Consequently, it passes between the separation of the inferior fibres of the obliquus internus, and the principal origin of the cremaster muscle. (See *Wrisberg. sylog. comment. anat. p. 23.*) After coming out of the ring, being always united to the spermatic cord, it is enclosed in the muscular and aponeurotic sheath of the cremaster muscle, which accompanies it to the bottom of the scrotum. Since the tunica vaginalis, including the displaced viscera, enters the inguinal canal on the outside of the point, at which the spermatic cord crosses the epigastric artery, it is manifest, that, as it follows exactly the direction of this cord, it must also cross the artery, and remove it from the outer to the inner side of the ring, according to the mechanism already explained in speaking of the common inguinal hernia. Hence, the displacement of the epigastric artery constantly happens in the inguinal congenital, just as it does in the ordinary external inguinal hernia.

"But, if these two species of inguinal hernia have some analogy to each other, in regard to the parts which constitute them, yet, they present some remarkable differences. 1. The common inguinal hernia, whether internal, or external, when it extends into the scrotum, cannot descend beyond the point at which the spermatic vessels enter the testicle. There the cellular substance of the spermatic cord terminates. There the hernial sac must unavoidably terminate. On the contrary, in the congenital hernia, the viscera may descend lower, than the testicle, with which they are in immediate

contact; and, at length, they even occupy the situation of this organ, which is then pushed upward and backward. 2. In the case of a congenital hernia, the descent of the viscera from the groin to the scrotum commonly takes place in a very short time, and in some measure precipitately: it is much slower and more gradual in the ordinary inguinal hernia. The reason of this difference is very plain. In the first case, the descent of the testicle, and the formation of the tunica vaginalis, have opened and prepared the route, which the viscera must follow in forming a protrusion; while, in the second, the hernial sac cannot descend into the scrotum, but by gradually elongating the layers of the cellular substance, which joins it to the surrounding parts. This fact is so generally known, that experienced practitioners consider the promptitude, with which the viscera have descended from the groin to the bottom of the scrotum, as a characteristic sign, of a scrotal congenital hernia." (*Scarpa, Traité des Hernies, p. 73, &c.*)

If circumstances will admit of a truss being applied and worn, in cases of congenital hernia, in young subjects, there will be a considerable chance of a radical cure being effected, in consequence of the natural propensity of the opening between the abdomen and tunica vaginalis to become closed.

The only material difference in the operation, from that for a bubonocoele, is, that the surgeon has to lay open the tunica vaginalis, instead of a common hernial sac. The stricture is to be divided on the same principle as that of an inguinal hernia, and much in the same manner. The parts having been reduced, the edges of the wound are to be immediately brought together, and retained so by means of one or two sutures, and sticking plaster, which is much preferable to the plan of applying the dressing to the testicle and inside of the tunica vaginalis, so as to heal the part by the granulating process.

A new species of hernia congenita has lately been described, in which a common peritoneal hernial sac, containing the viscera, is included in the tunica vaginalis. It arises from the parts being protruded, after the communication between the abdomen and tunica vaginalis is closed, so that the peritonæum is carried down along with the intestine, and forms a hernial sac, within the tunica vaginalis. It is evident also, that such a hernia can only be produced, while the original tunica vaginalis remains, in the form of a bag, as high as the abdominal

ring. Operators should be aware of the possibility of having a sac to divide, after laying open the tunica vaginalis. (See the accounts of this hernia in *Hey's Practical Observations, p. 221, &c.* and *A. Cooper's Work on Inguinal Hernia, p. 59.*)

UMBILICAL HERNIA, OR EXOMPHALOS.

"The exomphalos, or umbilical rupture, (says Pott) is so called from its situation, and has (like other herniæ) for its general contents, a portion of intestine or omentum, or both. In old umbilical ruptures, the quantity of omentum is sometimes very great.

"Mr. Ranby says, that he found two ells and half of intestine in one of these, with about a third part of the stomach, all adhering together.

"Mr. Gay and Mr. Nourse found the liver in the sac of an umbilical hernia; and Bohnius says that he did also.

"But whatever are the contents, they are originally contained in the sac, formed by the protrusion of the peritoneum.

"In recent and small ruptures, this sac is very visible; but in old, and large ones, it is broken through at the knot of the navel, by the pressure and weight of the contents, and is not always to be distinguished; which is the reason why it has by some been doubted whether this kind of rupture has a hernial sac or not.

"Infants are very subject to this disease, in a small degree, from the separation of the funiculus; but in general they either get rid of it as they gather strength, or are easily cured by wearing a proper bandage. It is of still more consequence to get this disorder cured in females, even than in males, that its return, when they are become adult, and pregnant, may be prevented as much as possible; for at this time it often happens, from the too great distention of the belly, or from unguarded motion when the parts are upon the stretch. During gestation, it is often very troublesome, but after delivery, if the contents have contracted no adhesion, they will often return, and may be kept in their place by a proper bandage.

"If such bandage was always put on in time, and worn constantly, the disease might in general be kept within moderate bounds, and some of the very terrible consequences which often attend it might be prevented. The woman who has the smallest degree of it, and who from her age and situation has reason to expect children after its appearance, should be particularly careful to keep it restrained.

"In some the entrance of the sac is large, and the parts easily reducible; in others they are difficult, and in some ab-

solutely irreducible. Of the last kind many have been suspended for years in a proper bag, and have given little or no trouble. They who are afflicted with this disorder, who are advanced in life, and in whom it is large, are generally subject to colics, diarrhoeas, and, if the intestinal canal be at all obstructed, to very troublesome vomitings. (Hence, patients are often supposed to labour under a stricture, when they really do not.) It therefore behoves such to take great care to keep that tube as clean and free as possible, and neither to eat, or drink any thing likely to make any disturbance in that part." (*Pott on Ruptures, Vol. 2.*)

Authors, who have published since the time of this celebrated surgeon, have not added much to the stock of information, which he has left, relative to the exomphalos. The writings of Mr. A. Cooper, Scarpa, (*Traité des Hernies, p. 327.*) and of all the most accurate moderns, confirm the fact, described by Pott, that, in the umbilical rupture, there is a hernial sac, just as in other instances of hernia. Every one, acquainted with anatomy, knows, that behind the opening in the linea alba at the umbilicus, the peritoneum is complete, and consequently must be protruded before the viscera, in cases of exomphalos. In the only two cases, which Mr. A. Cooper has seen of a deficiency of the sac, the membrane had been partially absorbed, or lacerated, so as to allow the protrusion of its contents, and threaten, from this cause, a double stricture. Similar appearances less closely inspected, probably gave rise to the opinion so firmly maintained by Dionis, De la Faye, Garengeot, and J. L. Petit, that in the umbilical hernia, the peritoneum was always lacerated, and there was no hernial sac. It is observed by Bichat, that the umbilicus is a kind of cicatrix, formed, in consequence of the separation of the funis, by the contraction of the parts with which it was continuous; and that it only gradually acquires the degree of firmness which it has in the adult subject. As it is for a long while weaker than the rest of the abdominal parietes, it only makes an inferior degree of resistance to the viscera; but this resistance increases with age; and, as the cicatrix now becomes stronger than the surrounding parts, it forms a more impenetrable barrier against any escape of the bowels. From these anatomical facts, the following pathological inferences, confirmed by experience, are deducible:—1. That infancy is more subject, than any other age, to the umbilical hernia, strictly so called, in which the parts protrude through the navel. 2. That other periods of life are

more subject than infancy to false umbilical hernia or to those which arise in the vicinity of the umbilicus. (*Œuvres Chirurgicales de Desault, par Bichat, Tom. 2, p. 315.*)

Besides a true hernial sac, the exomphalos is also covered with a more superficial expansion, consisting of condensed cellular substance. In operating, we should always cut, however, with great caution, for, often the integuments and hernial sac, in front of the tumour, are inseparably adherent; and sometimes, in consequence of the pressure of the viscera, in large cases, having caused an absorption of part of the sac, they are even found adherent to the integuments.

Pregnant women, and dropsical and corpulent subjects, are peculiarly liable to the exomphalos. In adults, there is almost always omentum in the sac when there is intestine. The transverse arch of the colon is observed to be particularly often contained in umbilical hernia, though the small intestines are not unfrequently protruded. (*Lawrence, 265.*)

In the true umbilical hernia, the stricture is made by the tendinous opening in the linea alba. We shall next consider the umbilical hernia in the three particular forms in which it has been noticed by the latest writers.

CONGENITAL UMBILICAL HERNIA.

Dr. Hamilton has met with about two cases of this kind annually, for the space of seventeen years; and they strictly deserve the epithet *congenital*, as they appear at birth. The funis ends in a sort of bag, containing some of the viscera, which pass out of the abdomen through an aperture in the situation of the navel. The swelling is not covered with skin, so that the contents of the hernia can be seen through the thin distended covering of the cord. The disease is owing to a preternatural deficiency in the abdominal muscles, and the hope of cure must be regulated by the size of the malformation, and quantity of viscera protruded.

The plans of cure proposed, consist of the employment of a ligature, or of a bandage. The latter seems preferable, and was practised by Mr. Hey, as follows: having reduced the intestine, he desired an assistant to hold the funis compressed sufficiently near the abdomen, to keep the bowel from returning into the hernial sac.

"I procured (says he) some plaster spread upon leather, cut into circular pieces, and laid upon one another in a conical form. This compress I placed

upon the navel, after I had brought the skin on each side of the aperture into contact, and had laid one of the lips a little over the other. I then put round the child's abdomen, a linen belt; and placed upon the navel, a thick, circular, quilted part, formed about two inches from one extremity of the belt.

"This bandage kept the intestine securely within the abdomen, and was renewed occasionally. The funis was separated about a week after birth; and at the expiration of a fortnight from that time, the aperture at the navel was so far contracted, that the crying of the child, when the bandage was removed, did not cause the least protrusion. I thought it proper, however, to continue the use of the bandage a little while longer. A small substance, like fungous flesh, projected, after the funis had dropped off, about half an inch from the bottom of that depression which the navel forms. A dossil of lint spread with cerat. è lapide calaminari, and assisted by the pressure of the bandage, brought on a complete cicatrization." (P. 227.)

This gentleman has related another example, in which the intestines were quite uncovered, and inflamed, the sac having burst in delivery. The parts were reduced; but the child died.

UMBILICAL HERNIA IN CHILDREN.

The umbilical hernia, which is sometimes formed in the fœtus, from causes difficult of explanation, takes place, in other instances, at the moment of delivery; and then, as Sabatier remarks, should it, by mistake, be tied with the funis, death would be the consequence. Most frequently, however, it is not till the second, third, or fourth month after birth, that the disease occurs; and the numerous cases collected by Desault, prove that, of ten infants attacked with this hernia, nine become afflicted at the periods just mentioned.

The umbilicus, still open, now begins to contract, so as to close the cicatrix, which, as has been already stated, forms, in the adult state, an obstacle soon capable of preventing a protrusion of the viscera, when nothing resists its formation. But, the repeated crying of the child, propelling the viscera outward, pushes them through the opening. Thus the cicatrix is forced before them, and they distend it so powerfully, forward, that its closure is prevented. As their continued action gradually dilates it more and more, the intestines insinuate themselves through it, increase its natural width, project be-

yond it, and thus a tumour arises, which, from being of trivial size at first, becomes afterwards more considerable; at length, attains the size of an egg, or large walnut, and presents itself with all the characteristic marks of a hernia.

The presence of a piece of intestine and omentum in the tumour, keeps the umbilicus open, and opposes the continual tendency which it has to close. Such tendency, however, being sometimes superior to the resistance of the protruded parts, forces them to return back into the abdomen, obliterates the opening through which they passed, and thus the spontaneous cure of the umbilical hernia in children is accomplished. Two cases illustrative of this fact, are related in *Œuvres Chirurgicales de Desault, par Bichat, Tom. 2, p. 318.*

Nature, however, does not effect many such cures, and when the case is left to her alone, she not only fails in bringing about a radical cure, but gradually renders it impossible. In short, the propensity of the opening to close diminishes, and is lost, as the subject grows older. In the adult, it is not the lodgment of the intestines in the opening, that prevents its obliteration; it is its having no disposition to undergo this beneficial change.

Hence, the umbilical hernia of children seems to be essentially distinguished from that of adults, by the tendency of the aperture to contract. Hence the ease of effecting a radical cure in children, and the almost utter impossibility of doing so in adults. In the former, it is enough to keep the intestines from protruding into the opening, and it becomes of itself obliterated; in the latter, it always continues, whether the bowels continue in it or not. Hence, the inaccuracy of the inferences deduced by some writers, from the umbilical hernia of infants, as being applicable to that of adults, and the necessity of not delaying the assistance of art in the former cases.

The means of curing the umbilical hernia of children, are of three kinds: external applications; compression; and the ligature. The first are totally useless; and, as they occasion a waste of time, are improper. Compression, and the ligature, are the only rational plans; and to these we shall limit our observations. The former is the most modern, the latter the most ancient, as it was practised by the Greeks, and then by Celsus. Desault has drawn a most able parallel between the two modes; he tells us, that the design both of the ligature and compression is the same, viz. to prevent the lodgment of the protruded viscera in the

opening of the umbilicus, and thus facilitate the approximation of its sides. To accomplish this end, the ligature retrenches the hernial sac, and skin pushed before it; and, by the union of the cut parts occasions a cicatrix, which hinders the protrusion of the viscera. At the same time, the sides of the opening, obeying their natural tendency, and affected by the irritation which they have sustained, contract, obliterate the opening, and put the cicatrix in its proper place, though now it is only an accessory means of hindering a protrusion. Compression stops up the aperture by something applied externally; thus, the deficiency, or opening, in the parietes of the abdomen, hinders the protrusion of the bowels, and keep these parts from resisting the contraction of the sac. Hence it is clear, that the two methods are founded on a different basis. Reason and experience also shew, that their results are equally different.

Though compression occasions no pain, it causes the child an irksome inconvenience, during the great length of time its employment is necessary. The ligature produces momentary pain; but there is nothing irksome attending its use, and it effects in a few days, what compression, when successful, accomplishes in several months. In one plan, continual attentions are requisite: should its employment be only for a short time neglected, the previous effect becomes almost destroyed. The other method always accomplishes its object with certainty, independently of the crying of the child, and the care of its attendants. The first, by continually compressing the sides of the opening, counteracts, in this point of view, its natural disposition to contract. The second, by artificially irritating this natural process of the umbilicus, accelerates its contraction. When compression is adopted, it is executed either by means of a flat compress applied to the opening, and which does not enter it, or else by means of some round or oval body, such as a ball of wax, a nutmeg, &c. adapted to the shape of the aperture, and, as Platner, and Richter, (in his Treatise on Hernia) advise, made continually to enter the opening. But, in the first case, if the bandage be exactly applied, the skin and sac, forming a fold in the aperture of the navel, will hinder its closure, and operate in the same manner, from without, inward, as the protruded intestines did from within outward. In the second case, the foreign body, being depressed into and maintained in the opening, will occasion, notwithstanding what Richter says, the same inconveniences, and, in a more striking manner, similar consequences.

But, on the contrary, when the ligature is employed, the sac and skin of the tumour are removed, while the opening remains free, and nothing prevents its obliteration. In this method, the omentum can never protrude outward; but, in the other, if the compression should ever be inexact, the parts slip out again, above or below, and the disorder prevails on one side of the useless application. Supposing compression successful, both plans effect a closure of the umbilicus; but, while compression only accomplishes the latter object, the ligature has the additional advantage of producing an adhesion of the sides of the opening, either to each other, or the adjacent parts. This adhesive process arises from the inflammation excited, and occasions a degree of firmness, not producible by any other mode of cure.

To this parallel, dictated by reason, (continues Desault) let us add that, which is the fruit of experience. On one side, we shall discover, that the beneficial effects of compression are only reckoned in the midst of its want of success, and that the children, on whom it is employed, miserably endure for years its irksomeness and inconveniences. If we look the other way, we shall find, that the ligature, which is employed at the Hôtel-Dieu, presents an uninterrupted series of well authenticated cures, which, in Desault's practice, amounted to the number of fifty. In the latter years of his practice, you might see many persons bringing to his public consultations their children, which were immediately operated on without any preparation, carried home immediately afterwards, and brought the next, and every following day, to be dressed, till the cure was complete.

To these considerations, are to be added other motives, which are, perhaps, not immaterial. The children of the poor may be cured in an hospital, by the ligature, in the space of a few days. But, when compression is adopted, the parents are frequently put to repeated expence, as the bandage wears out; and to additional loss from the time consumed in paying the necessary attentions.

The ancients had different modes of applying the ligature; but, what they have transmitted to us, may be referred to two different processes. One consisted in reducing the parts, and afterwards tying the integuments and sac, without opening the latter at all. In the other, an incision was made in the sac, either before, or after tying it, for the purpose of being sure, that no piece of intestine was, and could become, strangulated in the liga-

ture. Celsus adopted the first plan. Paulus Ægineta preferred the second, and was imitated by all the Arabian physicians, and their successors. Avicenna, Albucasis, and Guy de Chauliac give us proofs of this in their several works.

Experience soon decides, which of these modes of operating ought to be chosen. One is less painful, and equally safe; for, we soon become habituated to ascertaining, whether there is still any intestine in the sac, by rubbing the opposite sides of this bag against each other. The other, which is unnecessarily cruel, increases the pain, without making the method at all more certainly successful. The latter has been usually adopted, and Paré, who has described it, does not even mention the former. Latterly, some variations in the plan of operating were made. Some simply tied the base of the tumour; others passed through it one, or two needles, armed with ligatures for the purpose of fixing such ligatures in a better manner, and even making, for this purpose, a circular incision for the lodgment of them. It is chiefly in the Arabian practice, that we meet with this cruel proceeding, which was also useless, as the ligature was never known to fail, when properly applied. Paré also describes it; but, Saviard, the only modern, who has practised the ligature, rejected it, and followed the plan long ago advised by Celsus. Sabatier seems to recommend, in his work on the operations, both plans indifferently, with the exception of the circular incision. Desault's method, which much resembles that of Saviard, is simple, and attended with little pain: in short, it is the following:

The child, on whom the operation is to be done, must be placed on its back, with its thighs a little bent, and its head inclined towards the chest. The surgeon is to reduce the protruded parts, forming the tumour, and to hold them so with his finger, at the same time, that he raises the hernial sac, and rubs its sides between his fingers, so as to be sure, that there is nothing contained in it. Being certain, that the parts, which he lifts up, are only the skin and sac, he is to direct an assistant to surround their base several times with a waxed ligature, of middling size, each turn being tied with a double knot, in such a manner as only to occasion little pain. The tumour, thus tied, is to be covered with lint, which is to be supported with one or two compresses, and a circular bandage, secured with a scapulary. A slight swelling commonly takes place in the constricted parts, by the following day, just as a polypus swells, after its base has been tied.

No pain accompanies this tumefaction, which is itself often scarcely perceptible, as may be seen by referring to the first case of this operation related in the Parisian Journal. On the second, or third day, the parts shrink, and then the ligature becomes loose, so that a fresh one must now be applied in the same manner as the first, taking care to draw it a little more tightly. The sensibility of the parts, increased by the inflammation, which the constriction of the ligature has already produced, usually renders this second ligature more painful. After the operation, the same dressings, as before, are to be applied. The tumour soon becomes discoloured, livid, and smaller. A third ligature, put on in the same way as the preceding ones, entirely obstructs the circulation in it. The part turns black and flaccid, and commonly falls off on the eighth or tenth day. A small ulcer is left, which, being properly dressed very soon heals, and leaves a cicatrix sufficiently strong to resist the impulse occasioned by coughing, or other efforts of the abdominal muscles. For two, or three months, however, after the operation, the child should wear a circular bandage, in order to prevent, with still more certainty, the viscera from being propelled against the cicatrix, so as to interrupt the process of nature, which is now producing a gradual closure of the umbilical opening. Numerous cases might here be adduced, in confirmation of the above practice; but, several (nine) are already published in the Parisian Chirurgical Journal. The relation of others here would only prolong our observations in a fruitless manner. Suffice it to remark, that since those alluded to were published, Desault has practised an infinite number of operations of this sort with equal success; that, every week, many children were brought by their mothers into the amphitheatre, where he publicly delivered his lectures; that here the ligature was applied in the presence of all his pupils; and that children, thus operated upon, were carried home, and brought back every day to be dressed, till the cure was completed.

But, one may doubt, (says Sabatier) quoting the article in the journal, where Desault treats of the present disease, whether the infants got rid of the hernia, as it might have returned some time afterwards. Numerous facts remove this doubt; for, several of the subjects were brought to Desault's public consultation, for their diseases, a long while after they had been operated upon, and the great number of students, who examined them, all acknowledged, that the ring was completely obliterated, and there was no impulse of the

viscera in coughing, sneezing, &c. Other children, in the knowledge of the surgeons of the Hôtel-Dieu, have remained perfectly cured of their umbilical hernia, by the operation, which Desault has revived. Bichat is acquainted with two young subjects, who were operated on four years ago, and have since had no relapse.

The operation is almost certainly successful in young infants; but, it becomes less so, in proportion as their age increases. Bichat relates three cases, which tend to show, that success may be completely obtained at the age of a year and a half; that the cure is difficult, when the child is four years old; and impossible, when it is nine. Several other operations, done too late, have had the same result. (See *Œuvres Chirurgicales de Desault, par Bichat, Tom. 2, p. 315, &c.*)

Mr. Pott notices the plan of curing the exomphalos with the ligature, and expresses himself strongly against the practice in general. To adults the plan is not applicable, particularly, when the tumour is large. Mr. Pott was decidedly in favour of compression, and he observes, that, in young subjects, and small hernia, a bandage, worn a proper time, generally proves a perfect cure. (Vol. 2.)

Anxious that this work should be strictly impartial, I next proceed to relate what has been recently urged against the employment of the ligature for the cure of the umbilical hernia in children, and to notice the observations, which have been adduced in favour of the treatment by compression.

The incessant care that a bandage requires, either to keep it clean, or make it always keep up the proper degree of pressure, renders its employment difficult in the children of the poorer classes. Scarpa expresses his opinion, that "this was what induced Desault to revive the operation for the umbilical hernia by the ligature, nearly such as is described by Celsus, an operation (continues Scarpa), which, a long while since, and for good reasons, was altogether abandoned. Celsus has sufficiently described the particulars of it: (*Lib. 7, Cap. 14.*) he states, that the tumour is sometimes to be simply tied, and that, in other instances, its base is to have a needle and double ligature introduced through it, in order that it may be embraced almost in the same way as a staphyloma is tied. But, amongst the causes, which contra-indicate this operation, he mentions so many circumstances, in relation to age, constitution,

diseases of the skin, &c. that he seems to consider the cases, in which it may be practised with success, as very few. The same reflections have been made by several other ancient surgical writers, especially, by Fabricius ab Aquapendente. Desault himself has put some restrictions to the employment of the ligature, since he observes, with his usual candour, that this method does not radically cure the umbilical hernia of children, arrived at the age of four years; that it is indispensable, as Celsus inculcates, to employ a needle and double ligature, when the base of the tumour is very large; and, lastly, that, even in the youngest children, a radical cure cannot be effected by the ligature, unless a methodical compression of the navel, by means of a bandage, be kept up immediately after the operation, and for two or three months. It is perhaps to the omission of this last means, that a relapse is to be ascribed in several of the children operated upon by Desault.

"Desault avoit remis en vigueur la ligature tombée en désuétude. Il s'abusait sur sa valeur; et il n'est pas difficile d'en connaître la cause. Tous les enfans qu'il opéroit à l'Hôtel-Dieu sortoient guéris et n'y revenaient plus: on regardoit alors comme radicale une guérison momentanée." (*Nosographie Chirurgicale, Tom. 2, p. 453, par Richerand.*)

I have carefully watched (says Scarpa) the immediate effects, and the more or less remote consequences of tying the umbilical hernia, either simply, or by means of a needle and double ligature; and, after a considerable number of such cases, I believe I can assert, that *this operation, however performed, is not always exempt from grave and sometimes dangerous accidents. I can also add, that it never procures a truly radical cure, unless the cicatrix, occasioned by it in the umbilical region, be submitted for some months to a methodical and uninterrupted compression. It is not so uncommon, as some surgeons pretend, to see arise after the application of the ligature, a fever attended with symptoms of most violent irritation, and acute sufferings, which cause incessant crying, and sometimes convulsions. The ulcer, which is produced by the detachment of the swelling, is always very large and difficult to heal. Every now and then it becomes painful, and emits fungous granulations, even though dressed with dry applications.*

"Latterly, it has been explained by a celebrated surgeon, (*Paletta Memor. dell' Instituto, Tom. 2, Part 1.*) that the umbilical vein and the suspensory ligament of the liver, being included in the ligature of the umbilical hernia, the inflammation, which originates in these parts may, perhaps, in certain cases, be communicated

to the liver, so as to put the child's life in great danger. When, in consequence of the ligature, symptoms of violent irritation come on, they are ordinarily attributed to certain individual circumstances, such as extreme sensibility, or a particular disposition to spasm. Hence, it is believed, that they should be considered as exceptions, which do not exclude the general rule, and prove nothing against the utility of the operation. But, how (says Scarpa) can the surgeon ascertain the existence, or non-existence of these individual dispositions, in the children, upon which he is to operate? Assuredly, those subjects, in which I have had occasion to notice the above accidents, enjoyed, before the operation, perfect health in every respect.

"Whatever process be adopted for tying the umbilical hernia, it is evident, that the tumour can only be constricted as far as a little way on this side of the aponeurotic ring of the umbilicus, whence, it follows, that the integuments must always remain prominent and relaxed for a certain extent, at the front and circumference of this opening. Also, after the separation of the strangulated portion, there necessarily remains, under the cicatrix, a portion of the hernial sac, and of the loose integuments, which covered it; and as the cicatrix itself never acquires sufficient firmness to resist the impulse of the viscera, which tend to insinuate themselves into the remains of the hernial sac, the hernia sooner or later reappears, and, in a short time, becomes larger, than it was before the operation. If the subject is a little girl, it may be apprehended, that the first pregnancy will cause a recurrence of the hernia; for, it is known, that, during gestation, the external cicatrix of the umbilicus, is considerably distended, and much disposed to give way."

Pott has seen terrible accidents caused by the rupture of the cicatrix at the navel, during pregnancy. (*Chirurg. Works*, Vol. 2, p. 169.) It is true, that according to this writer, this cicatrix was not the consequence of a hernia, but rather of an abscess in the umbilical region, which abscess had formerly been opened with a bistoury; yet, observes Scarpa, it would not be impossible to raise doubts upon this conjecture. Lastly, after the separation of the tumour, there always remains, between the aponeurotic ring of the navel, and the integuments, a small cavity, formed by the neck of the hernial sac; a cavity, into which the viscera begin to insinuate themselves after the operation, so as to hinder the complete contraction of the umbilical ring. The demonstration of what I have advanced is,

in some measure to be found, in the old method of operating for the inguinal hernia, not in a strangulated state, by the ligature of the hernial sac and spermatic cord. It is well known, that most of the herniæ, operated upon by this barbarous process, were subject to relapses, because, in all probability, the cicatrix was not sufficiently firm to resist the impulse of the viscera, which entered the remains of the hernial sac. In the same manner, after the common operation for the strangulated inguinal hernia, although the cicatrix is formed very near the ring, there is no prudent surgeon, who does not advise the patient to wear a bandage the rest of his life, observation having proved that the hernia is still liable to recur.

"An experience of several ages (observes Professor Scarpa) has put out of all doubt, that compression alone is an extremely efficacious method of radically curing the umbilical hernia of young subjects. It is attended with no risk, and, provided it be executed with the requisite caution, it is hardly ever necessary to continue it longer, than two, or three months, for the purpose of obtaining a complete cure. On the other side, if it be clearly proved, by all that I have been observing, that the ligature never accomplishes a perfect cure without compression, it is manifest, that it cannot be at all advantageous for the children of the poor, since a bandage cannot be dispensed with. It may be said, that, in general, it does not shorten the treatment; for, in the most successful cases, the ulcer, caused by it, is not healed in less than a month, and, in order to make the cure certain, an exact compression must afterwards be kept up, by means of a bandage, two months longer. It has already been stated, that three months are ordinarily sufficient for obtaining a radical cure by the mere employment of a compressive bandage." (*Scarpa, Traité des Hernies*, p. 344—349.)

It appears from a note, which M. Cayol has inserted in the French translation of Scarpa's work on hernia, that M. Girard has published in the *Journal Général de Médecine*, Tom. 41, Cahier de Juillet, 1811, a memoir on the umbilical hernia of children, which was read to the Medical Society of Lyons in May, 1811, and the object of which was to recommend compression as an effectual means of cure. The arguments used were very similar to those adduced by Scarpa. In the course of the discussion, M. Cartier affirmed, that he had seen many children operated upon by Desault, who were not cured of their hernia.

The subject was afterwards taken up

by the Medical Society of Paris, and the result of the debate was, that the employment of the ligature ought to be rejected. 1. Because the cure of umbilical hernia is very often accomplished by the power of nature alone. 2. Because compression, either alone, or aided by tonic remedies, always succeeds. 3. Because the operation of the ligature deserves the triple reproach of being painful, and not free from danger, if unfortunately a piece of intestine should chance to be included in the ligature; of not succeeding in general, unless with the assistance of compression; and of being sometimes uselessly practised, as Desault himself gives us instances of.

It is farther stated by M. Cayol, that the majority of judicious surgeons have long since acknowledged the insufficiency of the ligature for the radical cure of the umbilical hernia; Sabatier, Lassus, Richerand. &c.

UMBILICAL HERNIA IN ADULT SUBJECTS.

This case is to be treated on the principles common to all ruptures. When reducible, the parts should be kept up with a bandage, or truss; which plan, however, at this period of life, affords no hope of a radical cure. Mr. Hey has described one of the best trusses for the exomphalos, which is applicable to children, when compression is preferred, as well as to adult subjects. It was invented by Mr. Marrison, an ingenious mechanic at Leeds.

"It consists of two pieces of thin elastic steel, which surround the sides of the abdomen, and nearly meet behind. At their anterior extremity they form conjointly an oval ring, to one side of which is fastened a spring of steel of the form represented. At the end of this spring is placed the pad or bolster that presses upon the hernia. By the elasticity of this spring the hernia is repressed in every position of the body, and is thereby retained continually within the abdomen. A piece of calico or jean is fastened to each side of the oval ring, having a continued loop at its edge, through which a piece of tape is put, that may be tied behind the body. This contrivance helps to preserve the instrument steady in its proper situation," (*Practical Obs. in Surgery*, p. 231.)

When the exomphalos is irreducible, and large, the tumour must be supported with bandages.

It is observed by Professor Scarpa, that the umbilical hernia, and those of the linea alba, are less subject to be strangulated, than the inguinal and femoral

hernia; but that, when they are unfortunately affected with strangulation, the symptoms are more intense, and gangrene comes on more rapidly, than in every other species of rupture. If the operation be performed, the event is frequently unfavourable, because it is generally done too late. This practical fact is proved by the experience of the most celebrated surgeons of every age. "*Il est certain (says Dionis) que de cette opération il en périt plus qu'il n'en réchappe.*" (*Cours d'Opération*, p. 98, Edit. 1777, avec les notes de La Faye.) He also adds, that they, who have the misfortune to be afflicted with an exomphalos, should rather dispense with their shirt, than a bandage. Heister says nearly the same thing. (*Instit. Chirurg. Tom. 2, Cap. 94.*)

It is further remarked by Scarpa, that when the omentum alone is strangulated in the exomphalos, or hernia of the linea alba, observation proves, that the symptoms are not less intense, than when the intestine is also incarcerated. There is this difference, however, that when the omentum alone is strangulated, only nausea occurs, and, if vomiting should likewise take place, it is less frequent and violent than when the bowel itself is strangulated. In the first case, the stools are hardly ever entirely suppressed. The proximity of the stomach is, no doubt, the reason, why the strangulation of the omentum, in the umbilical hernia, occasions far more intense symptoms of sympathetic irritation, than the strangulation of the same viscus in the inguinal, or crural hernia.

Here, says Scarpa, the operation is not only always necessary, but urgently required. It is not materially different from that, which is practised for the strangulated inguinal and crural hernia; but, in general, it demands greater circumspection, on account of the connexion, or intimate adhesions, which frequently exist, between the integuments and hernial sac, and also the adhesions, which often prevail between the latter part and the omentum which it contains. The situation of the intestine, which is frequently covered by, and enveloped in the omentum, is another circumstance deserving earnest attention. (*Scarpa, Traité des Hernies*, p. 361, 362.)

Mr. Pott is not such an advocate as Scarpa, for the early performance of the operation in cases of exomphalos:—"The umbilical, like the inguinal hernia, becomes the subject of chirurgic operation, when the parts are irreducible by the hand only, and are so bound as to produce bad symptoms. But though I have in the inguinal and scrotal hernia

advised the early use of the knife, I cannot press it so much in this: the success of it is very rare, and I should make it the last remedy. Indeed I am much inclined to believe, that the bad symptoms which attend these cases are most frequently owing to disorders in the intestinal canal, and not so often to a stricture made on it at the navel, as is supposed. I do not say that the latter does not sometimes happen, it certainly does; but it is often believed to be the case when it is not.

[On this opinion of Mr. Pott's I take the liberty to remark, that no surgeon ought to undertake an operation for the cure of hernia, unless certain that the hernia exists. If an umbilical hernia be strangulated, it calls as loudly for the operation as any other, and I see no reason why it should be longer delayed.]

"When the operation becomes necessary, it consists in dividing the skin and hernial sac, in such manner as shall set the intestine free from stricture, and enable the surgeon to return it into the abdomen." (*Pott on Ruptures.*)

The rest of the conduct of the surgeon is to be regulated by the usual principles.

The division of the stricture is properly recommended to be made directly upward, in the course of the linea alba.

In consequence of the great fatality of the usual operation for the exomphalos, I think the plan suggested, and successfully practised by Mr. A. Cooper in two instances, should always be adopted, whenever the tumour is at all large, and free from gangrene; a plan, that has also received the high sanction of that distinguished anatomist and surgeon, Professor Scarpa. (*Traité des Hernies*, p. 362.) I might, perhaps, safely add, that when the parts admit of being reduced, without laying open the sac, this method should always be preferred. It consists in only making an incision sufficient to divide the stricture, without opening the sac at all, or, at all events no more of it, than is inevitable.

In umbilical hernia, of not a large size, Mr. C. recommends the following plan of operating: "As the opening into the abdomen is placed towards the upper part of the tumour, I began the incision a little below it, that is, at the middle of the swelling, and extended it to its lowest part. I then made a second incision at the upper part of the first, and at right angles with it, so that the double incision was in the form of the letter T, the top of which crossed the middle of the tumour. The integuments being thus divided, the angles of the incision were turned down, which exposed a considerable portion of

the hernial sac. This being then carefully opened, the finger was passed below the intestines to the orifice of the sac at the umbilicus, and the probe-pointed bistoury being introduced upon it, I directed it into the opening at the navel, and divided the linea alba downwards, to the requisite degree, instead of upwards, as in the former operation. When the omentum and intestine are returned, the portion of integument and sac, which is left, falls over the opening at the umbilicus, covers it, and unites to its edge, and thus lessens the risk of peritoneal inflammation, by more readily closing the wound." (*On Crural and Umbilical Hernia.*)

[Mr. Lawrence remarks that in old umbilical hernia there is generally found a considerable portion of omentum adhering to the sac. About two years ago I operated on a case of umbilical hernia, in which the sac differed from any I have seen described. Upon cutting into it I found a portion of ilium, ten inches in length, strangulated in several places, by bands passing in all directions from the sac to the omentum, forming a cavity much resembling the ventricles of the heart. The omentum, and the sac had been blended together in this way probably for years. The intestine was not a part of the usual contents of the sac, but had been forced into this singular cavity and become strictured in four distinct places by these productions. It was necessary by very careful dissection to divide these bands and liberate the strictured intestine, which was accomplished, and the intestine evidently not being gangrenous was returned into the abdomen.]

LESS FREQUENT KINDS OF HERNIA.

The *ventral hernia*, described by Celsus, is not common; it may appear at almost any point of the anterior part of the belly, but, is most frequently found between the recti muscles. The portion of intestine, &c. is always contained in a sac, made by the protrusion of the peritonæum. Mr. A. Cooper imputes its causes to the dilatation of the natural foramina for the transmission of vessels, to congenital deficiencies, lacerations, and wounds, of the abdominal muscles, or their tendons. In small ventral hernia, a second fascia is found beneath the superficial one; but, in large ones, the latter is the only one covering the sac.

Hernia in the course of the linea alba sometimes occur so near the umbilicus, that they are liable to be mistaken for true umbilical ruptures. They may take place either above, or below the navel. The first case, however, is more frequent,

than the second, and the following is the reason of this circumstance according to the opinion of Scarpa. "The upper half of the linea alba, that which extends from the ensiform cartilage to the umbilicus, is naturally broader and weaker, than the lower half, the recti muscles becoming nearer and nearer together, as they descend from the navel to the pubes." (*Scarpa, Traité des Hernies, p. 333.*)

The hernial sac of ruptures at the upper part of the linea alba may contain a noose of intestine, and a piece of the omentum, though, in most cases, a portion of the latter membrane alone forms the contents. In some subjects, the linea alba is so disposed to give way, that several herniæ are observed to be formed successively in the interspace between the ensiform cartilage and the umbilicus.

"With respect to the small hernia (says Scarpa) which is considered as formed by the stomach, and concerning which Hoin and Garengot have written so much (without either of them having related, at least to my knowledge, a single example proved by dissection), it is at least unproved, that it was exclusively formed by this viscus. I do not see, why the other viscera, particularly the omentum and transverse colon, might not also contribute to it. In my judgment, it only differs from other herniæ of the linea alba, in being situated on the left side of the ensiform cartilage, a situation, that must materially influence the symptoms of the case. In fact, whatever may be the viscera, which form it, a sympathetic irritation of the stomach is occasioned, that is much more intense, than that which ordinarily accompanies umbilical herniæ, those of the lower part of the linea alba, or, in short, all other herniæ, which are more remote from the stomach." (*Op. cit. p. 334.*)

The following are said to be the circumstances, by which the umbilical hernia, and that which occurs in the linea alba near the navel, may be discriminated.

The first, whether in the infant, or the adult, has a roundish neck, or pedicle, at the circumference of which the aponeurotic edge of the umbilical ring can be felt. Whatever may be its size, its body always retains nearly a spherical shape. Neither at its apex, or its sides, is any wrinkling of the skin, or any thing like the cicatrix of the navel, distinguishable. In some points of the surface of the tumour, the skin is merely somewhat paler and thinner, than elsewhere.

On the contrary, the hernia of the linea alba has a neck, or pedicle of an oval form, like the fissure, through which it is protruded. The body of the tumour

is also constantly oval. If the finger be pressed deeply round its neck, the edges of the opening in the linea alba can be felt; and, if the hernia be situated very near the umbilical ring, the cicatrix of the navel may be observed upon one side of it, which cicatrix retains its rugosity and all its natural appearance; a certain indication, that the viscera are not protruded through the umbilical ring. (*Scarpa, Traité des Hernies, p. 336.*)

The distinction, which Scarpa has established between the umbilical hernia, properly so called, and those of the linea alba, is not useless in regard to practice. Indeed, when the latter are left to themselves, they make much slower progress than the former. On account of their smallness, they frequently escape notice, particularly in fat persons, and, when situated at the side of the ensiform cartilage. They occasion, however, complaints of the stomach, habitual Colics, especially after meals; and, unfortunately for the patient, he may be tormented a very long time by these indispositions, before the true cause of them is discovered.

The umbilical hernia may be known, from the earliest period of its formation, by the alteration which it produces in the cicatrix of the navel, and the rapidity of its increase.

In other respects, these two kinds of herniæ demand the same means of cure; but, those of the linea alba, *ceteris paribus*, are more difficult to cure, than ruptures at the umbilicus. This is probably owing to the natural tendency, which the umbilical ring has to close, when the hernia is kept well reduced, whilst accidental openings in the linea alba, have not the same advantage. (*Scarpa, p. 340.*)

When a common ventral hernia is reduced, it should be kept in its place by means of a bandage or truss. When strangulated, it admits, more frequently than most other cases, of being relieved by medical treatment. If attended with stricture, which cannot otherwise be relieved, that stricture must be carefully divided. Mr. A. Cooper recommends the valvular incision, and the dilatation to be made, either upward, or downward, according to the relative situation of the tumour and epigastric artery, which crosses the lower part of the linea semilunaris.

Pudendal Hernia.—This is the name assigned by Mr. A. Cooper, to that which descends between the vagina and ramus ischii, and forms an oblong tumour in the labium, traceable within the pelvis, as far as the os uteri. Mr. C. thinks this case has sometimes been mistaken for a hernia of the foramen ovale. When reducible, a common female bandage, or the

truss used for a prolapsus ani, should be worn. A pessary, unless very large, could not very well keep the parts from descending, as the protrusion happens so far from the vagina. Mr. C. is of opinion, that, when strangulated, this hernia, in consequence of the yielding nature of the parts, may generally be reduced, by pressing them with gentle and regular force, against the inner side of the branch of the ischium. If not, the warm bath, bleeding, and tobacco glysters, are advised. Were an operation indispensable, the incision should be made in the labium, the lower part of the sac carefully opened, and, with a concealed bistoury, directed by the finger, in the vagina, the stricture should be cut directly inward, towards the vagina. The bladder should be emptied, both before the manual attempts at reduction, and the operation. (*On Cruval Hernia, &c. p. 64.*)

Vaginal Hernia—A tumour occurs within the os externum. It is elastic, but not painful. When compressed, it readily recedes, but, is reproduced by coughing, or even without this when the pressure is removed. The inconveniences produced are an inability to undergo much exercise, or exertion; for, every effort of this sort brings on a sense of bearing down. The vaginal hernia protrudes in the space, left between the uterus and rectum. This space is bounded below by the peritonæum, which membrane is forced downwards towards the perinæum; but, being unable to protrude further in that direction, is pushed towards the back part of the vagina. Mr. C. advised the use of a pessary in one case; the plan, however, was neglected. These cases, probably, are always intestinal.

Some herniæ protrude at the anterior part of the vagina. (See *Mr. A. Cooper on Cruval Hernia, &c. p. 65, 66.*)

Perineal Hernia.—In men, the parts protrude between the bladder and rectum; in women, between the rectum and vagina. The hernia does not project, so as to form an external tumour, and, in men, its existence can only be distinguished by examining in the rectum. In women, it may be detected both from this part, and the vagina.

In case of strangulation, the hernia might, perhaps, be reduced by pressure from within the rectum. An interesting case of perineal hernia, which took place from the peritonæum being wounded with the gorget in lithotomy is related by Mr. Bromfield; *Chirurgical Observations, p. 264.*

The reducible perineal hernia in women may be kept from descending, by using a large pessary. Both this kind of rupture

and the vaginal may prove very dangerous in cases of pregnancy. See *Smellie's Midwifery, Case, 5.*

Thyroidal Hernia, or Hernia Foraminis Ovalis. In the anterior and upper part of the obturator ligament, there is an opening, through which the obturator artery, vein, and nerve proceed, and through which, occasionally, a piece of omentum, or intestine is protruded, covered with a part of the peritonæum, which constitutes the hernial sac.

In the case, which Mr. A. Cooper met with, the hernia descended above the obturators muscles. The os pubis was before the neck of the sac; three-fourths of it were surrounded by the obturator ligament; and the fundus of the sac lay beneath the pectineus and adductor brevis muscles. The obturator nerve and artery were situated behind the neck of the sac, a little towards its inner side. This species of hernia can only form an outward tumour, when very large. Garengeot, however, met with an instance, in which there was not only a swelling, but, one attended with symptoms of strangulation; he reduced the hernia, which went up with a gurgling noise; the symptoms were stopped, and stools soon followed.

The hernia of the foramen ovale, when reducible, must be kept up with a suitable truss; and when strangulated, and not capable of relief from the usual means, an operation would be requisite, though attended with difficulties. The division of the obturator ligament and mouth of the sac should be made inwards, to avoid the obturator artery. This vessel, however, would even be exposed to injury by following this plan, if it should arise in common with the epigastric artery. (See a paper by Garengeot in *Mém. de l'Acad. de Chir. tom. 1*; and *A. Cooper on Cruval Hernia, &c. p. 70.*)

Cystocèle.—As Mr. Pott observes, "The urinary bladder is also liable to be thrust forth from its proper situation, either through the opening in the oblique muscle, like the inguinal hernia, or under Poupart's ligament, in the same manner as the femoral.

"This is not a very frequent species of hernia, but does happen, and has as plain and determined a character as any other.

"It has been mentioned by Bartholin, T. Dom. Sala, Platerus, Bonetus, Ruysch, Petit, Mery, Verdier, &c. In one of the histories given by the latter, the urachus, and impervious umbilical artery on the left side, were drawn through the tendon into the scrotum, with the bladder; in another he found four calculi.

"Ruysch gives an account of one complicated with a mortified bubonocèle.

Mr. Petit says he felt several calculi in one, which were afterwards discharged through the urethra.

"Bartholin speaks of T. Dom. Sala as the first discoverer of the disease, and quotes a case from him, in which the patient had all the symptoms of a stone in his bladder; the stone could never be felt by the *sound*, but was found in the bladder (which had passed into the groin) after death.

"As the bladder is only covered in part by the peritoneum, and must insinuate itself between that membrane and the oblique muscle, in order to pass the opening in the tendon, it is plain that the hernia cystica can have no sac, and that, when complicated with a bubonocoele, that portion of the bladder which forms the cystic hernia must lie between the intestinal hernia and the spermatic chord, that is, the intestinal hernia must be anterior to the cystic.

"A cystic hernia may indeed be the cause of an intestinal one; for when so much of the bladder has passed the ring, as to drag in the upper and hinder part of it, the peritoneum which covers that part must follow, and by that means a sac be formed for the reception of a portion of gut or caul. Hence the different situation of the two hernia in the same subject.

"While recent, this kind of hernia is easily reducible, and may, like the others, be kept within by a proper bandage; but when it is of any date, or has arrived to any considerable size, the urine cannot be discharged, without lifting up, and compressing the scrotum; the outer surface of the bladder is now become adherent to the cellular membrane, and the patient must be contented with a suspensory bag.

"In case of complication with a bubonocoele, if the operation becomes necessary, great care must be taken not to open the bladder instead of the sac, to which it will always be found to be posterior. And it may also sometimes by the inattentive be mistaken for a hydrocele, and by being treated as such, may be the occasion of great or even fatal mischief." (Vol. 2.)

The cystocoele is always easily distinguishable by the regular diminution of the swelling, whenever the patient makes water.

Verdier and Sharp have accurately described the cystocoele. Pott has offered two cases, which fell under his observation; Vol. 3. Pipelet le Jeune mentions a cystic hernia in perinaeo, and several cases of its occurrence in the female; Acad. de Chir. tom. 4. Pott cut into one cystocoele, by mistake. Mention is made

(Edinb. Surg. Journ. vol. 4. p. 512.) of a cystic hernia, which protruded between the origins of the levator ani, and obturator internus muscles: the tumour made its appearance in the pudendum of an old woman. Gunz and Hoin have also treated of the cystocoele.

Ischiatic Hernia.—The case is probably very rare. A case, however, which was strangulated, and undiscovered till after death, is related in Mr. A. Cooper's second part of his work on hernia. It is communicated by Dr. Jones, already celebrated for his book on hemorrhage. The disease happened in a young man, aged 27. On opening the abdomen, the ilium was found to have descended on the right side of the rectum into the pelvis, and a fold of it was protruded into a small sac, which passed out of the pelvis at the ischiatic notch. The intestine was adherent to the sac at two points: the strangulated part, and about three inches on each side, were very black. The intestines towards the stomach were very much distended with air, and, here and there, had a livid spot on them. A dark spot was even found on the stomach itself just above the pylorus. The colon was exceedingly contracted, as far as its sigmoid flexure. A small orifice was found in the side of the pelvis, in front of, but a little above, the sciatic nerve, and on the forepart of the pyriformis muscle. The sac lay under the glutæus maximus muscle, and its orifice was before the internal iliac artery, below the obturator artery, but above the vein. Mr. A. Cooper remarks, that a reducible case might be kept up with a spring truss, and, that if an operation were requisite, the orifice of the sac should be dilated directly forwards. (On Crural Hernia, &c. p. 73.)

Phrenic Hernia.—The abdominal viscera are occasionally protruded through the diaphragm, either through some of the natural apertures in this muscle, or deficiencies, or wounds, and lacerations in it. The second kind of case is the most frequent: Morgagni furnishes an instance of the first. Two cases, related by Dr. Macauley in *Med. Obs. and Inq. Vol. 1.* and two others published by Mr. A. Cooper, are instances of the second sort: and another case has been lately recorded by the latter gentleman, affording an example of the third kind. Hildanus, Pare, Petit, Schenck, &c. also mentions cases of phrenic hernia. The disease is quite out of the reach of art.

Mesenteric Hernia.—If one of the layers of the mesentery be torn by a blow, while the other remains in its natural state, the intestines may insinuate themselves into the aperture and form a kind of hernia.

The same consequences may result from a natural deficiency in one of these layers. Mr. A. Cooper records a case, in which all the small intestines, except the duodenum, were thus circumstanced. The symptoms during life were unknown. (On *Crural Hernia*, &c. p. 82.)

Mesocolic Hernia.—So named by Mr. A. Cooper, when the bowels glide between the layers of the mesocolon. There is a specimen of this disease preserved at St. Thomas's hospital.

Every surgeon should be aware, that the intestines may be strangulated within the abdomen from the following causes: 1. Apertures in the omentum, mesentery, or mesocolon, through which the intestine protrudes. 2. Adhesions, leaving an aperture, in which a piece of intestine becomes confined. 3. Membranous bands at the mouths of hernial sacs, which becoming elongated, by the frequent protrusion and return of the viscera, surround the intestine, so as to strangulate them within the abdomen, when returned from the sac. (See *A. Cooper on Crural Hernia*, &c. p. 85.)

Pott remarks, that "Ruysch gives an account of an impregnated uterus being found on the outside of the abdominal opening; and so do Hildanus and Senertus. Ruysch also gives an account of an entire spleen having passed the tendon of the oblique muscle. And I have myself seen the ovaria removed by incision, after they had been some months in the groin." (Vol. 2.)

The best sources of information on hernia are the following: *Franco, Traité des Hernies*, &c.; Lyon, 1561; 8vo. *Littre, Observations sur une Nouvelle Espèce de Hernie*; *Mem. de l'Acad. des Sciences*; 1700. *Mery*; same work; 1701. *Littre, sur une Hernie Rare*; same work; 1714. *Mauchart de Hernia incarcerata*; *Tubing.* 1722. *Heister, Institut. Chirurg. et De Hernia Incarcerata Suppurata non semper lethali*. *Vogel, abhandlung aller arten der bruche*; *Lips.* 1738. *Peyronie, Observations, &c. sur la Cure des Hernies avec Gangrene*, *Mém. de l'Acad. de Chir.* tom. 1. *Gunzius, Observationum Anatomico-chirurgicarum de Herniis libellus*; *Lips.* 1744. *Arnaud on Hernias*, 1748; also his *Mem. de Chir.* *Haller de Herniis Congenitis*, 1749. *Garengeot, sur plusieurs Hernies singulières*; *Mem. de l'Acad. de Chir.* tom. 2. *Moreau sur les suites d'une Hernie opérée*; *Mem. de l'Acad. de Chir.* tom. 3. *Benevoli, una Ernia assai particolare*; *Firenze*, 1750. *Haller Herniarum adnotationes*; extant in opuscul. pathol. 1755. *Blanc Nouvelle Méthode d'opérer les Hernies*; avec un essai sur les Hernies, par M. Hoin; *Orléans*, 1767; 8vo. *Louis, Reflexions sur*

l'Opération de la Hernie; *Mem. de l'Acad. de Chir.* tom. 4. *Hoin, Essai sur les Hernies rares et peu connues*; 1767. *Medical Observations and Enquiries*. *Pott's Works*, vols. 2. and 3. *Goursaud sur la Différence des Causes de l'étranglement des Hernies*; *Mem. de l'Acad. de Chir.* tom. 4. *Le Dran, Traité des Opérations de Chir. et Observations de Chir.* obs. 57. *F. Hildanus*, cent. 5. obs. 54. *J. L. Petit, Traité de Mal Chir.* tom. 2. *Sharp on the Operations*, and his *Critical Enquiry*. *Bertrandi Traité des Opérations*, et *Exemple d'une Hernie formée du côté droit par l'intestin ileum seulement*, dont une portion s'étoit échappée par une des échan-crures ischiatiques, en se glissant sur les ligaments sacro-sciatiques; *Mem. de Chir.* tom. 2. *Saltzman, Disp. de Vesicæ Urinariæ Hernia*; 1712. *Mery sur des Descendentes de la Vessie*; *Acad. de Sciences*, 1713. *J. L. Petit sur les Hernies de la Vessie*; *Acad. des Sciences*, 1717. *Verdier, Recherches sur la Hernie de la Vessie*; *Mem. de l'Acad. de Chir.* tom. 2. *Divoux, Disp. de Hernia Vesicæ Urinariæ*; *Argent.* 1732. *Leuret, Obs. sur la Hernie de la Vessie*; *Mem. de l'Acad. de Chir.* tom. 2. *P. Petit (le jeune) sur les Hernies de la Vessie, et de l'Estomac*; *Acad. de Chir.* tom. 4. *Vater de Lienis Prolapsione*; 1746. *Peyronie sur un étranglement de l'intestin, causé intérieurement par l'adhérence de l'epiploon au-dessus de l'anneau*; *Mem. de l'Acad. de Chir.* tom. 1. *Tenon in Acad. des Sciences*; 1764. *Gunzius, Obs. de Entero-epiplocele*. *Callisen, System Chirurg. hodiernæ, pars posterior*. *Richter Von den Brüchen*, in 2 vols. 1778, 1779: or the French transl. by *Rougemont*. Also *Richter's Bibliothek*, and *Anfang der Wundarzn.* *Wilmer's Pract. Obs. on Hernia*. *Schmucker's Chir. Wahrnehmungen*. *Desault's Œuvres Chirurg.* par *Bichat*. tom. 2. *Hey's Pract. Observ. in Surgery*. *Sandifort's Anat. Pathol.* *Camper's Demonstrat. Anat. Pathol.* 1760; and his *Icones Herniarum*, edit. à *Soemmerring*. 1801. *Dr. Hunter's Med. Comment.* 1762, 1764. *Monro in Edinb. Med. Essays*; and the edition of his works by his Son. *Gimbernat's Account of a New Method of operating for Femoral Hernia*. *A. Cooper on Inguinal and Congenital Hernia*; and on *Crural and Umbilical Hernia*. *Monro on Crural Hernia*, 1803. *Sabatier, Médecine Opératoire*, tom. 1. *Chopart and Desault, Traité des Mal. Chir.* *Desault, Parisian Surgical Journal*. *Wrisberg in Comment. Reg. Societ. Götting.* 1778. *Schmucker's Vermischte Chir. Schriften*. *Haller's Opera Minora*; and *Disputationes Chir.* *Sulperne Memorie anatomi-*

co-chirurgie di Antonio Scarpa, 1809 and 1810; or the French transl. by Cayol, 1812. *Richerand's Nosographie Chirurgicale*, Tom. 3. p. 354, &c. Edit. 2. *Lasus, Pathologie Chirurgicale*, Tom. 1, p. 1, &c., Edit. 1809. *Pelletan Clinique Chirurgicale*, Tom. 3. *Travers on Injuries of the Intestines*, &c. 1812. *Léveillé, Nouvelle Doctrine Chirurgicale*, Tom. 3, p. 170, &c. 1812. But, above all, the work, which I feel infinite pleasure in recommending, from a conviction of its superior merit, and practical utility, is a *Treatise on Hernia by W. Lawrence*; 8vo. the first edit. of which was published 1807, the second in 1810, under the title of a *Treatise on Ruptures*.

HERNIA CEREBRI. (*Fungus Cerebri. Encephalocele.*) This name is given to a tumour which every now and then rises from the brain, through an ulcerated opening in the dura mater, and protrudes through a perforation in the cranium, made by the previous application of the trephine. Mr. Abernethy has made some observations on this disease, and related some cases. In one of these, the hernia cerebri arose on the tenth day after trephining, and was as large as a pigeon's egg; the pia mater, covering it, was inflamed; and a turbid serum was discharged at the sides of the swelling, from beneath the dura mater. On the eleventh day, the tumour was as large as a hen's egg, smooth, and ready to burst. The man died the next day. On examination, the swelling was found larger, than before, and of a dark colour, with an irregularly granulated surface. This appearance was owing to coagulated blood, which adhered to its surface, as the part had bled so much, that the patient's cap was rendered quite stiff with blood. The pia mater was in general much inflamed, and, as well as the dura mater, was deficient at the place of the tumour. The deeper part of the swelling seemed to consist of fibrous coagulated blood, and it was found to originate about an inch below the surface of the brain.

Mr. Abernethy explains the particular appearance and progress of the disease, as follows: "In consequence of the brain being injured to some depth beneath the surface, disease of the vessels, and consequent effusion of the blood, had ensued; the effusion was, for a time, restrained by the superincumbent brain and its membranes; but, these gradually yielding to the expansive force exerted from within, and at last giving way altogether, the fluid blood oozed out and congealed upon the surface of the tumour." An organized fungus could

hardly be produced so rapidly as these tumours are. (*Essay on injuries of the Head*, p. 37.)

Mr. C. Bell contends, however, that such swellings are vascular and organized. (*Operative Surgery*, Vol. 1.)

When the bad symptoms disappear, on the tumour being no longer confined by the dura mater, it is best to interfere as little as possible, as the hemorrhage will probably cease, and the tumour drop off in pieces. (See *Edinb. Med. Comment.* Vol. 1. p. 98. *Med. Museum*, Vol. 4. p. 463.) The mildest dressings alone should be employed, and all pressure avoided.

When the tumour acquires a very great size, it may be pared off with a knife, as Mr. Hill did several times, with success. (*Cases in Surgery*.)

Should the swelling still increase, and bad symptoms prevail, in consequence of the irritation and pressure on the brain, the opening in the bone ought to be enlarged. Were the bleeding to continue in a dangerous degree, Mr. Abernethy suggests removing the coagulum, to try whether exposure of the cavity would stop the effusion of blood. Quesnay mentions an instance, in which a patient tore off the coagulum himself, and the cavity healed up; *Mem. de l'Acad. de Chir.* tom. 1. The danger of applying styptics, and irritating applications is shewn by Hildanus, *Obs.* 14, and Mr. Hill, p. 198. (See *Abernethy on Injuries of the Head*.)

One would suppose, that cases of this kind would generally require the employment of every thing at all likely to keep off, and diminish, inflammation of the brain.

[The American Editor has recently witnessed the recovery of a patient with hernia cerebri—he does not venture to call it a cure.—During the existence of the tumour vomiting took place, which was followed by a copious discharge of blood, and an amelioration of the symptoms.—The patient, aged about 12 years, is now in good health.]

HERNIA HUMORALIS. (*Inflammatio Testis. Swelled Testicle.*) A very common symptom, attending a gonorrhœa, is a swelling of the testicle, which is only sympathetic, and not venereal, because the same symptoms follow every kind of irritation on the urethra, whether produced by strictures, injections, or bougies. Such symptoms are not similar to the actions arising from the application of venereal matter, for suppuration seldom occurs, and when it does, the matter is not venereal. The swelling and inflammation appear suddenly, and as suddenly disappear, or go from one testicle to the other. The epididymis remains swelled,

however, even for a considerable time afterwards. (*J. Hunter.*)

The first appearance of swelling is generally a soft pulpy fulness of the body of the testicle, which is tender to the touch; this increases to a hard swelling, accompanied with considerable pain. The epididymis, towards the lower end of the testicle, is generally the hardest part. The hardness and swelling, however, often pervade the whole of the epididymis. The spermatic chord, and especially, the vas deferens, are often thickened and sore to the touch. The spermatic veins sometimes become varicose. A pain in the loins, and sense of weakness there, and, in the pelvis, are other casual symptoms. Cholicky pains; uneasiness in the stomach and bowels; flatulence; sickness; and even vomiting; are not unfrequent. The whole testicle is swelled, and not merely the epididymis, as has been asserted. (*J. Hunter.*)

The inflammation of the part most probably arises from its sympathizing with the urethra. The swelling of the testicle coming on, either removes the pain in making water, and suspends the discharge, which do not return, till such swelling begins to subside; or else the irritation in the urethra, first ceasing, produces a swelling of the testicle, which continues till the pain and discharge return; thus rendering it doubtful, which is the cause, and which the effect. Occasionally, however, the discharge has become more violent, though the testicle has swelled; and such swelling has even been known to occur after the discharge has ceased; yet, the latter has returned with violence, and remained as long as the hernia humoralis. (*J. Hunter.*)

Irritation at the mouth of the vasa deferentia has been mentioned as a cause; but, were this true, both testicles would usually be affected at the same time, and the complaint would occur more frequently, when the irritation of the urethra extends far towards the bladder, than when it only reaches about an inch and a half, or two inches, from the orifice of the passage. (*J. Hunter.*)

Hernia humoralis, with stoppage of the discharge, is apt to be attended with strangury. A very singular thing is, that the inflammation more frequently comes on when the irritation in the urethra is going off, than when it is at its height. (*J. Hunter.*)

The enlargements of the testicle, from cancer and scrophula, are generally slow in their progress; that of a hernia humoralis very quick. (*J. Hunter.*)

Rest is the best remedy, and the horizontal position of the body is easiest. At

all events, the testicle must be well suspended; to which expedient the patient will readily have recourse as soon as he knows the ease it affords. The case is treated as inflammation in general, by bleeding and purging, and applying fomentations and poultices. Leeches have often proved serviceable. The swelling not being venereal, mercury is only useful in removing the induration, continuing after the inflammation has subsided. Vomits have been recommended, and found beneficial. They have even been known to cure the complaint in a surprisingly sudden manner. Opiates are useful. When suppuration occurs, no mercury is requisite, only common treatment.

As the hernia humoralis often appears to depend on the cessation of the discharge, some (*Bromfield*) have advised irritating the urethra with bougies to bring on the gonorrhœa again; but the practice is not followed by the expected good. The introduction of venereal matter into the urethra has also been most absurdly suggested.

A hernia humoralis is at first very quick in subsiding; but, some of the swelling remains a long while, and the hardness and swelling of the epididymis even continue for years, nay, for life. However, no inconvenience attends the mere induration. In such instances, the vas deferens may occasionally be rendered impervious, though the occurrence must be by no means frequent. (*J. Hunter.*)

Frictions with camphorated mercurial ointment; fumigations with aromatic herbs; and electricity; are the best means for promoting the absorption of the superfluous particles, causing the induration in question. (*J. Hunter.*)

The signs, distinguishing a hernia humoralis from a scrotal rupturè, are explained in the article *Hernia*.

John Hunter has undoubtedly given the best account of hernia humoralis.

HERPES. (from *ἑρπας*, to creep.) Several cutaneous, superficial kinds of ulcerations, having a great propensity to creep, or spread over the skin, are so named. Cullen places this disease in the class *locales*, and order *dyalyses*; and defines it, phlyctenæ, or a great number of small ulcers, crowding together, creeping, and difficult to heal. For an account of one disease, usually considered as a species of herpes, see *Noli me tangere*. Refer also to *Tinea Capitis*, which some have classed with herpes.

The *tetter*, ring-worm, *serpigo*, or *darta*, consists of clusters of sharp-pointed pustules, of a yellowish white colour, with inflamed bases. The disease is attended

with more or less smarting and itching, is sometimes difficult of cure, and apt to recur. When the disorder is connected with constitutional causes, small doses of mercury are useful. One of the best local applications, is a solution of the hydrargyrus muriatus in lime-water.

Shingles, zona aurea, or herpes zoster, is a disease, which appears in large clusters on the neck, breast, loins, hips, or thighs, and sometimes spreads all round the body, or limbs. The heads of the little pustules have at first a white watery appearance, and then a small round scab, resembling a millet-seed. Hence the names *herpes miliaris*. The complaint is often attended with febrile symptoms. The treatment should resemble that of erysipelas; but, bark and camphor are particularly recommended as useful internal medicines. The lotion of lime-water, and muriated mercury is also said to be frequently an efficacious application. Old persons are subject to a more inveterate, obstinate, and dangerous species of shingles. All the other kinds of herpes, enumerated by writers, are medical cases, as, indeed, some may consider the two latter affections: we shall therefore, not enlarge on the subject in this work.

HORDEOLUM, (dim. of *hordeum*, barley.) A little tumour on the eye-lid, resembling a barley-corn. *A Sty.* As Scarpa remarks, the sty is strictly only a little boil, which projects from the edge of the eye-lids, particularly often near the great angle of the eye. This little tumour, like the furunculus, is of a dark red colour, much inflamed, and a great deal more painful, than might be expected, considering its small size. The latter circumstance is partly owing to the vehemence of the inflammation producing the sty, and partly to the exquisite sensibility and tension of the skin, which covers the edge of the eyelids. On this account, the hordeolum very often excites fever and restlessness in delicate, irritable constitutions; it suppurates slowly and imperfectly; and, when suppurated, has no tendency to burst.

The sty, like other furunculous inflammations, forms an exception to the general rule, that the best mode, in which inflammatory swellings can end, is resolution. For, whenever, a furunculous inflammation extends so deeply as to destroy any of the cellular substance, the little tumour can never be resolved, or only imperfectly so. This event, indeed, would rather be hurtful, since there would still remain behind a greater or smaller portion of dead cellular membrane, which, sooner or later, might bring on a renewal of the sty in the same place

as before, or else become inverted into a hard indolent body, deforming the edge of the eyelid.

The resolution of the incipient hordeolum may be effected in that stage of it, in which the inflammation only interests the skin, and not the cellular substance underneath, as is the case on the first appearance of the disease. Now repellent, cold applications are useful; particularly ice. But when the hordeolum has affected, and destroyed, any of the cellular membrane underneath, every topical repellent application is absolutely useless, and even hurtful; and the patient should have recourse to emollient anodyne remedies. The hordeolum and eyelids should be covered with a warm soft bread and milk poultice, which ought to be renewed very often. When a white point makes its appearance on the apex of the little tumour, Scarpa says, the surgeon should not be in a hurry to let out the small quantity of serous matter, which exists between the skin and dead portion of cellular membrane. It is better, that he should wait till the skin, within this white point, has become still somewhat thinner, so as to burst of itself, and give a ready vent, not merely to the little serous matter, but, to all the dead cellular membrane, which constitutes the chief part of the disease. When the contents of the little tumour are slow in making their way outward, through the opening, the surgeon, gently compressing the base of the sty, ought to force them out. After this, all the symptoms of the disease will disappear, and the cavity, left by the dead cellular membrane, in the centre of the little tumour, will be found quite filled up, and healed, in the course of twenty-four hours.

Sometimes, though seldom, this process of nature, destined to detach the dead from the living cellular membrane, only takes place incompletely, and a small fragment of yellow dead cellular substance still continues fixed in the cavity, and hinders the cure. In this circumstance, the further employment of emollient poultices is of little or no service. The surgeon should dip the point of a camel-hair pencil in sulphuric acid, and touch the inside of the sty with it, one or more times, until the sloughy cellular membrane comes away. After this, the small cavity remaining will soon close. Should the eyelid continue afterwards a little swollen and œdematous, this affection may be removed by applying the lotio aquæ litharg. acet., containing a little spirit of wine. Some persons are very often annoyed with this disease. Scarpa imputes this most frequently to a

disordered state of the *primæ viæ*, often met with in persons who live on acrid irritating food, and drink too much spirits. (See *Scarpa sulle Malattie degli Occhi*, cap. 2.)

HYDARTHURUS. (from *υδωρ*, water, and *αρθρον*, a joint.) The white swelling. (See *Joints*.)

HYDRARGYRIA. A peculiar eruption occasioned by the use of mercury. (See *Mercury*.)

HYDRARGYRUS. (from *υδωρ*, water, and *αργυρος*, silver.) Quicksilver; mercury. (See *Mercury*.)

HYDROCELE. (from *υδωρ*, water, and *κηλη*, a tumour.) The term *hydrocele*, if used in a literal sense, means any tumour produced by water; but surgeons have always confined it to those, which possess either the membranes of the scrotum, or the coats of the testicle and its vessels. The first of these, viz. that which has its seat in the membranes of the scrotum, is common to the whole bag, and to all the cellular substance, which loosely envelopes both the testes. It is, strictly speaking, only a symptom of a disease, in which the whole habit is most frequently more or less concerned, and very seldom affects this part only. The latter, or those which occupy the coats immediately investing the testicle and its vessels, are absolutely local, very seldom affect the common membrane of the scrotum, generally attack one side only; and are frequently found in persons, who are perfectly free from all other complaints.

Dr. Monro, the father, professor of anatomy at Edinburgh, and Mr. Samuel Sharpe, were almost the only writers, before Mr. Pott, who sensibly and rationally explained the true nature of these diseases.

ANASARCOUS TUMOUR OF THE SCROTUM.

It is most frequently only a symptom of a dropsical habit, and very often accompanies both the general anasarca, and the particular collection within the abdomen, called the ascites. This being the case, and the true method of cure consisting in an internal medical process, it has been improperly ranked among the species of hydrocele, though the nature of the contents will certainly admit the use of the word.

"It is (says Pott) an equal, soft tumour, possessing every part of the cellular membrane, in which both the testicles are enveloped, and consequently is generally as large on one side as on the other; it leaves the skin of its natural colour; or, to speak more properly, it does not

redden or inflame it; if the quantity of water be not large, nor the distention great, the skin preserves some degree of rugosity: the tumour has a doughy kind of feel: easily receives, and for a while retains, the impression of the fingers; the raphe, or seam, of the serotum divides the swelling nearly equally; the spermatic process is perfectly free, and of its natural size; and the testicles seem to be in the middle of the loaded membrane. This is the appearance, when the disease is in a moderate degree. But if the quantity of extravasated serum be large, or the disease farther advanced, the skin, instead of being wrinkled, is smooth, tense, and plainly shews the limped state of the fluid underneath: it is cold to the touch, does not so long retain the impression of the finger, and is always accompanied with a similar distention of the skin of the penis: the preputium of which is sometimes so enlarged, and so twisted, and distorted, as to make a very disagreeable appearance. These are the local symptoms: to which it may be added, that a yellow countenance, a loss of appetite, a deficiency of urinary secretion, swelled legs, a hard belly, and mucous stools, are its very frequent companions.

"The cure of the original disease comes within the province of the physician, and requires a course of internal medicine: but sometimes the loaded scrotum and penis are so troublesome to the patient, and in such danger of mortification, that a reduction of their size becomes absolutely necessary; and at other times a derivation, or discharge, of the redundant extravasated serum from this part is ordered as an assistant to the internal regimen.

"The surgical means in use for this end is called in general scarification; a term, whose precise sense has by no means been settled; by which it has now and then happened, that a general order being given, and the particular method of executing it being left to the choice of those who have not been sufficiently acquainted with this kind of business, much hazard has been incurred, and considerable mischief done, which might have been avoided.

"The means of making this discharge are two, viz. puncture and incision: the former is made with the point of a lancet; the latter with the same instrument, or with a knife.

"The generality of writers on this subject have spoken on the two methods in such a manner, that a practitioner, who had seen but little of either, would be inclined to think, that it was a matter

of great indifference, which we should make use of: and that the safety and utility of each were equal: which is by no means the case.

"The intention of the use of either is, by a discharge of extravasated serum, to alleviate the present uneasiness; and, by reducing the size of the scrotum, to render it less troublesome, and less likely to mortify. In some few instances, it has indeed happened that this drain has proved a radical cure of the original disease; but that has been accidental, and is not in general to be expected. The intention is generally palliative; and, if the patient lives, is most likely to require repetition: therefore, if there be any difference between the two methods, with regard either to ease or safety, there can be no doubt which ought to be preferred.

"All wounds of membranous parts, in anasarca or dropsical habits, are necessarily both painful and hazardous; they are apt to inflame, are very difficultly brought to suppuration, and will often prove gangrenous in spite of all endeavours to the contrary. But the larger and deeper the wounds are, the more probable are these bad consequences. Simple punctures, with the point of a lancet, are much less liable to be attended by them, than any other kind of wound; they generally leave the skin easy, soft, cool, uninflamed, and in a state to admit a repetition of the same operation, if necessary. Incisions create a painful, crude, hazardous sore, requiring constant care. Punctures seldom produce any uneasiness at all; and stand in need of only a superficial pledget, for dressing.

"Now, although there is so very material a difference in the symptoms and trouble attending the two methods, yet is there none in their effect: the communication of the cells of the dartos with each other is so free, through every part of it, that punctures made with the fine point of a bleeding-lancet, into the most superficial of them, will, as certainly and as freely, drain off all the water, as a large incision, without any of its inconveniences or its hazard. Neither the one nor the other will cure the original disease, unless by mere accident: they are both made, with a design to cure only the local one. The same habit and constitution remaining, the same effect will in general follow, and the same relief be again necessary. The ease, the freedom from bad symptoms, or from danger, and the state in which the parts are left, render one method practicable at all times, and capable of being repeated as often as may be thought necessary: the fatigue, pain, confinement and hazard,

which most frequently attend the other, make one experiment in general as much as most people choose to submit to, or indeed have an opportunity of complying with."

Mr. Pott afterwards remarks; "If we consider the preceding complaint as merely symptomatic, and do not rank it among the different kinds of hydrocele, there will then remain only three, viz.

"1. That which consists of a collection of water in the cells of the tunica communis, or cellular membrane, enveloping and connecting the spermatic vessels.

"2. That which is formed by the extravasation of a fluid, in the same coat as the former, but which, instead of being diffused through the general cellular structure of it, is confined to one cavity or cyst, in which all the water constituting this species of disease is contained; the rest of the membrane being in its natural state.

"3. That which is produced by the accumulation of a quantity of water, in the cavity of the tunica vaginalis testis.

"These three are distinct, local, and truly within the province of surgery. They may accidentally be combined or connected with other disorders, but not necessarily; and are frequently found in persons whose general habit is good, and who are perfectly free from all other complaints."

THE HYDROCELE OF THE CELLS OF THE TUNICA COMMUNIS.

"The spermatic vessels, from their origin quite down to the insertion into the testicle, are enveloped in, and connected together by, a membrane, called formerly tunica vaginalis vasorum spermaticorum, but now (more properly) tunica communis. This membrane, so enveloping the spermatic vessels, has no one particular cavity, (as its old name would seem to imply;) but is merely cellular, as either the inflation of air or the extravasation of a fluid, will always prove. While it is within the cavity of the belly, its cells are lax and large; and when it has passed out from thence, and has formed a part of the spermatic process, by enveloping its vessels, its cells are rather smaller, and the membrane composing them, firmer. It is included within that thin expansion of muscular fibres, called the cremaster. And a great number of lymphatics, passing from the testicle to the receptaculum chyli, are always to be found in it.

"An attentive consideration of these circumstances in the structure of this part

will shew us, (continues Pott) why either obstruction or breach of the lymphatic vessels, considerable pressure by means of diseased indurations within the abdomen, or a morbid state of the parts which should receive the lymph from the vessels of the spermatic cord, may induce the disease in question; and also, when it is produced, that its appearance, and the nature of the extravasation, must make the term *cellular* a very proper one, as expressive of its true state.

"When the disease is simple, it is perfectly local; that is, it is confined entirely to the membrane forming the tunica communis; and does not at all affect, either the scrotum, the tunica vaginalis testis, or any other part."

According to Pott, it does not give a great deal of trouble, unless it arrives to a considerable size; and, being by no means so frequent as either of the other two kinds of hydrocele, it is in general but little known or attended to. With some, it passes for a varix of the spermatic cord; with others, for the descent of a portion of omentum, which, having contracted an adhesion, cannot be returned. Thus, its true nature not being in general rightly understood, and it giving but little trouble or uneasiness while it is within moderate bounds, and neither hindering any necessary action or faculty, they who have it are most frequently advised to be contented with a suspensory bandage, and find very little inconvenience from it.

"Sometimes it arises to so large a size, and gets into such a state, as to become an object of surgery, and to require our very serious attention.

"In general, (says Pott,) while it is of moderate size, the state of it is as follows. The scrotal bag is free from all appearance of disease; except that when the skin is not corrugated, it seems rather fuller, and hangs rather lower on that side than on the other, and if suspended lightly on the palm of the hand, feels heavier: the testicle, with its epididymis, is to be felt perfectly distinct below this fulness, neither enlarged, nor in any manner altered from its natural state: the spermatic process is considerably larger than it ought to be, and feels like a varix, or like an omental hernia, according to the different size of the tumour; it has a pyramidal kind of form, broader at the bottom than at the top: by gentle and continued pressure it seems gradually to recede or go up, but drops down again immediately upon removing the pressure, and that as freely in a supine, as in an erect, posture; it is attended with a very small degree of pain or uneasiness; which

uneasiness is not felt in the scrotum, where the tumefaction is, but in the loins.

"If the extravasation be confined to what is called the spermatic process, the opening in the tendon of the abdominal muscle is not at all dilated, and the process passing through it may be very distinctly felt; but if the cellular membrane, which invests the spermatic vessels within the abdomen, be affected, the tendinous aperture is enlarged; and the increased size of the distended membrane passing through it, produces to the touch, a sensation, not very unlike that of an omental rupture.

"While it is small, it is hardly an object of surgery; the pain or inconvenience which it produces being so little, that few people would chuse to submit to an operation to get rid of it; and it is very seldom radically cured without one: but when it is large or affects the membrane within the cavity, as well as without, it becomes an apparent deformity, is very inconvenient both from size and weight, and the only method of cure which it admits is far from being void of hazard. The plan is to make a free incision into the swelling." (See *Pott on Hydrocele*.)

THE ENCYSTED HYDROCELE OF THE TUNICA COMMUNIS.

"This species of hydrocele (Pott remarks) has its seat in the same part as the preceding, viz. the tunica communis, or cellular membrane, which invests the spermatic vessels; with this difference, that, in the former, the water is diffused in general through all the cells of the membrane; whereas, in this, it is contained in one cavity only. If any of the three kinds of hydrocele deserves the name of encysted, it is this. The water, which constitutes it, being all contained in a bag, formed in the same manner as all the coats of all encysted tumours are, viz. by mere pressure and condensation of the common membrane.

"It is a complaint by no means infrequent, especially in children. It was very well known to many of the ancients, and has been very accurately described by Albucasis, Celsus, Paulus, Ægineta, &c.; but later writers have often mistaken it for, and represented it as, a species of wind-rupture, or pneumatocoele; a disease existing in their imaginations only. It most frequently possesses the middle part of the process, between the testicle and groin, and is generally of an oblong figure; whence it has by some people been compared to an egg, by others to a fish's bladder. Whether it be large

or small, it is generally pretty tense, and consequently the fluctuation of the water within it, not always immediately or easily perceptible; for which reason it has been supposed to contain air only. It gives no pain, nor (unless it be very large indeed) does it hinder any necessary action. It is perfectly circumscribed; and has no communication, either with the cavity of the belly above, or that of the vaginal coat of the testicle below it. The testis and its epididymis, are perfectly and distinctly to be felt below the tumour, and are absolutely independent of it. The upper part of the spermatic process in the groin is most frequently very distinguishable. The swelling does not retain the impression of the fingers; and when lightly struck upon, sounds as if it contained wind only. It undergoes no alteration from change of the patient's posture; nor is affected by his coughing, sneezing, &c. and has no effect on the discharge per anum.

"These marks (while the disease is simple and uncombined with any other) are sufficient to distinguish it by, from all others which may affect the same part; but it sometimes happens, that the present complaint is found connected either with a true hernia, or with a hydrocele of the tunica vaginalis; by which the case is rendered complex, and less easy to be understood.

"In this, as in every other case where, from a complication of symptoms and appearances, a combination of diseases may be suspected, there is but one method of investigating the truth; which is, to consider carefully what disorders the part aggrieved is naturally liable to; what the distinct symptoms and appearances of each of those are; and what are the effects of the present complaint. The two diseases with which this kind of hydrocele is most likely to be combined are, an hydrocele of the tunica vaginalis testis, and a true hernia; the parts within the groin, the spermatic process, and the scrotum being the seat of all three.

"One mark, or characteristic of an hydrocele of the tunica vaginalis testis is, that it possesses and distends the inferior part of the scrotum; and that the testicle being nearly (though not absolutely) surrounded by the water, it very seldom happens, that the former can be clearly and plainly distinguished by the fingers of an examiner; whereas, in the encysted collection, in the membranes of the cord, the tumour is always above the testicle, which is obvious and plain to be felt below it.

"Another circumstance worth attending to is, that although the fluid in a hy-

drocele of the vaginal coat does so nearly surround the testis as to render it often not very easy to be distinguished, yet the different parts of the tumour have always a very different feel: for instance, in all those points where the vaginal tunic is loose, and unconnected with the tunica albuginea, the tumour is soft and compressible, and gives a clear idea of the contained fluid: but when these two coats are continuous, or make one and the same membrane, and have no cavity between them (which is the case on the middle and posterior part) there will always be found a hardness and firmness very unlike to what is to be found in all those places, where the distance between the two tunics leaves room for the collection of a fluid: now the hydrocele of the cord being formed in the mere cellular membrane of it, is the same to the touch in all the parts of the tumour, and feels like a distended bladder through every point of it.

"The free state of the upper part of the spermatic process, while the tumour is forming below; the gradual accumulation of the fluid, and consequently the gradual growth of the swelling; the indolent and unaltering state of it; its being incapable of reduction, or return into the belly from the first; its being always unaffected by the patients coughing, or sneezing; and the uninterrupted freedom of the fecal discharge per anum, will always distinguish it from an intestinal hernia; and he who mistakes it for an omental one, must be very ignorant, or very heedless.

"Now, although there may not always be such external marks as may, to the eye, explain the combination of these diseases with each other; yet the particular seat and symptom of each being known, and the sensations which they produce to the fingers of an intelligent examiner being well understood, when such mixed characteristics are found in the same subject, we may reasonably conclude the case to be complex, and act accordingly.

"I have indeed seen an encysted hydrocele, situated so high toward the groin, as to render the perception of the spermatic vessels very obscure, or even impracticable; but then, the state and appearance of the testicle, and the absence of every symptom proceeding from confinement of the intestinal canal, were sufficient marks of the true nature of the complaint.

"Infants are much more subject to this disease than adults; though it often affects the latter.

"In young children, it frequently dissipates in a short time, especially if as

sisted by warm fomentation, and an open belly.

"If it does not disperse, that is, if it be not absorbed, the point of a lancet will give discharge to the water; and, in young children, will most frequently produce a cure: but in adults, the cyst formed by the pressure of the fluid does sometimes become so thick, as to require division through its whole length; which operation may in general be performed with great ease, and perfect safety." Mr. Pott says, in general, because it is most frequently so: though he has seen even this, slight as it may seem, prove troublesome, hazardous, and fatal. (See *Pott on Hydrocele*.)

Sir James Earle has proposed curing this case, in the same way as the hydrocele of the tunica vaginalis, viz. by an injection of red wine and water. This gentleman has succeeded in this manner himself. (See *Earle on Hydrocele*, p. 194, edit. 2.)

HYDROCELE OF THE TUNICA VAGINALIS TESTIS.

"The third species of this disease, (as Pott describes) is that which is confined to the vaginal coat, or bag, which loosely envelopes the testicle. In a natural, healthy state, its cavity always contains a small quantity of a fine fluid, exhaled from capillary arteries, and constantly absorbed by vessels appointed for that purpose.

"This fluid, in the natural small quantity, serves to keep the tunica albuginea moist, and to prevent a cohesion between it and the vaginalis; a consequence, which almost necessarily follows any such diseased state of these parts, as prevents the due secretion of it. On the contrary, if the quantity deposited be too large, or if the regular absorption of it be by any means prevented, it will be gradually accumulated, and, by distending the containing bag, will form the disease in question."

It is a disease from which no time of life is exempt; not only adults are subject to it, but young children are frequently afflicted with it; and infants sometimes born with it. What is the immediately producing cause, Mr. Pott will not take upon him to affirm. Ruysch is of opinion, that it proceeds from a varicose state of the spermatic vessels. What real foundation there may be for such conjecture, Mr. Pott cannot say; certain it is, that the spermatic vessels are very frequently found varicose, in persons afflicted with this kind of hydrocele; but whether such state of these parts

ought to be regarded as a cause, or as an effect of the disease, is a matter worth enquiring into.

"In Morgagni, are some observations on the state of the parts concerned, particularly the inside of the tunica vaginalis, and outside of the albuginea; which, if repeated and confirmed, may possibly lead us on to farther information.

"Whatever tends to increase the secretion of the fluid into the sacculus, beyond the due and necessary quantity, or to prevent its being taken up, and carried off, by the proper absorbent vessels, must contribute to its production: which is so slow, and gradual, and at the same time so void of pain, that the patient seldom attends to it, until it has arrived to some size. Not but that it sometimes is produced very suddenly; and in a very short space of time attains considerable magnitude.

"The size and figure of the tumour (continues Pott) are various in different people, and under different circumstances. In general, at its first beginning, it is rather round; but as it increases, it frequently assumes a pyriform kind of figure, with its larger extremity downward: sometimes it is hard, and almost incompressible; so much so, that, in some few instances, it has been mistaken for an induration of the testicle: at other times, it is so soft and lax, that both the testicle, and the fluid surrounding it, are easily discoverable. It is perfectly indolent, in itself; though its weight does sometimes produce some small degree of uneasiness in the back. The transparency of the tumour, the great characteristic (as it is called) of this disease, and on which almost all writers have agreed to lay the greatest stress, and to rest their proof of the nature of the disorder, is, according to Pott, the most fallible, and uncertain sign belonging it: it is a circumstance which does not depend upon the quantity, colour, or consistence of the fluid constituting the disease, so much as on the uncertain thickness, or thinness of the containing bag, and of the common membranes of the scrotum.

"If (adds this celebrated writer) they are thin, the fluid limpid, and the accumulation made so quick as not to give the tunica vaginalis time to thicken much, the rays of light may sometimes be seen to pass through the tumour: but this is accidental, and by no means to be depended upon. Whoever would be acquainted with this disorder, must learn to distinguish it by other, and those more certain marks; or he will be apt to fall into very disgraceful, as well as pernicious blunders. The colour of the fluid is very dif-

ferent and uncertain; sometimes it is of a pale yellow, or straw-colour; sometimes it is inclined to a greenish cast; sometimes it is dark, turbid; and bloody; and sometimes it is perfectly thin and limped.

"In the beginning of the disease, if the water be accumulated slowly, and the tunica vaginalis thin and lax, the testicle may easily be perceived; but if the said tunic be firm, or the water accumulated in any considerable quantity, the testis cannot be felt at all; and other symptoms, or marks must be attended to. In most cases, the spermatic vessels may be distinctly felt at their exit from the abdominal muscle, or in the groin; which will always distinguish this complaint from an intestinal hernia, the disease which it is most likely to be confounded with. It does indeed now and then happen, that the vaginal coat is distended so high, and is so full, that it is extremely difficult, nay, almost impossible, to feel the spermatic process: and it also sometimes happens, that the same kind of obscurity is occasioned by the addition of an encysted collection of water in the membrane of the cord; or by the case being combined with a true enterocele. These circumstances are not very frequent, but yet do occur often enough to render it well worth while to mention them; and to signify that, when they are met with, recourse must be had to other marks.

"The two coats of the testicle, the tunica vaginalis and tunica albuginea, are so inseparably united at the posterior and superior, or rather the posterior and middle part of the tumour, that no fluid can collect between them; and, in operating, a puncture, or incision, made here, cannot only do no service, as it cannot reach the water, but must injure the testicle, or epididymis, and do great mischief.

"This natural connexion, between the two tunics, at the upper and binder part, is the reason (says Pott) why, in a simple hydrocele, that part of the tumour feels so very unlike to every other. In that, the tunica albuginea, and vaginalis, being immediately continuous, no water can get between them; and therefore, the fingers of an intelligent examiner must immediately discover the firmness and hardness arising from the union of these parts: in all others, the two membranes being unconnected, and affording a void space for the collection of water, the fluctuation of it will always be distinguishable.

"This must for ever discriminate the simple hydrocele of the tunica vaginalis, from the anasarcaous swelling of the scrotum; from the encysted hydrocele of the

cord; and from the intestinal hernia. The first is every where equal, tumid and soft; and every where equally receives and retains the impression of the fingers: the second, though circumscribed, not very compressible, and affording the sensation of fluctuation, yet does not pit, and is alike to the touch in all parts of it: and in the third, if the testicle be distinguishable at all, it is found at the inferior part of the whole tumour.

"An indurated or scirrhus testicle (continues this author) has indeed, very frequently, a quantity of fluid lodged in its vaginal coat (hydro-sarcocele;) which is a circumstance (says Pott) not to be wondered at; the diseased state of the gland being sufficient to account for the non-execution of the absorbent faculty, and consequently, for the collection of the water. But although part of this mixed tumour is undoubtedly owing to a fluid, and such fluid as is lodged within the vaginal coat, yet it is a very different disease from the true simple hydrocele, and ought not to be confounded with it; one of these marks of the latter being the natural, soft, healthy state of the testicle; and the characteristic of the former, being its diseased and indurated enlargement."

Mr. Pott does not mean that, in a true simple hydrocele, the testicle is never altered from the natural state. He knows the contrary, and that it is often enlarged in size, and relaxed in structure, and that the spermatic vessels are frequently varicose. But, the testicle is never indurated. These two diseases are extremely unlike each other, and require very different treatment. That which would cure a simple hydrocele would dangerously aggravate the hydro-sarcocele.

Mr. Pott observes, that "it may, and does sometimes become necessary to let out the water from the vaginal coat of a testicle, in some degree diseased; but this should always be done with caution, and under a guarded prognostic; lest the patient be not only disappointed, by not having that permanent relief, which, for want of better information, he may be induced to expect; but be also (possibly) subjected to other unexpected inconveniences from the attempt.

"When the disease is a perfect, true, simple hydrocele, the testicle, though frequently somewhat enlarged, and perhaps loosened in its vascular texture, is nevertheless sound, healthy, and capable of executing its proper office; neither is the spermatic cord any way altered from a natural state, except that its vessels are generally somewhat dilated; neither of which circumstances are objections either

to the palliative or radical cure of the disease. But in those disorders, which in some degree resemble this, the case is different; either the testicle, or spermatic cord, or both, bearing evident marks of a diseased state.

METHODS OF CURING THE HYDROCELE OF THE VAGINAL COAT.

"The methods of cure (says Pott) though various, are reducible to two, (*viz.*) the palliative, or that which pretends only to relieve the disease in present, by discharging the fluid; and the radical, or that which aims at a perfect cure, without leaving a possibility of relapse. The end of the former is accomplished by merely opening the containing bag in such manner as to let out the water: that of the latter cannot be obtained, unless the cavity of that bag be abolished, and no receptacle for a future accumulation left. One may be practised at all times of the patient's life, and in almost any state of health and habit: the other lies under some restraints and prohibitions; arising from the circumstances of age, constitution, state of the parts, &c.

"The operation by which the fluid is let out, is a very simple one. The only circumstances requiring our attention in it, are, the instrument wherewith we would perform it; and the place or part of the tumour, into which such instrument should be passed.

"The two instruments in use, are the common bleeding-lancet, and the trocar.

"The former having the finer point, may possibly pass in rather the easier, (though the difference is hardly perceptible) but is liable to inconveniences, to which the latter is not. The trocar, by means of its cannula, secures the exit of the whole fluid without a possibility of prevention; the lancet cannot. And therefore it frequently happens when this instrument is used, either, that some of the water is left behind; or that some degree of handling and squeezing is required for its expulsion; or, that the introduction of a probe, or a director, or some such instrument, becomes necessary for the same purpose. The former of these may in some habits be productive of inflammation: the latter prolongs what would otherwise be a short operation, and multiplies the necessary instruments; which, in every operation in surgery, is wrong. To which it may be added, that if any of the fluid be left in the vaginal coat, or insinuates itself into the cells of the scrotum, the patient will have reason to think the operation imperfect, and to fear that

he shall not reap even the temporary advantage which he expected. The place where this puncture ought to be made, is a circumstance of much more real consequence; the success of the attempt, the ease, and even sometimes the safety of the patient, depending upon it.

"All the anterior and lateral parts of the vaginal coat are loose and detached from the albuginea; in its posterior and superior part, those two tunics make one; consequently the testicle is, as it were, affixed to the posterior and superior part of the cavity of the sac of an hydrocele; and consequently, the water or fluid can never get quite round it. This being the state of the case, the operation ought always to be performed on that part of the tumour, where the two coats are at the greatest distance from each other, and where the fluid must therefore be accumulated in the largest quantity; and never on that part of it where the fluid cannot possibly be. The consequence of acting otherwise, must not only produce a disappointment, by not reaching the said fluid; but may prove, and has proved, highly and even fatally mischievous to the patient.

"After performing this operation, present practitioners content themselves with a bit of lint, and a plaster; and if the scrotum has been considerably distended, they suspend it in a bag truss; and give the patient no farther trouble.

"In most people, (continues Pott) the orifice thus made heals in a few hours, (like that made for blood-letting;) but in some habits and circumstances, it inflames and festers; this festering is generally superficial only, and is soon quieted by any simple dressing; but it sometimes is so considerable, and extends so deep, as to affect the vaginal coat, and by accident produce a radical cure. Mr. Pott has also seen it prove still more troublesome, and even fatal: but then the circumstances both of the patient, and of the case, have been particular.

"Wiseman and others have advised deferring the puncture, till a pint of fluid has collected. When there is a sufficient quantity, however, to keep the testicle from the instrument, there can be no reason for deferring the discharge; and the single point on which this argument ought to rest, is this: Whether the absorbent vessels, by which the extravasation should be prevented, are more likely to reassume their office, while the vaginal coat is thin, and has suffered but little violence from distention; or after it has been stretched and distended to ten or perhaps twenty times its natural capacity; and by such distention is

(like all other membranes) become thick, hard, and tough? Mr. Pott thinks the probability so much more on the side of the former, that he should never hesitate a moment about letting out the water, as soon as he found, that the puncture could be made securely. And from what has happened within the small circle of his own experience, he is inclined to believe, that if it was performed more early than it generally is, it might sometimes prevent the return of the disease."

The palliative cure should in general be performed at least once on those, who determine to undergo a radical one, as it gives an opportunity of examining the state of the testis, and also of permitting the cavity to be filled again only to such a size, as may be thought to be best calculated to insure success in any future operation. (*Sir James Earle on the Hydrocele*, p. 13, edit. 2.)

Upon the subject of performing the operation of tapping hydroceles, Professor Scarpa gives us some useful cautions. The analogy, which exists between large scrotal herniæ and hydroceles of considerable size, led this writer to suspect, that, in the latter disease, the displacement and separation of the vessels of the spermatic cord from each other might also happen. Careful investigations, made upon the dead subject, fully justified the conjecture. In all considerable hydroceles, he found the spermatic vessels so displaced and separated, that the artery and vas deferens were ordinarily situated on one side of the tumour, and the veins on the other. Sometimes these vessels all extended over the lateral parts of the tumour, as far as its anterior surface, principally towards the bottom.

It is well known, that, in many instances, the operation of puncturing a hydrocele has been followed by a large extravasation of blood within the tunica vaginalis; but, Scarpa informs us, that until lately, he was unacquainted with any case of this kind, which was well detailed and authentic enough, to be cited as an example of injury of the spermatic artery in the puncture of a hydrocele. This learned Professor, however, has had such a fact recently communicated to him by Gasparoli, a distinguished surgeon of Pallaanza, who, in introducing the trocar into the lower part of the swelling, had the misfortune to injure the spermatic artery, and the patient was afterwards castrated. The wound of this vessel was most clearly proved by the particulars of the case, as detailed in Scarpa's work, to which I must refer the reader.

"From the accurate knowledge, (says Scarpa) which we now have upon this

pathological point, such an accident may be avoided, by observing the rules, which are elsewhere given for opening the sac of a very large scrotal hernia. In this last operation, as well as that of puncturing an old and voluminous hydrocele, care must be taken to introduce the instrument at a considerable distance from the bottom of the tumour, that is to say, a little below its middle part, and on a line, which would divide the swelling longitudinally into two perfectly equal parts. Experience proves, that, for the purpose of completely emptying an hydrocele, it is unnecessary to make the puncture very near the bottom of the tumour. The corrugation of the scrotum, and a slight pressure, made by the surgeon's hand, will suffice for discharging all the fluid contained in the tunica vaginalis, even when the puncture is made at the middle part of the swelling. (*Scarpa, Traité des Hernies*, p. 64—68.)

RADICAL CURE OF THE HYDROCELE.

Six different operations have been practised for this purpose; viz. the incision, the excision, the application of caustic, the introduction of a tent, the employment of a seton, and injecting some stimulating fluid into the cavity of the tunica vaginalis.

The principle, on which the success of every plan of this kind depends, is the excitement of such a degree of inflammation in the tunica vaginalis, and tunica albuginea, forming the cavity which contains the water, as shall end in a mutual and general concretion of those membranes with each other, by which, it is evident, the receptacle for a future accumulation of fluid is completely obliterated.

All the above plans are not equally eligible. Some of them, indeed, are now quite exploded: some, which are still practised by a few, are not more successful, though certainly more severe, than one, which will be presently recommended; others are very uncertain in their effect, as well as painful.

Incision.

Making an incision, so as to lay open the cavity containing the fluid, is the most ancient method, being described by Celsus. Paulus Ægineta says, the incision is to commence at the middle of the tumour, and be carried to the upper part of it, in a line parallel to the raphe. This incision is only to go through the integuments; the bag, which contains the water, is then to be opened, and part of the

sides of the sac taken away. A director is next to be introduced, and a division of the tunica vaginalis made to the bottom of the swelling. The cavity is afterwards to be dressed with lint, and healed by granulations. Hildanus, Dodonæus, Wiseman, Cheselden, Heister, and Sharp, all coincide in stating the dangerous and even fatal consequences sometimes following this mode. Mr. B. Bell, who preferred this operation to every other one, acknowledges that he has seen it produce great pain and tension of the abdomen, inflammation and fever. Pott observes, that it can never be said to be totally void of danger, and that it bears the appearance of an operation of some severity. This eminent surgeon abandoned the method, during the last twenty-six years of his life. Severe as it is, it has also been known to fail, as Sabatier and Earle have confirmed.

Excision.

Albucasis gives the first clear account of this operation, though Celsus has certainly mentioned removing some of the sac. White and Douglas used to adopt this method. The latter advises making two incisions, so as to form an oval, from the upper to the lower part of the tumour; dissecting off the oval piece of the scrotum, and then making an opening into the sac, and enlarging it with scissors. The tunica vaginalis was next to be entirely cut away, close to where it is connected with the spermatic vessels. The cavity was afterwards filled with lint. Sir James Earle justly notices, that this plan must have been tedious, exquisitely painful in the performance, and, as subsequently treated, attended with violent and dangerous symptoms.

Caustic.

Paulus Ægineta advises destroying the skin with a cautery of a particular form, dissecting off the eschar, and then cauterizing the exposed membrane. Guido de Cauliaco is, perhaps, the first who described the application of caustic for the cure of the hydrocele. Wiseman practised this method. Dionis advises it; but, De la Faye and Garengot make objections to it. Mr. Else has left the best account of the manner of using caustic. He recommends laying "a small caustic upon the anterior and inferior part of the scrotum, which is intended to affect, and, if possible, penetrate through the tunica vaginalis."

The objections to the employment of caustic are, its causing an unnecessary

destruction of parts, and producing a tedious painful sore. The action of caustic can never be so regulated as to make an opening with certainty through the tunica vaginalis, so that either its application must sometimes be repeated, or else a lancet, or trocar used after all. Its success is also less sure, than that of an injection; but it is preferable to all the other methods, except this latter, and, perhaps, the seton.

Tent.

This is first mentioned by Franco. The operation consists in making an opening into the tunica vaginalis, and keeping the wound open with a tent of lint, linen, or sponge, so as to make the cavity suppurate, in which the water was contained. Pare, Guillemau, Covillard, Ruysch, Heister, and Marini, have all described the plan, with some variations, one of which consisted in smearing the tents with irritating substances. The famous Monro devised the plan of keeping a cannula in the tunica vaginalis; so as to bring on a cohesion of the parts, without suppuration. Fabricius ab Aquapendente, however, has made allusion to some surgeons before him, who used to keep the wound open a few days with a cannula. Mr. Pott tried the cannula, but found it very inconvenient, as its inflexibility hurt the testis whenever the patient moved with inattention, and, consequently, he preferred a tent, or bougie, though he speaks of the plan as a very uncertain one.

Of late, M. Larrey, in consequence of having seen several instances, in which the symptoms, following the use of an injection, were violent, and one case, in which a fatal peritonitis was produced by this mode of treatment, has recommended, exciting the necessary degree of inflammation by keeping a short piece of an elastic gum catheter in the puncture, which instrument also serves afterwards to let any fluid escape from the tunica vaginalis. (*Mém. de Chirurgie Militaire*, Tom. 3, p. 409, &c.) This author, of course, speaks of the plan as having fully answered his expectations; but, I much doubt, whether it has any particular superiority over several of the former methods of employing the tent; methods, which the wisdom, arising from past experience, has long since rejected.

Seton

Is first mentioned by Guido de Cauliaco, 1363, as a means of curing the hydrocele. In modern times, Pott preferred it to

every other method, if we except injection, of which, according to Sir J. Earle, he expressed his approbation before his decease. Mr. Pott found, that the best mode of making the seton was, as follows. He employed three instruments: the first was a trocar, the cannula of which was about one-fourth of an inch broad. The second was what he called the seton-cannula, which was made of silver, was just small enough to pass with ease through the cannula of the trocar, and five inches long. The third instrument was a probe 6 1-2 inches long, having at one end a fine steel trocar point, and, at the other, an eye, which carried the seton. The seton consisted of so much white sewing-silk, as would just pass easily through the cannula, and yet fill it. The thickness of the seton, however, was not so great in the latter part of his practice. Having pierced the inferior and anterior part of the tumour with the trocar, withdrawn the perforator, and discharged the water, Mr. Pott used to pass the seton-cannula through that of the trocar, to the upper part of the tunica vaginalis, so as to be felt there. The probe, armed with the seton, was next conveyed through the latter cannula, and its point pushed through the upper part of the tunica vaginalis and scrotum. The silk was then drawn through the cannula until a sufficient quantity was brought out of the upper orifice. The two cannulae being withdrawn, the operation was finished.

Injection.

Dr. Monro attributes the first use of injections for the radical cure of hydroceles to an army-surgeon of his own name, who first used spirits of wine. This produced a cure, but, the inflammation was so violent, that he afterwards tried a milder injection, which consisted of wine. However, M. Lambert, above a century ago, in his *Œuvres Chirurgicales*, published at Marseilles, advised injecting a solution of sublimate and lime-water, and he has related cases of success. Mr. Sharp also made trial of spirit of wine, which cured the hydrocele, but, not without causing dangerous symptoms, and two subsequent abscesses in the scrotum. (*Operations of Surgery*.) Douglas, Le Dran, and Pott, all disapprove of injections, in their works; though Sir James Earle informs us, that the latter lived to alter his opinion on the subject.

The violence of the inflammatory symptoms, consequent to the first employment of injections for the radical cure of hydroceles, arose from the fluids used being

too irritating. Sir James Earle, at last, preferred wine for several reasons. He found, that it had been used with success in France; its strength is never so great as to render it unsafe: and it may be readily weakened. This injection, in short, produces less pain, than any other mode of cure, does nothing more than is intended, and is as certain as any plan.

"I have commonly used (says Sir James Earle) about two-thirds of wine to one-third of water; if the parts appeared insensible, and no pain at all was produced by the first quantity thrown in, I have withdrawn the syringe, and added to the proportion of wine; on the contrary, if the complaint was recent, and the parts irritable, I have increased the proportion of water, so that I have hitherto been principally guided by the degree of sensation, which the patient has expressed. I have lately used pure water mixed with wine, and found it answer as well as when astringents were added." (P. 103. *Treatise on the Hydrocele*, Edit. 2.) In the preface, the author says, that he has long disused the pipe with a stop-cock, which he once employed, on account of not being well able to spare a hand, during the operation, to turn it, and its consequently being found awkward. A pipe, one end of which is made to fit into the cannula of a trocar, the other adapted to receive the neck of an elastic bottle, with a valve, or ball, in the centre of the pipe to permit the entrance, and prevent the exit, of the injection, will be found infinitely more convenient and useful. (Earle.) When the hydrocele is very large, Sir James recommends simply letting out the fluid, and waiting, till the tumour acquires a more moderate size, before attempting the radical cure by injection.

It appears from Sir James Earle's interesting cases, that a cure may be accomplished in this manner, even when the tunica vaginalis is considerably thickened. The following is the common mode of operating: the hydrocele is to be tapped with a trocar at its anterior and inferior part, and, when the whole of the fluid is evacuated, the cavity of the tunica vaginalis is to be distended to its former dimensions with the above injection. This is to be allowed to remain in the part about five minutes, upon the average, after which it is to be discharged through the cannula. The patient usually feels some pain in the groin, and about the kidneys, on the injection being introduced; which symptoms are rather desirable, as they evince, that the stimulus of the fluid is likely to have the

wished for effect of exciting the necessary degree of inflammation. This plan, now brought to so high a pitch of perfection by Sir James Earle, may be deemed almost an infallible means of obtaining a permanent cure; and being the mildest method, also, is, of course, universally preferred.

The treatment after the operation is exactly like that of the common swelled testicle (see *Hernia Humoralis*), consisting of the use of fomentations, poultices, saline purges, and, above all, of a bag truss for keeping up the scrotum.

There is a particular case, that has been called the *congenital hydrocele*, by which is implied a collection of water in the tunica vaginalis, in consequence of there being a preternatural communication between it and the cavity of the peritonæum. Desault used to cure this disease by a red-wine injection. Any protruded viscera being returned into the belly, and the opening between that and the inside of the tunica vaginalis being carefully compressed and closed by a trusty assistant, this celebrated surgeon, after letting out the water in the common way, used to throw in the injection. The method is said to succeed, without causing a perilous circumstance, one might *a priori* expect, viz. inflammation of the peritonæum. (See *Desault par Bichat*.)

This kind of hydrocele, has not been described by most writers. The case is easy of discrimination from the fluid being capable of being pushed into the belly. The French state, that this disease admits of a cure by injections, first taking care to press the upper part of the cord, so as to keep the injection from coming into contact into the peritonæum. A successful instance of this practice is related, by which a boy was cured both of a congenital hydrocele and hernia. The patient was nine years old, and had in his scrotum, ever since he was born, a fluctuating semi-transparent tumour, which was free from pain, of the size of a large egg, and disappeared, when compressed, and in a horizontal posture.—(See *Œuvres Chir. de Desault*, Tom. 2, p. 442.)

The success of the vinous injection in hydroceles of the tunica vaginalis, in encysted ones of the chord, and in other cases, in which Sir James Earle has tried it, particularly in a large ganglion, and a collection of the patella, makes it probable, that it will be found extensively useful in all cavities, where we wish to procure an adhesion, without destruction of parts. (*Earle*, p. 158, edit. 2.)

One caution it is necessary to offer, before taking our leave of this subject; it

has sometimes happened, during the operation, that the cannula has slipped out of the tunica vaginalis, and its inner mouth become situated in the substance of the scrotum, in which event, the operator, if he persists in propelling in the injection, will fill the cellular texture of the part with a stimulating fluid, which may cause sloughing, and other unpleasant symptoms, without entering the cavity of the tunica vaginalis, or affording the least prospect of a radical cure of the hydrocele. When such an accident happens, it is best to defer the operation, till a sufficient quantity of fluid has collected again. Hydroceles have been cured by applying to the scrotum a solution of sal ammoniac in vinegar and water. (*Keate*.) But, the application frequently creates a good deal of pain and irritation, and does not often succeed, to say the best of it. (*Earle*.)

For information, relative to the hydrocele, the reader is particularly referred to *Monro on the Tumours of the Scrotum*, in the *Edinb. Med. Essays*, Vol. 5. *Pott on the Hydrocele*; *Elce on the Hydrocele*; *Keate*; *B. Bell*; *Douglas*; and *Sir James Earle on the same*. *Mémoire sur l'Hydrocele par Bertrandi*, in *Mém. de l'Acad. de Chirurgie*, Tom. 3. Also the same author in *Trattato delle Operazioni di Chirurgia*. *Nizza*, 1763. *Remarques, &c. sur diverses especes d'Hydrocele*, en *Œuvres Chirurgicales de Desault*, Tom. 2. *Sharpe's Treatise on the Operations*, and his *Critical Enquiry*. Also *Sabatier in Médecine Opératoire*, Tom. 1. *Scarpa, Traité des Hernies*, p. 64, &c. *Larrey, in Mémoires de Chirurgie Militaire*, Tom. 3, p. 409, &c. *Practical Observations on the Sclerocele*, &c. by *T. Ramsden*, surgeon to *Christ's Hospital*, &c.

The mode of distinguishing a hydrocele from a scrotal hernia, as explained by Pott, is described in the article *Hernia*.

HYDROPHOBIA. (from *ὕδωρ*, water, and *φοβέω*, to fear) *A dread of water.* This being a striking symptom of that species of madness, which results from the bite of a mad dog, and some other animals affected in the same way, the disease itself has been named *Hydrophobia*. Some have used the more general term, *hygrophobia*, from *ὕγρον*, liquid.

Both these terms are highly objectionable, because they are derived from a symptom, which does not exclusively belong to the disease, nor constantly exist in it.

The old writers, as we learn from *Cælius Aurelianus*, used the terms *aërophobia*, or a dread of air, and *pantophobia*, or, a

fear of all things, as appropriate names for the disease, since the impression of cold air sometimes excited terror, and the disorder is marked by a singular degree of general timidity and distrust. Others called it *phobodipsos* ($\phi\theta\omicron\varsigma$, signifying thirst,) because the patient is *thirsty*, yet *fears* to drink. Several modern authors, however, objecting to an appellation expressive only of one symptom, have more correctly denominated the disease *rabies*, and *rabies canina*, or canine madness. The French call it *la rage*. (*Rees' Cyclopædia*, art. *Hydrophobia*.) Aristotle is the first writer, that expressly mentions this disorder; but, he appears to have had a very imperfect idea of it, since he sets down man as exempt from the danger of being affected by it.

Animals of the dog kind, including the wolf and the fox, are most frequently the subjects of rabies; and some writers have maintained, that, although it may be received and propagated by other animals, yet it always originates with some of the canine race. (*Hillary on Diseases of Barbadoes*, p. 246.) Wrong notions, of a very dangerous tendency, have been generally entertained, in regard to the disease, as it appears in the canine race. The writer of the article *Dog*, in Dr. Rees' *Cyclopædia*, appears to have had most extensive opportunities of observing the disorder in dogs, having paid attention to more than two hundred cases. From his remarks, I have collected the following information.

The peculiar symptom, which characterises the complaint in the human subject, has been applied to the disease in the dog, and has occasioned it to be called by the same name, hydrophobia. This is a palpable misnomer; for, in no instance, does there ever exist any dread of water; on the contrary, dogs are in general very greedy after it. Such unfounded supposition has often conducted to a very fatal error; for, it being the received opinion, that no dog is mad, who can lap water, many persons have been lulled into a dangerous security. Another equally false and fatal idea has prevailed, that every mad dog must of course be wild and furious; but, this is so far from being true, that, in the greater number of instances, there is very little of that wild savage fury, that, is expected by the generality of persons. "Hence," says this author, "as it is evident, that the term hydrophobia, characterising the affection in the dog, is a misnomer, so it is evident, that the term madness is equally so. In no instance, have I ever observed a total alienation of the mind; in very few, have the mental

faculties been disturbed. The disposition to do mischief is rather an increased irritability, than absence of sense; for, in most instances, even those that are furious, they acknowledge the master's voice, and are obedient." The symptom, which is most frequently first observable in a rabid dog, is a certain peculiarity in his manner; some strange departure from his usual habits. In a very great number of instances, the peculiarity consists in a disposition to pick up straws, bits of paper, rag, threads, or the smallest objects, which may happen to be on the floor. This is said to be particularly common in small dogs. "Others again shew an early peculiarity by licking the parts of another dog. In one instance, the approach of the disease was foretold, by our observing a very uncommon attachment in a pug puppy, towards a kitten, which he was constantly licking; and likewise the cold nose of a healthy pug, that was with him. An attachment to the sensation of cold appears in many cases, it being very common to observe them (the dogs) licking the cold iron, cold stones, &c. Some dogs, early in the disease, will eat their own excrement, and lap their own urine." An early antipathy to strange dogs and cats is very commonly observed, but, particularly to cats. As the disease advances, the affected dogs bite those with which they are domesticated, and, lastly, the persons around; but, except in a moment of irritability they seldom attack the human subject. The irritability, that induces them to bite is very strong; but, is devoid of wildness. It is more like peevishness, than fury. A stick held up at them always excites their anger in a violent degree, and, throughout the disease, there is generally a wonderful impatience of controul, and the animals are with great difficulty frightened. (See art. *Dog* in *Rees' Cyclopædia*.)

For additional details, relating to the disease as it appears in the dog, I must refer to the paper, which has been just now quoted. Enough, I hope, has been said to make the reader aware, that mad dogs are not particularly characterised by an inability to lap water, or any degree of fury. These animals, when actually affected with rabies, from their quiet manner, have even not been suspected of having the disorder, and have even been allowed to run about, fondled, and even slept with. (See *Mem. of Swedish Acad.* 1777.)

The causes of this peculiar distemper in dogs are at present in much obscurity, and we have little more, than conjecture upon the subject. We do not positively

know, whether rabies sometimes originates spontaneously in these animals, or, whether, like small pox, in the human species, it is propagated only by contagion. That the disease is frequently imparted in consequence of one dog biting another, every body well knows. But, still, there are many instances, in which it is certain, that no such cause can be suspected. Several facts tend to shew, that among dogs the disease is often communicated by contagion. It is observed, that, in insular situations, dogs are seldom affected, and this circumstance is ascribed to such animals being in a kind of quarantine. The celebrated sportsman, Mr. Meynell, secured his dogs from the malady, by making every new hound perform a quarantine before he was suffered to join the pack. (See *Trans. of a Society for the Improvement of Med. and Chir. Knowledge*, Vol 1, art. 17.) Great heat is very commonly supposed to be an exciting cause of the disease in dogs; but, without much foundation. "A very hot climate, or one exposed to the extremes of heat and cold; a very hot and dry season; feeding upon putrid, stinking and maggoty flesh; want of water; worms in the kidneys, intestines, brain, or cavities of the nose," are set down by Boerhaave as causes of the disease.—(*Aphorism*, 1134.) We learn from Dr. J. Hunter, that in the hot island of Jamaica, where dogs are exceedingly numerous, not one was known to go mad during forty years. (*Transactions of a Society for the Improvement of Medical Knowledge*, loc. cit.)

"Although (says M. Larrey) hydrophobia is more frequent in warm, than temperate climates, it is not observed in Egypt, and the natives assured us, that they knew of no instance, in which this disease had manifested itself either in man, or animals. No doubt, this is owing to the species and character of the dogs of this country, and the manner of living.

"It is remarked, that the Egyptian dogs are almost continually in a state of inaction: during the day, they lie down in the shade, near vessels, full of fresh water, prepared by the natives. They only run about in the night time: they evince the signs and effects of their love but once a year, and only for a few instants. They are seldom seen coupled. On our arrival, there was a vast number of these animals in Egypt, because, they were held, like many others, in great veneration, and were never put to death. They do not go into the houses: in the day time, they remain at the sides of the streets, and they only wander into the

country at night, in order to find any dead animals, which happen to be unburied. Their disposition is meek and peaceable, and they rarely fight with each other. Possibly, all these causes may exempt them from rabies." (*Larrey, in Mém. de Chir. Militaire*, Tom. 2, p. 226.)

In Mr. Meynell's account, which was communicated to him by a physician, it is asserted, that the complaint never arises from hot weather, nor putrid provisions, nor from any cause except the bite; for, however dogs have been confined, however fed, or, whatever may have been the heat of the season, the disorder never commenced, without a possibility of tracing it to the preceding cause, nor was it ever introduced into the kennel, except by the bite of a mad dog. This malady is also stated to be rare in the northern parts of Turkey, more rare in the southern provinces of that empire, and totally unknown under the burning sky of Egypt. At Aleppo, where these animals perish in great numbers, for want of food and water, and the heat of the climate, this disorder was never known. In other parts of Africa, and in the hottest zone of America, dogs are said to be never attacked with madness. (See *art. Dog*, in *Rees' Cyclopædia*.)

Mr. Gillman endeavours to prove, that the disease in dogs is probably produced independently of particular climates, of putrid aliment, of deficiency of water, of want of perspiration, or, of the worm under the tongue, to which it has been at different times ascribed, and he expresses his belief, that it originates somewhat like typhus in the human subject, and is not always produced by inoculation by means of a bite. He thinks, that it may be occasionally brought on by the confinement of dogs, without exercise, in close and filthy kennels; and that the success of Mr. Trevalyan, as related by Dr. Bardsley, in clearing his kennel of the disease, by changing even the pavement, after other means of purification had failed, affords presumptive evidence in favour of the opinion; and, consequently, this author thinks, that the method of quarantine, adopted by Mr. Meynell, and recommended by Dr. Bardsley, on the supposition, that the disease originates exclusively from contagion, will not be a sufficient preventive alone; and he shews, from some facts, reported by Mr. Daniel, that the poison sometimes lies dormant in dogs four, five, and six months; and, consequently, he infers, that the period of two months is not a sufficient quarantine, before a new dog is introduced into a pack. (See *Gillman's Diss. on the Bite of a Rabid Animal*.)

It is observed by the late Dr. J. Hunter, that all domestic animals, birds, as well as beasts, are susceptible of the poison of the mad dog; and, indeed, our experience has not yet taught us that there is any race of animals exempted from its effects. Whether every animal labouring under the disease is capable of infecting others, or whether this power is confined to a few only, we are yet to learn.

The disease has been communicated to the human species by dogs, cats, wolves, and foxes. The dog, the wolf, and the jackal, have, by the late inquiries of naturalists, (*Mr. Hunter's paper, Phil. Trans. Vol. 77, p. 253.*) been ascertained to be of the same species; and therefore it is probable, from analogy, that the latter is capable of communicating the infection as well as the two former. The fox also has a strong affinity to the dog, and is by Linnæus counted of the same *genus*; but the distinctions of natural history will not avail us here; for the cat, an animal of a very different *genus*, has often produced the hydrophobia in the human species. Many other animals are reported to have the power of infecting others, by biting them while labouring under the disease themselves; but the facts hitherto collected are very vague, and lead to nothing conclusive on this head. Were we to judge from analogy, from seeing two animals so different from each other as the dog and the cat, capable of infecting others, we might be led to infer, that every animal susceptible of the disease had the power of communicating it, provided their natural habits led them to bite and tear with their teeth such animals as came in their way while in an enraged state. But, though there are instances of men labouring under hydrophobia biting some of those employed in taking care of them, no ill consequences have been known to follow. From this, however, we can draw no positive inference, for it is but a small proportion of such persons as are bit by dogs undoubtedly mad, who are infected with the poison.

The bite only serving the purpose of inoculation, the danger arising from it will be various, as it happens to be in a part more or less vascular; or as the teeth are more or less loaded with the poison. There is the greatest danger from bites in the face, and the symptoms come on soonest; bites in the hands also, which are generally bare, are full of danger. In other parts of the human body the clothing, by wiping the teeth, greatly lessens the danger of infection. The bite is not essentially necessary for the application of the poison: a dog, by licking a sore, produced the hydrophobia; but he

licked it till it bled, so that the poison came in contact with the newly divided blood-vessels. This circumstance, if we may judge from the analogy of other poisons, is probably of importance in giving efficacy to the poison, yet it is not clear that it is essential; for there are two cases of the disease mentioned in the Philosophical Transactions, (*Phil. Trans. Vol. 23, p. 1074.*) which arose from putting the hands in the mouth of a puppy that was mad, but when there was no bite; and there is a similar case in the Memoirs of the Royal Academy of Sciences of Sweden. (*Anno 1777.*) It is true, various other modes of infection are narrated by writers, but in all of them there is much appearance of fabulous credulity. There is good reason to think that tetanus has sometimes been mistaken for hydrophobia, and given rise to the accounts of the diseases proceeding from the bite of a cock, the claw of a cat, and similar histories.

Dogs are much more susceptible of the infection than the human species. Four men and twelve dogs were bit by the same mad dog, and every one of the dogs died of the disease, while all the four men escaped, though they used no other means of prevention but such as we see every day to fail. There is also an instance of twenty persons being bit by the same mad dog, of whom only one had the disease.

There is a question which naturally presents itself here; does the disease ever arise spontaneously in the human species? The facts relating to this question involve many doubts. Francis Stannier died in November 1787, with the symptoms of hydrophobia, though it was not known that he had ever been bitten by a mad dog; (*London Med. Journal, Vol. 9, p. 256.*) and similar cases are related by writers. Yet as a large bite is no way necessary to communicate the infection, the patient above-mentioned may have been slightly bit, without knowing it, as he was often drunk, and frequently in the streets at night. There is good reason to believe that the difficulty of swallowing, which sometimes occurs in tetanus, has been mistaken for hydrophobia in some cases; and there may be other spasms about the throat and the œsophagus, which may so far resemble hydrophobia, as to give rise to errors on this subject. Something of this kind occurred once to Dr. John Hunter, in an hysteric woman. Were we to be guided by analogy in deciding the present question, we should be led to deny the existence of spontaneous hydrophobia; for where is there an example of any of those diseases which de-

pend upon a specific poison, as the small-pox, the venereal disease, or the measles, arising spontaneously? But the full decision of this question must be left to future experience and observation. (*Dr. J. Hunter in Trans. of a Society for the Improvement of Med. and Chirurgical Knowledge, Vol. 1, p. 299—303.*)

Dr Heysham has defined hydrophobia to be an aversion and horror at liquids, exciting a painful convulsion of the pharynx, and occurring at an intermediate period after the canine virus has been received into the system. Dr. Cullen places it in the class *neuroses*, and order *spasmi*, and defines it a loathing and great dread of drinking any liquids, from their creating a painful convulsion of the pharynx, occasioned most commonly by the bite of a mad animal. Others have suggested the following definition, as more complete: melancholy, dread of cold air; of any thing shining, and particularly of water; often arising from the bite of a mad animal. (*Parr's Med. Dict.*) However, the latter definition is, perhaps, equally objectionable, because there is not invariably a dread of shining bodies. (See *Dr. Powell's Case, p. 8.*)

Writers in general have divided hydrophobia into two stages, viz. the *melancholy*, and the *raving*; the *hydrophobia simplex*, and *rabiosa*, of Cullen. In many instances, however, the latter stages of the disorder are not preceded by any condition, to which the epithet melancholy is applicable.

With regard to the symptoms of hydrophobia, they are generally tardy in making their appearance, a considerable, but a very variable space of time usually elapsing between their commencement and the receipt of the bite. This interval in the greater number of instances appears to be about six weeks. Out of a table of 131 cases, none of the patients became ill before the eleventh day after the bite, and only three before the eighteenth. Dr. Hamilton thinks nineteen months the longest interval, to which any credit can be given. (*On Hydrophobia, Vol. 1. p. 113.*) On the other hand, Dr. Bardsley, of Manchester, has recorded a case, in which the most careful enquiries tended to prove, that the patient had never suffered the least injury from any animal, except the bite, inflicted twelve years previous to the commencement of the hydrophobia, by a dog apparently mad. (*Mem. of Liter. and Phil. Society of Manchester, Vol. 4, Part 2, p. 431.*) The wound, if treated by common methods, usually heals up at first in a favourable manner. At some indefinite period, and, occasionally, long after the bitten part seems quite well, a slight pain

begins to be felt in it, now and then attended with itching, but generally resembling a rheumatic pain. It soon extends from the wound up the arm, and affects the situation of the trapezius muscle, and the neck, on the same side as the bite. The cicatrix, in the mean while, begins to swell, inflames, and, at length, discharges an ichorous matter. There are often pains of a more flying, convulsive kind, felt in various parts of the body. As the disease advances, the patient complains of the pain shooting, from the situation of the bite, towards the region of the heart. A lassitude, a dull pain in the head, and a vertigo, soon come on: the patient is commonly melancholy, though not always, mutters, is forgetful, and drowsy; his mind seems disordered; his temper irritable and irregular; his slumbers disturbed, and convulsive agitations immediately follow his waking: a deafness is sometimes complained of; the eyes are watery; the aspect sorrowful; the face pale and contracted; sweat breaks out upon the temples; and an unusual discharge of saliva is made from the mouth. From the beginning, a peculiar stricture and heaviness on the breast, occasional involuntary sighing, and nausea, take place. There is often a bilious vomiting. The idea of drinking any kind of fluids creates considerable alarm and agitation, and the attempt to do so generally brings on most afflicting pains and convulsions, attended with a dreadful sense of suffocation, and choaking. Dr. Marcet, in relating the case of a patient affected with hydrophobia, observes, that "on our proposing to him to drink, he started up, and recovered his breath by a deep convulsive inspiration: yet, he expressed much regret, that he could not drink, as he conceived, it would give him great relief, his mouth being extremely parched and clammy. On being urged to try, however, he took up a cup of water in one hand, and a tea-spoon in the other. The thought of drinking out of the cup appeared to him intolerable; but, he seemed determined to drink with the spoon. With an expression of terror, yet, with great resolution, he filled the spoon, and proceeded to carry it to his lips; but, before it reached his mouth, his courage forsook him, and he was forced to desist. He repeatedly renewed the attempt; but, with no more success. His arm became rigid and immovable, whenever he tried to raise it towards his mouth, and he struggled in vain against this spasmodic resistance. At last, shutting his eyes, and, with a kind of convulsive effort, he suddenly threw into his mouth a few drops of the fluid, which he actually swallowed. But,

at the same instant, he jumped up from his chair, and flew to the end of the room panting for breath, and in a state of indescribable terror." (See *Medico-Chirurgical Transactions*, Vol. 1, p. 138.) Even the splashing, or running, of any liquid causes a great deal of inconvenience. As the system becomes more and more affected, the patient loses his sleep entirely, and has frequent and violent fits of anxiety and loud screaming from slight causes. The woman, whom Dr. Powell attended, was often attacked in this way, in consequence of so trivial a circumstance as a fly settling on her face. The noise of tea-cups, or the mention of any sort of drink greatly disturbed her, though she was not at all agitated by the sound of her urine. The currents of air entering her room, whenever the door opened, became very distressing to her, and this more and more so. The pain in her neck became so great, that she could scarcely bear it to be touched; but she made use of a looking-glass without the inconvenience which hydrophobic patients usually suffer from the sight of shining bodies. Dr. Powell states, that the paroxysms which this poor woman suffered, resembled those of hysteria, and increased in duration as the disorder lasted. "She described their commencement to be in the stomach, with a working and fulness there, and that a pricking substance passed up into her throat and choked her; she screamed suddenly, and grasped firmly hold of her attendants, as if voluntarily; and muscular convulsions came on, which were sometimes more, sometimes less general and violent. The causes from which these paroxysms arose, were extremely slight; the passage of a fly near her face, the attempt to swallow a pill, a stream of air, the sight of oil or wine, or any other liquids, even the sound of water, and other such circumstances, were sufficient; she now also complained of inconvenience from light, which was accordingly moderated. The effects of sounds was peculiar; for, though in the subsequent stages, their influence became more general, at this period the effect was rather proportionate to the ideas they excited in her mind, than to their violence. Bells, and other strong noises, did not agitate her, but the clatter of earthen ware, the noise of a distant pump, or any thing connected with liquids, produced the paroxysms in all their violence." She could swallow fresh currants with less resistance than any thing else, taking care that they were perfectly dry. Her mind had, till now, been quite calm and composed, and her conversation

and behaviour proper, during the intervals of the convulsive attacks. But Dr. Powell was obliged to discontinue the pills of argenti nitratum, in consequence of the sufferings which the attempt to swallow them regularly brought on. Fifteen grains of this substance had been given without any sensible effect. The fits and irritability to external objects, increased. The pain shot from the back of the neck, round to the angles of the jaws, the chin, and throat. At length, the paroxysms became more frequent, and, indeed, might be said to come on spontaneously: seven occurred in one hour. She looked pale and exhausted, and a tremor and blueness of her lips and fingers were observable; her pulse became weaker and more rapid, and her scalp so tender, that touching it brought on convulsions. She had, latterly, eructations of wind, and spit up some thick viscid saliva. Her urine now came away involuntarily, and she was more and more irritable and uncontrollable. She now passed two hours in almost constant convulsions; became extremely irritable and impatient of every thing about her, complained of failure of her sight; wished to be bled to death; her words were fewer and interrupted; she struck, and threatened to bite, her attendants; had copious eructations of air; discharged an increased quantity of viscid saliva with much convulsive effort; said the affection of her throat and stomach had quite left her; and continued in a general perspiration, with a weak pulse from 140 to 150. She afterwards bit some of the attendants, and was therefore confined with a waistcoat. From this period, she had lost all control over her mind, and continued for almost four hours in a paroxysm of furious insanity. She now swallowed, with an effort, near half a pint of water: but this was, in a few seconds, vomited up, with some mucus, and a greenish fluid. In this violent raving state, she continued till within two hours of her death, which took place forty-seven hours after the first marked occurrence of hydrophobia. In the course of the case, she swallowed, once or twice, a little porter; and also some cinnamon-water, with tinct. opii; but they were always vomited up. On opening the body, the most remarkable appearances were, a turgid state of the vessels of the brain; great distentions of the intestines with air; the œsophagus rather redder than natural, and covered with a thin layer of coagulating lymph; nearly half a pint of greenish fluid in the stomach, which was rather redder than natural, and had under its

internal coat, near the cardia, a few spots of extravasated blood. (*Dr. Powell's Case of Hydrophobia.*)

The dread of swallowing liquids, though the most singular symptom of the disease, constitutes but a small part of the malady. It is true, that none, or very few recover, who have this symptom, yet, they certainly do not die, in consequence of the difficulty of swallowing liquids; for, the human body could easily exist double the time, in which the disease usually proves fatal, without food, or drink. Besides, the sick can often swallow substances, that are nourishing, in a pulpy state, without, however, having their life thereby at all prolonged. It is not, therefore, the difficulty, or impossibility of swallowing liquids; but the effects of the poison upon the constitution at large, which occasions death. (*Dr. J. Hunter in Trans. of a Society for the Improvement of Med. Knowledge, Vol. 1, p. 305.*)

The extreme sensibility of the sick to all impressions, appears in the displeasure which they express at even the air blowing upon them; in their dislike to a strong light; in their aversion to new faces, or even the sight of their friends and relations; and in the terror they express at being touched, which almost threatens to throw them into convulsions. As the disease advances, the mind is more and more filled with dreadful fears and apprehensions. (*Op. cit. p. 307.*)

The duration of life, from the appearance of the hydrophobia till death, varies from thirty-six hours to four or five days: the most common period is from two to three days. (*Op. cit. p. 308.*)

The dread of water is said to be sometimes a symptom of certain fevers, from topical inflammations of the thorax, or neighbouring parts. (*Edinburgh Medical Commentaries. Vol. 2, p. 331.*) A species of hydrophobia has been known to originate from an inflammation of the stomach. (*Med. Essays, Vol. 1.*) Also from the bite of an epileptic patient, or of persons in violent fits of passion; and from the accession of epilepsy. An inferior degree of it is said to be observable in some hysteric cases, when, from the difficulty of swallowing, patients are fearful of taking liquids. In the latter cases, musk and opium are recommended.

With respect to the treatment of hydrophobia, arising from the canine poison, little is necessary to be said in this work, because the subject is rather medical than surgical. The reader will regret my brevity the less, when he is informed, that, after hydrophobia has once begun, it has always pursued its dreadful course to a fatal termination, without

any one well authenticated instance to the contrary, notwithstanding the trial of every medicine, and method, which the ablest practitioners have suggested. The only case, that I have ever perused, which seemed really to be one, in which hydrophobia was cured, was published in a Calcutta paper, of December, 1811. The treatment, if my memory fails me not, consisted in mercurial frictions, and copious and repeated bleedings. The particulars, I believe, however, are likely to be made public in one of the periodical works, long before this edition of the dictionary will be completed. If this were a true case of hydrophobia, it is extraordinary, that a method, which has been often and often tried in other instances, should have answered in this particular one. The same observation, in regard to the inefficacy, of every mode of treatment hitherto known, might, perhaps, be accurately extended to every internal remedy, mercurial frictions, plunging the patient for a considerable time under water, &c. as preventives. The instances, in which a prevention has been inferred to have taken place by different writers, in consequence of such means, may all be very rationally ascribed to other circumstances. It is well known, that, out of the great number of persons, frequently bitten by the same dog, only a few are commonly affected. The hydrophobic poison is known to reside in the saliva of the animal; consequently, the chance of being affected must greatly depend upon the quantity of this fluid, which may be insinuated into the wound; and, if the teeth of the animal should have previously pierced a thick boot, or other clothing, before entering the skin, the danger must obviously be in general much diminished. Many patients wash and suck the wound, immediately after its occurrence, and thus, no doubt, very often get rid of the poison. Even when it has lodged in the wound, it may not be directly absorbed, but be thrown off with the discharge. All prudent patients submit to excision of the bitten part. Now, under each of the above circumstances, escapes have frequently occurred, while internal medicines, half drowning, or salivating the patients, had also not been neglected, so that all the efficacy of preventives has too often been most unjustly ascribed to means, which probably never yet had, nor ever will have, any beneficial effect whatever. What confirms the truth of the preceding statement are these facts; that persons bitten by the same animal have sometimes been treated exactly on the same plan; some of them have escaped having the disease; others have

had it, and, of course, perished: on other occasions, some of the patients, bitten by the same animal, have been treated in a particular way, and have escaped hydrophobia, while others bitten at the same time by the animal, also never had any constitutional effects, although they took no medicines, nor followed any other particular plan.

Happily, there is, in surgery, one means of preventing hydrophobia, when it is practised in time, and in a complete manner. Every reader will know, that the excision of the bitten parts is the operation to which I allude. Indeed, as hydrophobia is often several months before it begins, the wounded parts should, perhaps, always be cut out, even though they are healed, and some weeks have elapsed since the accident, provided no incipient symptoms of hydrophobia have already commenced. The operation should be done completely; for a timorous surgeon, who should fear to cut deeply enough, or to cut a sufficient quantity of the surrounding flesh away, would be a most dangerous one for the patient. All hopes of life depend on the prevention of the disorder: for, in the present state of medical knowledge, none can rest upon the efficacy of any plan, except the extirpation of the part. This some have done with caustics. However, as their action can never be regulated with the same precision as that of the knife, and, consequently, they will not always destroy the flesh to a sufficient depth, excision should always be preferred. The latter method is also the safest, for another important reason, viz. the part, and poison lodged in it, are removed from the body at once; but, when caustic is used, the slough will not be thrown off for some days afterwards.

Some surgeons of the present day are not content with cutting out the part; they recommend, after the operation, filling the wound with the aqua ammoniac puræ, so as to produce a general sloughing of the surface, by way of greater security.

I shall conclude this article with referring the reader to the following works, for farther information on hydrophobia: *Sauvages sur la Rage*; *James on Canine Madness*; *Mead on the Bite of a Mad-dog*; *Seleg, Nugent, and Hamilton, on Hydrophobia*; *Medical Museum, Vol. 2*; *London Medical Transactions, Vol. 2*; *Med. Obs. and Inq. Vol. 3*; *Edinb. Med. Comment. Vol. 5, p. 42*; *Vaughan's Two Cases of Hydrophobia*; *Dr. Powell's Case of Hydrophobia*; *Latta's System of Surgery, Vol. 3*; *Cullen's First Lines, Vol. 4*; *Memoirs of the Med. Society of London, Vol. 1, p. 243*; *Medical*

Communications, Vol. 1; *Mem. of the Royal Society of Medicine in Paris, Supplement to Vol. 4*. *Ferriar's Med. Facts and Observations*. *Richerand's Nosographie Chirurgicale, Tom. 1, p. 251, &c. Edit. 2*. *Marcet, in Medico-Chirurgical Transactions, Vol. 1, p. 132, &c. Lassus, Pathologie Chirurgicale, Tom. 2, p. 239, &c. Edit. 1809*. *A valuable paper by Dr. John Hunter in Trans. of a Society for the Improvement of Med. and Chirurgical Knowledge, Vol. 1, Art. 17*. *Gillman's Dissertation on the Bite of a Rabid Animal*. *Levéillé, Nouvelle Doctrine Chirurgicale, Tom. 2, p. 341, &c.* *Bardsley in Memoirs of the Literary and Philosophical Society of Manchester, Vol. 4, Part 2*. *Babington, in the Medical Records and Researches, Lond. 1798*.

HYDROPTHALMIA. (from ὑδωρ, water; and ὀφθαλμος, the eye.) *Dropsy of the eye*. In all the cavities of the animal body, (says Scarpa) which are continually moistened by a serous vapour, as well as in those destined to contain a determinate quantity of an aqueous, limpid fluid, there is such a reciprocalness of action, between the secerning extremities of the arteries, and the minute mouths of the absorbent vessels, that the fluid effused in these cavities is always in circulation, being incessantly renovated, but never accumulating beyond a certain degree and determinate measure. When this mutual action, existing between these two vascular systems, is interrupted, in consequence of a general or local indisposition, the above cavities, being no longer moistened by a serous vapour, shrivel and become obliterated; or, on the contrary, being unusually distended by the excessive quantity of fluid, they acquire an enormous magnitude, much beyond what a person, unacquainted with these things, would suppose.

As Scarpa continues, the eye, considered simply as a cavity destined to contain a certain quantity of limpid fluid, is occasionally subject to both these infirmities. The first is termed *atrophy*; the second, *dropsy of the eye*, or *hydrophthalmia*. In the first case, the globe of the eye gradually becomes smaller; and, as the absorbent system does not cease acting, when there is no more fluid to be absorbed, it gradually consumes the solid parts of this organ, which it insensibly diminishes, and in time destroys. In the second case, the eye assumes a greater bulk than is natural to it; sometimes acquiring such an extraordinary magnitude, that it projects out of the eyelids, at first with great weakness, and afterwards with total loss of sight.

Surgeons generally state, that the immediate cause of the dropsy of the eye, is

sometimes an increase of the vitreous humour, sometimes of the aqueous. In every case of this kind, on which Scarpa has performed the operation, and in other examinations of the different stages of the disease, made on the dead subject, he has constantly found the vitreous humour, more or less, altered in its organization, liquified, and converted into water, according as the disease was ancient, or recent. In some instances, he could not distinguish whether the increased quantity of the vitreous or the aqueous humour had most share in the formation of the disease. Some of the most celebrated modern oculists believe, that the principal cause of this complaint is referrible to the closure of the inorganic pores of the cornea, through which the aqueous humour can no longer transude, and consequently collects in the interior of the eye, so as to occasion dropsy. By this assertion, they evince, that they are not sufficiently acquainted with the activity of the absorbent system in the animal economy; and they do not seem to have adverted that, in conformity with their theory, the dropsy of the eye ought invariably to follow a thickening of the conjunctiva spread over the organ, as well as the leucoma and extensive scars of the whole cornea; a thing that is contradicted by daily observation and experience.

Scarpa has also dissected a dropsical eye, taken from the body of a child, three years and a half old, who died of marasmus. The vitreous humour was not only wanting in this eye, and the cavity destined for its reception filled with water; but the vitreous tunic was converted into a substance, partly of a spongy, partly of a lippomatous nature. This dropsical eye was one-third larger than the sound one. The sclerotica was not thinner than that of the other eye; but, in consequence of being yielding, flaccid, and separated from the choroides, it had lost its plumpness, and globular shape. The cornea formed a disk, one-third larger than that of this membrane in a sound state; it did not retain its natural pulpousness, and was obviously thinner than the cornea of the healthy eye. There was a considerable quantity of an aqueous, reddish fluid, between the cornea and iris. The crystalline lens, with its opaque capsule, had been pushed forward a little way into the anterior chamber, but could not advance further on account of a firm adhesion, which the capsule had contracted with the iris, around the edge of the pupil. As soon as the capsule was opened, the lens issued from it, half dissolved, the rest exceedingly

soft. It was impossible to detach the whole of the posterior layer of the capsule from a hard substance, which seemed to be the altered membrane of the vitreous humour. Scarpa, therefore, slit open the choroides, from the ciliary ligament to the bottom of the eye, when a considerable quantity of a reddish aqueous fluid gushed out, without, however, one particle of the vitreous humour. In lieu of the latter body, there was found a small cylinder of a substance, partly of a fungous, partly of a lippomatous nature, surrounded with a good deal of water, which was effused in the longitudinal axis of the eye, from the entrance of the optic nerve, as far as the ciliary ligament, or that hard substance to which the posterior layer of the capsule firmly adhered. This little cylinder was covered, for the extent of two lines and a half forwards from the entrance of the optic nerve, by a stratum of whitish matter, reflected on itself, like the epiploon, when raised towards the fundus of the stomach. Scarpa conceived that this stratum of whitish matter was nothing else than the relics of the unorganized retina; for, on pouring rectified spirits of wine on the whole inner surface of the choroides, and the little cylindrical body, he found no vestiges of the retina on this membrane, and that the whitish substance, which was reflected on itself, became very firm, just as the retina does when immersed in spirit of wine. Both the cylinder and the indurated substance, occupying the place of the ciliary body, were manifestly nothing else than the membrane of the vitreous humour destitute of water, and converted, as was described, into a substance, partly of a spongy, partly of a lippomatous nature. It is not easy to determine whether this fungous and lippomatous degeneration of the vitreous tunic had preceded, or was a consequence of the dropsy of the eye. However, it may be, this fact, in conjunction with several other similar ones, that Scarpa has met with, in which he found no vitreous humour in the posterior cavity of the eye, but only water, or a bloody lymph, tends very much to confirm that this disease principally consists of a morbid secretion of the vitreous humour, and occasionally, also, of a strange degeneration of the alveolar membrane, by which this humour is formed. Scarpa refers to a similar case in *Medical Obs. and Inquiries*, Vol. 3, Art. 14.

The augmentation in the secretion of the aqueous fluid, both in the cells of the vitreous humour and out of them, after they have been ruptured from excessive distention; together with a debilitated

action of the absorbent system of the eye affected; are, most probably, continues Scarpa, the causes of every species of dropsy, and, consequently, of the morbid accumulation of humours in the eye. From such a lodgment and successive increase of the vitreous and aqueous humours, the eye-ball at first necessarily assumes an oval shape, ending at the point of the cornea; then, as the organ enlarges in all dimensions, it acquires a larger size than that of its fellow; so that, in the end, it projects from the orbit in such a manner, that it cannot be covered by the eyelids, and disfigures the patient's face as much as if an ox's eye were placed in the orbit, instead of his own natural one.

This disease (says Scarpa) is sometimes preceded by blows on the eye, or adjoining temple; sometimes by an obstinate internal ophthalmia. In other instances, it is preceded by no other inconvenience except an uneasy sensation of tumefaction and distention in the orbit, a difficulty of moving the eye-ball, and a considerable impairment of sight. Lastly, it is sometimes preceded by none of these causes, or no other obvious one whatever, especially when the complaint occurs in children, of very tender age, from whom no information can be obtained. As soon as the eye has assumed an oval form, and the anterior chamber has become preternaturally capacious, the iris seems situated further backward than usual, and tremulates, in a very singular way, on the slightest motion of the eye-ball. The pupil remains dilated in every degree of light, while the crystalline is sometimes brownish from the very beginning of the disease; and sometimes it does not become cloudy till the affection has arrived at its highest pitch. The complaint then becomes stationary; and, as the crystalline is not deeply opaque, the patient can distinguish light from darkness, and, in some degree, the contour of objects, and brilliant colours. But, when the eye has acquired a larger volume, and the whole crystalline has become opaque, the retina at last remains in a state of paralysis, from the excessive distention, and, consequently, is no longer sensible to such few rays of light as reach the bottom of the eye, by insinuating themselves at the sides of the lens.

In the last stage of the disease, (continues the above celebrated surgeon) when the dropsical eye projects from the orbit, so as not to admit of being covered by the eyelids, with the inconveniences already enumerated, others associate themselves, arising from the friction of the cilix, the secretion of gum, the flux of

tears, the ulceration of the lower eyelid, on which the eye rests, and the excoriation of the eye itself. Hence, the dropsical eye is gradually attacked by violent ophthalmies, attended with intolerable pains of the part affected, and of the whole head. The ulceration, also does not always confine itself within certain limits; but continues to spread, first depriving the cornea of its transparency, next consuming the sclerotica, and lastly, destroying progressively the other component parts of the eye-ball.

At the first appearance of the dropsy of the eye, the masters of the art recommend the internal administration of mercurials, the extract of cicuta, and of pulsatilla nigricans; and the external employment of astringent and corroborant collyria, making a seton in the nape of the neck, and compressing the eye, which forms a preternatural projection out of the orbit. As far, however, as Scarpa can judge, from the events of observations made by the best practitioners on this point, he has never yet met with a single well-detailed history of a dropsy of the eye cured by means of the above-mentioned internal medicines. With regard to externals, he has learnt, from his own experience, that, when the disorder is manifest, astringent, and corroborant collyria, as well as compression on the protuberant eye, are highly prejudicial. In such circumstances, making a seton in the nape of the neck, frequently bathing the eye in a lotion of mallows, and applying to it a plaster composed of the same plant, have enabled him to calm, for a time, that disagreeable sense of distention in the orbit, and over the forehead, and temple of the same side, of which patients in this state make so much complaint, especially when they are affected with a recurrence of ophthalmia. But, as soon as the eye-ball begins to protrude from the orbit, and project beyond the eyelids, there is no means of opposing the very grievous dangers, which the dropsy of the eye threatens, except an operation, which consists in evacuating, by an incision, the superabundant humours from the eye, then exciting gentle inflammation of the membrane, and suppuration on the interior of this organ, so as to make it contract, and shrink into the bottom of the orbit. To defer the operation any longer, would be abandoning the patient to the constant inconvenience of an habitual ophthalmia, the danger of an ulceration of the eye-ball and subjacent eyelid, and, what is worse, of carcinoma of the whole eye, with great peril to the patient.

Scarpa next states, that, in order to fulfil the preceding indication, of evacu-

ating the superabundance of aqueous humours lodged in the eye, the paracentesis of the eye-ball has been greatly extolled in past times—Nuck, one of the promoters of this operation, punctured the eye with a trocar, exactly in the centre of the cornea. (*De Duct. Ocul. Aquos.* p. 120.) It has since been thought better to puncture the eye-ball in the sclerotica, at about two lines from the junction of this membrane with the cornea, that such a small quantity of the vitreous humour may be more easily discharged at the same time with the aqueous, as may be deemed adequate to effect a diminution in the morbid enlargement of the eye-ball.

Notwithstanding the approbation, says Scarpa, which the most celebrated surgeons have conferred on this method of operating for the dropsy of the eye, it has at present fallen into disuse, as insufficient, and ineffectual for the purpose. This will not appear surprising to such as are acquainted with our present knowledge of the animal economy, particularly in regard to the lymphatics, and are not ignorant how little reliance can be put in paracentesis, as a means of curing chronic dropsy in general, especially that of the tunica vaginalis, termed hydrocele. Indeed, the radical cure of the latter is never accomplished, except when the adhesive inflammation takes place in the tunica vaginalis and albuginea, after the evacuation of the fluid, or when these membranes suppurate, ulcerate, or contract an intimate adhesion together, which remove every opportunity, every possibility of a fresh accumulation of water in the scrotum. If it has sometimes happened, that the puncture has radically cured the hydrocele, it is because it has, by some unexpected incident, excited inflammation of the *vaginalis* and *albuginea*, so as to produce a coalescence of these two membranes.

In consequence of these principles, (continues Scarpa) the paracentesis of the eye, directed wholly for the discharge of the superfluity of humours in this organ, can never be a means of curing the dropsy of the part, unless the puncture, made by the trocar, excite, at the same time, inflammation and suppuration, and afterwards a concretion of the membranes composing the eye-ball. Indeed Nuck relates, that in a young man at Breda, on whom he had operated, he was obliged to puncture the eye five several times; that, on the fifth time of doing this, it was necessary to suck through the cannula of the trocar, in order to evacuate the greatest possible quantity of the vitreous humour; and, lastly, that it seemed proper to intro-

duce a plate of lead, between the eyelids and eye-ball, for the purpose of making a continual pressure on the eye, in its empty, shrivelled state. In a woman of the Hague, he mentions that he twice punctured the eye in vain; and that this person submitted, two or three other times, to the same operation, but he omits adding with what degree of success. Scarpa has no difficulty in believing, that a radical cure of the dropsy has sometimes been accomplished by means of the puncture, after the trocar, and other similar hard substances, have been repeatedly introduced into the eye, through the cannula of that instrument; but this success can never be attributed to the mere evacuation of the superabundance of the vitreous and aqueous humour; though it may be referred to that, conjoined with the irritation produced by the cannula, and, consequently, to the adhesive inflammation or suppuration excited in the internal membranes of the eye. It is by no means unlikely, that, after having learnt this practical point from experience, and wishing to insure the success of the paracentesis in the radical cure of the dropsy of the eye. Woolhouse may have directed that, when the cannula is introduced in the eye, it should be rolled at least six times between the fingers; and that Platner, following the same steps, may have proposed to inject a warm fluid through the cannula into the cavity of the eye, after having evacuated the humours, by means of a trocar; and that Mauchart may have directed keeping open the wound made in the eye by the trocar, by means of a small tent of lint. If all these circumstances prove, on one side, the inefficacy of the paracentesis in the radical cure of the dropsy of the eye, they evidently shew, on the other, that the perfect cure of this infirmity can only be achieved by evacuating the humours contained in the eye; and exciting, at the same time, a certain degree of inflammation, and suppuration, of the internal membranes of the organ.

The most easy and expeditious way hitherto known, of obtaining all these advantages, is undoubtedly that which is explained in the account of the radical cure of the inveterate staphyloma, protruding out of the eye-lids. (See *Staphyloma*.) With respect to this subject, Scarpa cannot refrain from repeating, at this opportunity, that it is exceedingly disadvantageous, and even dangerous, to make the circular section of the dropsical eye-ball in the sclerotica. In fact, this circular resection, when performed in the sclerotica, is constantly followed by the most aggravated symptoms, particularly,

frequent hemorrhages, an accumulation of grumous blood at the bottom of the eye-ball, vehement inflammation of the eye, eyelids, and head, obstinate vomitings, convulsions, delirium, and the most imminent danger to the patient's life. Such modern surgeons, as have faithfully published the results of their practice on this point, among whom, Marchan (*Journal de Med. de Paris. Janvier, 1770. Sur deux Exophthalmies, ou grosseurs contre nature du Globe de l'Œil.*) and Terras, (*Ibidem; Mars. 1776. Sur l'Hydrophthalmie.* next to Louis, (*Mémoires de Chirurgie, t. 13, p. 289, 290.*) merit infinite praises, have ingenuously declared that, after performing the circular recision of dropsical eyes in the sclerotica, they have had the greatest motives for repenting of what they had done.

The circular section, as broad, or rather broader than a large lentil-seed, is performed at the summit or centre of the cornea of the dropsical eye, according to Celsus's direction relative to the staphyloma, is exempt from the serious consequential symptoms that Scarpa has just mentioned. By means of this operation, which is by no means painful, an opening is made for the evacuation of the humours of the eye, and internal inflammation is, at the same time, excited. These objects are accomplished, also, without occasioning such a sudden subsidence, and emptiness, of the membranes of the whole eye, as necessarily happen when a circular incision is made in the sclerotica, and greatly affect the nerves of this organ, and the parts sympathizing with it, particularly the head and stomach. This intimate sympathy, perhaps, is not the least of the causes producing the fatal consequences above specified; besides those very serious ones, which necessarily result from the almost sudden exposure of a large surface of the deeper part of the eye to the contact of the air, and from the lotions which are, in these circumstances, often employed.

With regard to the manual of the operation, it is exactly the same as what is detailed in the article *Staphyloma*. In the dropsical eye, whether the cornea be transparent or not, since the function of the immediate organ of sight is irrevocably lost, as Scarpa has already stated, the surgeon must introduce a small bistoury across the apex, or middle of the cornea, at one line and a half from its central point; and then, by pushing the instrument from one towards the other canthus of the eye, he will cut the lower part of the cornea in a semicircular manner. The segment of the cornea being next elevated with the forceps, the operator is to turn

the edge of the knife upward, and complete the work by a circular removal of as much of the centre of the cornea as is equal, in size, to a large lentil-seed, or three lines in diameter, supposing the patient to be in the adult state. Through this circular opening, made in the centre of the cornea, the surgeon may, by means of gentle pressure, discharge as much of the superabundant humours in the eye, as is requisite to make the eye-ball diminish, and return into the orbit, so as to be covered with the eyelids. As for the rest of the humour lodged in the eye, it will gradually escape of itself, through the circular opening in the cornea, without any more pressure being made.

Until the appearance of the inflammation, that is, until the third or fifth day after the operation, the dressings are to consist of the application of a pledget of dry lint, supported by a retentive bandage. As soon as the inflammation and tumefaction invade the eye operated on, and the eye lids, the surgeon is to employ such internal remedies as are calculated to moderate the progress of inflammation; and he is to cover the eyelids with a bread and milk poultice, which must be renewed at least once every two hours. It is a very frequent phenomenon, both in the staphyloma and dropsy of the eye, that, on the first appearance of inflammation, the eye-ball on which the operation has been done, augments, and protrudes again from the eyelids, in the same way as before the operation. In this circumstance, it is proper to cover the projecting part of the eye-ball with a piece of fine linen, smeared with a liniment of oil and wax, or the yolk of an egg, and oleum hyperici; the application of the bread and milk poultice being continued, as before-mentioned, over this other dressing. Scarpa next states, that when suppuration of the interior of the eye manifests itself, the swelling of the eyelids at the same time decreases, and the eye-ball diminishes in size, returns gradually into the orbit, and continues to contract itself. This state of suppuration may be known by observing, that the dressings are smeared with a viscid lymph, blended with a portion of the humours of the eye, which incessantly issue from the centre of the cornea; and by noticing the appearance of the margin of the recision, which is changed into a circle of a whitish substance, resembling the rind of bacon. In the progress of the case, this whitish circle, surrounding the place of the recision of the cornea, becomes detached, like a slough, so as to leave a small ulcer, of a very healthy colour. This ulcer, as well as the whole eye-ball, contracts, so as to

become entirely closed, and cicatrized, leaving every opportunity for the placing of an artificial eye between the eyelids and the stump of the eye-ball.

Although, in the majority of cases, the circular resection of the centre of the cornea, equal in size to a large lentil-seed, proves sufficient to excite a mild inflammation, and suppuration, in the interior of the eye of an adult subject: yet, if this occurrence does not take place on the fifth day, it is useful to expose the eye, on which the operation has been done, to the air; or, as is stated in the article *Staphyloma*, it is useful to remove a circular portion of the cornea, half a line in breadth, or little more, by means of the forceps and curved scissors. This gives the patient neither pain nor any other inconvenience, and produces the desired effect, viz. it makes the interior of the eye, at length, inflame and suppurate mildly, without which it is impossible to effect a perfect cure. (*Scarpa sulle Principali Malattie degli Occhi*, cap. 13.)

HYDROPS. (from ὕδωρ, water.) A dropsy, or morbid accumulation of water. For *hydrops articuli*, refer to *Articulation*. With regard to *hydrops pectoris*, *hydrothorax*, or *dropsy of the chest*, as it is altogether a medical case, an account of its symptoms and treatment will hardly be required in this Dictionary. The only concern which a surgeon has with the disease, is being occasionally required to make an opening for the discharge of the water: this operation is described in *Paracentesis Thoracis*.

HYDROSARCOCELE. (from ὕδωρ, water: σὰρξ, flesh: and κηλη, a tumour.) A morbid enlargement of the testicle, attended with a collection of fluid in the tunica vaginalis.

HYMEN IMPERFORATE. The inconveniences brought on by such a cause and the mode of relief, are explained in the article *Vagina*.

A continuation of the hymen over a part of the orifice of the meatus urinarius may produce great pain and difficulty in making water, and symptoms, which may give rise to suspicion of there being a stone in the bladder.

The following case illustrates this observation. "In the year 1740, (says Mr. Warner) I was consulted in the case of a little girl, about three years old, who had long laboured under such severe symptoms in voiding her urine, as to make it suspected by her physician, that she had a stone in her bladder. Upon enquiry, I was informed, that her urine came away by drops, that she was inclined to put her hand to the pudendum when she

made water, and that, at that time, she could not help crying and stamping with her feet. These symptoms so nearly resembled those of the stone, that I thought proper to propose the passing a staff into the bladder that we might be satisfied, whether there was a stone, or any other disease of the urethra, or bladder; but, upon endeavouring to do it, I observed, that the urethra was at least half covered over with a continuation of the hymen, which appeared imperforated; for this reason, I could with difficulty execute my design. However, I effected the introduction of the instrument into the bladder, without using much violence; but, there was no stone, nor any other preternatural appearance to be discovered in the bladder, or the urethra. For this reason, I pronounced, that the difficulties and pains, which arose in discharging the urine, probably proceeded from the size and situation of this membrane; which I divided by incision with a small knife," &c. The patient was cured in a few days. (See *Warner's Cases in Surgery*, p. 276, edit. 4.)

HYPOPYON, or HYPOPIUM. (from ὑπο, under; and πύον, pus.)

By hypopium (says Scarpa) I imply, with all surgeons, that accumulation of a glutinous, yellowish fluid, like pus, which take place in the anterior chamber of the aqueous humour, and, frequently, also in the posterior one, in consequence of severe, acute ophthalmia, particularly the internal species. I have explained, in speaking of inflammation of the eyes, that, though the severe, acute ophthalmia particularly affects the external parts of the eye, in the majority of instances; yet, it occasionally invades, with equal violence, both the external and internal coats of this organ, especially the choroides and uvea. In this last circumstance, if the inflammatory diathesis, affecting the interior of the eye, be not promptly checked and subdued, by the most effectual chirurgical means, coagulating lymph is extravasated from the highly inflamed choroides and uvea, and gradually, as it is effused into the cavity of the eye, it passes through the pupil, into the chambers of the aqueous humour, and descends to the bottom of the anterior one, so as to fill sometimes one third, sometimes one half of this space; and, occasionally, to occupy it to such a height, as totally to conceal the iris and pupil.

This viscid matter of the hypopium is commonly called pus; but Scarpa contends that it is only coagulating lymph. The symptoms portending an extravasation of coagulating lymph in the eye,

an hypopium, are the same as those which occur in the highest stage of violent acute ophthalmia: viz. prodigious tumefaction of the eye-lids; the same redness and swelling of the conjunctiva, as in chemosis; burning heat and pain in the eye; pains in the eye-brow and nape of the neck; fever, restlessness, aversion to the faintest light, and a contracted state of the pupil.

As soon as the hypopium begins to form, (says Scarpa) a yellowish semilunar streak makes its appearance at the bottom of the anterior chamber, and, regularly, as the glutinous fluid is secreted from the inflamed internal membranes of the eye, so as to pass through the pupil, and fall into the aqueous humour, it increases in all dimensions, and gradually obscures the iris, first at its inferior part, next, where it forms the pupil, and lastly, the whole circumference of this membrane. As long as the inflammatory stage of the violent ophthalmia lasts, the hypopium never fails to enlarge; but, immediately this stage ceases, and the ophthalmia enters its second period, or that dependent on local weakness, the quantity of coagulating lymph, forming the hypopium, leaves off increasing, and, from that moment, is disposed to diminish.

This fact sufficiently evinces (continues this eminent Professor) how important it is, in order to check the progress of the hypopium, to employ with the utmost care, the most effectual means for checking and resolving the attack of violent ophthalmia, in its first stage. Copious evacuations of blood, both generally and topically, ought to be speedily put into practice; and when chemosis exists, the conjunctiva should be divided; mild aperients, blisters to the nape of the neck, little bags of emollient herbs, applied to the eye, and other measures of this kind, described on the subject of the first stage of severe acute ophthalmia, ought to be employed. It will be known that they have fulfilled the indication, by noticing that, some days after the adoption of such treatment, though there may still be redness, of the conjunctiva and eyelids, the lancinating pains in the eye abate, the heat considerably diminishes, the fever subsides, quietude and sleep are restored, the motion of the eye becomes free, and, lastly, the collection of viscid matter forming the hypopium, becomes stationary. It is not unfrequent to see, especially among the lower orders of the people, persons affected with the second stage of severe acute ophthalmia, bearing this collection of coagulating lymph, in the chambers of the aqueous humour, with

the greatest indifference, and without complaining of any of those symptoms which characterize the acute stage of ophthalmia. It is only at this crisis, or at the termination of the acute stage of violent inflammation of the eye, that the enlargement of the hypopium ceases, and the coagulating lymph begins to be absorbed, provided this salutary operation of nature be not impeded, nor retarded, by any injudicious regimen.

Scarpa states, that persons, little versed in the treatment of diseases of the eyes, would fancy that the most expeditious and efficacious mode of curing an hypopium, after it has become stationary in the second stage of severe acute ophthalmia, would be that of opening the cornea at its most depending part, in order to procure a speedy exit for the matter collected in the chambers of the aqueous humour; especially, as this is also the common doctrine. But experience shews, that dividing the cornea, in such circumstances, is seldom successful, and most frequently gives rise to evils, worse, than the hypopium itself, notwithstanding the modification suggested by Richter, (*Obs. Chir. Fasc. 1, Chap. 12.*) not to evacuate the whole of the matter at once, nor to promote its discharge by repeated pressure, and injections, but to allow it to flow slowly out of itself. The wound made at the lower part of the cornea, for evacuating the matter of the hypopium, how small soever the incision may be, most commonly reproduces the severe acute ophthalmia, and occasions a greater effusion of coagulating lymph in the chambers of the aqueous humour, than existed before. Besides, after opening the cornea, the matter of the hypopium, if allowed to escape gradually, and in drops, of its own accord, would be several days in becoming completely discharged, on account of its viscid quality. During this space of time, the glutinous lymph would keep the edges of the wound of the cornea dilated, and make them suppurate. Thus the incision would be converted into an ulcer, through which the aqueous humour, situated behind the coagulating lymph, would escape, and next even a fold of the iris. Opening the cornea, therefore, only converts the hypopium into an ulcer of that membrane, attended with a prolapsus of the iris, and occasionally of the crystalline itself. Nor can any inference be drawn in favour of making an artificial opening during the stationary state of an hypopium in the second stage of severe acute ophthalmia, from the matter of the hypopium having sometimes made its way spontaneously through a narrow aperture in the cornea, with a

successful result. For, there is a wide difference, between the effects of a spontaneous opening into a natural, or preternatural cavity of the animal body, or of one made with caustic, and the consequences of an opening, made with a cutting instrument. In the two first methods, the subsequent symptoms are constantly milder than in the last. Besides, even in the instance, in which a spontaneous exit of the hypopium takes place through the cornea, an escape of the aqueous humour, and a prolapsus of the iris not unfrequently ensue; consequently, the spontaneous evacuation of the hypopium cannot justly form a rule for the treatment of the disease. There is only one case, in which dividing the cornea, in order to discharge an hypopium, is not only useful, but indispensable: this is, when there is such an immense quantity of coagulating lymph, extravasated in the eye, that the excessive distention, which it produces of all the coats of this organ, occasions such vehement symptoms, as not only threaten the entire destruction of the eye, but even endanger the life of the patient. But, this particular case cannot serve (says Scarpa) as a model, for the treatment of the hypopium, usually met with in practice.

Besides, if it be certain, that blood extravasated in the eye in consequence of blows, and what is still more remarkable, that even the membranous flakes of the capsular cataract, pushed by the needle from the posterior into the anterior chamber, are insensibly dissolved, and, at length, entirely absorbed, if it be the same with milky, and caseous cataracts, that have been lacerated as much as possible; and even with the crystalline lens itself, when deprived of its capsule, and depressed into the vitreous humour by the operation; (see *Cataract*;) there cannot be a doubt, as Scarpa states, that absorption will take place, in the case of coagulating lymph extravasated into the chambers of the aqueous humour, as soon as the source of this extravasation of glutinous fluid no longer exists, and the lymphatics of the eye have recovered their original energy.

Hence the resolution of the hypopium, by means of absorption, forms the primary indication, at which the surgeon should aim in the treatment of the complaint. We have already observed, that, in order to stop its progress, the only truly efficacious method is to subdue the first shock of the inflammation, and to shorten the acute stage of the severe ophthalmia, by the free employment of the antiphlogistic treatment, and the use of mild, emollient, topical remedies.

If this plan of treatment answer the wishes of the practitioner, (continues Scarpa) as in the majority of cases it does, the incipient collection of coagulating lymph, at the bottom of the anterior chamber of the aqueous humour, not only ceases to augment, but, also, in proportion as the severe ophthalmia disappears, the absorbent system takes up the heterogeneous fluid extravasated in the eye, and the white, or yellow speck, shaped like a crescent, situated at the bottom of the anterior chamber, gradually diminishes, and is at last entirely dispersed. Janin considered the infusion of the flowers of mallows, applied to the eye that is inflamed and affected with this disease, as a specific resolvent in these circumstances. (*Mem. et Obs. sur l'Œil*, p. 405;) but, it is now known, that every topical emollient application, provided it be conjoined with such internal antiphlogistic treatment, as is the most proper for repelling the acute stage of the severe ophthalmia, produces quite as good an effect as this infusion. Simple warm water produces the same benefit. "A young girl, (writes the celebrated practitioner Nannoni) was struck in the eye by an ear of corn. An inflammation was the consequence, which produced a white pus of a semilunar shape, apparently behind the cornea, without a possibility of judging, whether the matter was actually situated between the laminae of that membrane, or in the anterior chamber. Hence, I was asked whether it might not be evacuated by an incision, particularly, as the patient complained of great pain in the eye, and eye-brow. She was in the hospital; and in the presence of Dr. Lulli, and several students in surgery, I said that the pain of which the patient complained, was not occasioned by the pus itself, but the cause which produced it. This cause was inflammation, which probably would be increased by making a larger opening for the external air, than what it has to the internal parts, while the external ones remain entire. By fomenting the eye and forehead with warm water, the inflammation subsided, and the pus disappeared. We have so often witnessed the fact subsequently, that we can also extol the simplicity of the treatment." Such, in short is the happy termination of an hypopium, whenever the disease is properly treated at its commencement, and the acute stage of the severe ophthalmia has been promptly checked, and repelled by internal antiphlogistic means, and emollient applications to the eye. But, in consequence of the inflammatory period of the severe ophthalmia having resisted in an un-

common manner the best means, or because such means have been employed too late, it sometimes happens, that the coagulating lymph, effused in the eye, and collected in the anterior chamber, is so abundant, even after the acute stage of the ophthalmia, that it continues for a long time to cloud the eye, and intercept vision. Scarpa has often seen patients, especially paupers, who from indolence, negligence, or ill treatment, have remained, a long time after the cessation of the inflammatory stage of ophthalmia, with the anterior chamber almost entirely filled with the glutinous matter of hypopium. When the inflammation ceases, these unhappy persons wander about the streets almost quite indifferent, and without complaining of pain, or any other inconvenience, than the difficulty of seeing with the eye affected. In this second stage of the ophthalmia, the resolution of the hypopium obviously cannot be accomplished by the same means, nor with equal celerity, as in the first. At this crisis, the great quantity, and density of the glutinous matter extravasated, and the atony of the vascular system of the eye, make it necessary to give nature sufficient time, to dissipate the thick, tenacious matter of the hypopium, and, at length, to dispose it to be insensibly absorbed with the aqueous humour which is continually undergoing a renovation. Hence, it is right, (says Scarpa) to adopt these means, which are best calculated to invigorate the debilitated tone of the vascular system of the eye, more especially the lymphatics. This requires more or less time, according as the patient is advanced in years, of a relaxed fibre, and weak; or a young man of good constitution.

However, in the second stage of violent acute ophthalmia, complicated with hypopium, the surgeon, according to Scarpa, should limit his efforts to the removal of every thing, which may irritate the eye, or be likely to renew the inflammation; and he should only employ such means, as are conducive to the resolution of the second inflammatory stage, depending on relaxation of the conjunctiva and its vessels, and such remedies as tend, at the same time, to invigorate the action of the absorbents. Therefore, in this state, he ought first to examine carefully the degree of irritability in the eye affected with the hypopium, by introducing, between the eye and eyelids, a few drops of vitriolic collyrium, containing the mucilage of quince-seeds. Should the eye seem too strongly stimulated by this application, it must not be used, and little bags of warm mallows with a few grains of camphor are to be substituted for it. In the

intervals, the vapours of the spir. ammon. comp. mentioned in the article *Ophthalmia*, may be applied, and recourse had again to a blister on the nape of the neck. When the extreme sensibility of the eye is overcome, the simple vitriolic collyrium must be used again, strengthening it afterwards by the addition of a few drops of camphorated spirit of wine. Under such treatment, proceeds Scarpa, the surgeon may observe, that, in proportion as the chronic ophthalmia disappears, and the action of the absorbents is re-excited, the tenacious matter of the hypopium divides first into several small masses; then dissolves still further; and, afterwards, decreases in quantity; depending towards the inferior segment of the cornea; and, finally, vanishing altogether. But Scarpa accurately observes, that the surgeon cannot always expect to be equally successful, whether the disease occur during the first, or second stage of violent acute ophthalmia, if the tenacious lymph, suddenly extravasated in the interior of the eye, prevail in such quantity, as not only to fill, but strongly distend, the two chambers of the aqueous humour, and the cornea in particular. Notwithstanding the most skilful treatment, in this state of the complaint, the unpleasant complication is often followed by another inconvenience, still worse than the hypopium itself; viz. ulceration, opacity, and bursting of the cornea, at that point of its circumference, or centre opposite the pupil, where there is the smallest resistance to the pressure.

The ulceration of the cornea ordinarily takes place with such celerity, that the surgeon seldom has time to prevent it. As soon as an aperture has formed, the excessive abundance of coagulating lymph, contained in the eye, (sometimes named *empyema oculi*) begins to escape through it, and a degree of relief is experienced. But, this melioration is not of long continuance; for, scarcely is the glutinous fluid evacuated, that distended the whole eye, and especially the cornea, when it is followed by a portion of the iris, which glides through the ulcerated aperture, protrudes externally, and constitutes the disease termed, prolapsus of the iris. (See *Iris, Prolapsus of*.) But, if in such an emergency, the cornea already ulcerated, opaque, and greatly deranged in its organization, should not immediately burst, the surgeon is then constrained by the violence of the symptoms, depending on the prodigious distention of the eyeball, to make an artificial opening in this membrane, in order to relieve the immense constriction, and even the danger in which life is placed. The practitioner

will do this the more readily, as, in such circumstances, there is little hope of preserving the organ of vision. Scarpa adds, that the pain in the eye, and whole head, is often so severe in this case, as to cause delirium.

Were there the least chance of restoring, in any degree, the transparency of the cornea, and the functions of the organs of vision, after opening the cornea, it would certainly be more prudent to make the opening at the lower part of this membrane, as is practised in the extraction of the cataract. But, in the case of empyema of the eye, now considered, in which the cornea is universally menaced with ulceration and opacity, and seems ready to slough, there is no hope of its resuming its transparency at any point. The best, and most expeditious, method of relieving the patient from the terrible pain, which he suffers, is, according to Scarpa, to divide the centre of the cornea with a small bistoury to the extent of a line and a half; then to raise with a pair of forceps the little flap, and cut it away all round with one stroke of the scissors, so as to make in the middle of this membrane an opening of about the size of a lentil-seed.

The most fluid part of the matter, distending the eye, immediately escapes through this opening, the lips of which cannot close, like those of a simple incision. Successively afterwards, the coagulating lymph, and the chrystalline lens, take the same course, and also, in a few days, the vitreous humour. The surgeon should refrain from promoting the escape of the latter by strong pressure on the

eyeball; experience proves, that, in such cases, it is best to allow it to flow out spontaneously.

Immediately after the operation, the surgeon must cover the eye with a bread and milk poultice, which is to be renewed every two hours, not neglecting the use of such general remedies, as are calculated, to check the progress of acute inflammation, and to quiet the alarm of the nervous system. In proportion as the interior of the eye suppurates, the eye-ball gradually diminishes, shrinks into the orbit, and at length cicatrizes, leaving things in a favourable state for the application of an artificial eye.

However, Scarpa infers from the whole of what has just been said, that making an incision into the cornea is as dangerous, and useless, in the case of hypopium ordinarily met with in practice, as it is necessary in the instance of empyema of the eye, attended with the aggravating symptoms above-mentioned, and irremediable opacity of the cornea.

The foregoing remarks, which are some of the best ever offered on the subject, were first published by Professor Scarpa in *Saggio di Osservazioni e d'Experience, sulle Principali Malattie degli Occhi; Venezia*, 1802. Another excellent writer on hypopium is Richter: see *Anfangsgrunde der Wundarzneykunst, Band. 3.* 1795. Consult also *Essays on the morbid Anatomy of the Human Eye: by J. Wardrop, Chap. 6.* Edinb. 1808.

HYSTEROTOMIA. (from *ὕστερα*, the womb, and *τεμνω*, to cut.) See *Cæsarean Operation*.

I.

IMPERFORATE HYMEN. See *Vagina*.

INCARCERATION. (from *incarcerare*, to confine.) This term is usually applied to cases of hernia, in the same sense as strangulation. When the viscera are pressed upon either by the opening through which they protrude, or by the parts themselves within the hernial sac, in such a degree, that the course of the intestinal matter to the anus is obstructed, and nausea, sickness, pain, and tension of the swelling and abdomen, &c. are occasioned, the rupture is said to be affected with incarceration, or strangulation.

According to Professor Scarpa, however, an *incarcerated*, and a *strangulated*

hernia, do not imply exactly the same thing. In the first case, says he, the course of the intestinal matter is interrupted, without any considerable impairment of the texture, or vitality of the bowel. On the contrary, in the strangulated hernia, besides the obstruction to the course of the fecal matter, there is organic injury of the coats of the intestine, with loss of its vitality. The bowel, that is merely incarcerated, resumes its functions immediately it is replaced in the abdomen; while that, which is truly strangulated, never returns to its natural state. (See *Scarpa's Traité des Hernies*, p. 251.)

This distinction, however, which Scarpa has drawn, is by no means generally

adopted, *incarceration*, and *strangulation* being used as synonymous terms.

INCISION. (from *incido*, to cut.) A wound made with a sharp cutting instrument.

INCONTINENCE OF URINE. An inability of the bladder to retain this fluid, which should not be discharged without the concurrence of the will. See *Urine*, *Incontinence of*.

INDURATION. (from *induro*, to harden.) A morbid hardness of any part.

INFLAMMATION. (from *inflammo*, to burn.) By the term, *inflammation*, is generally understood, the state of a part, in which it is painful, hotter, redder, and somewhat more turgid, than it naturally is; which topical symptoms, when present in any considerable degree, or when they affect very sensible parts, are attended with fever, or a general diseased action of the system. (*Burns*.)

The susceptibility of the body for inflammation is of two kinds; the one *original*, constituting a part of the animal economy, and beyond the reach of human investigation; the other *acquired* from the influence of climate, habits of life, and state of the mind over the constitution. (*Hunter*.) The first kind of susceptibility, being innate, cannot be diminished by art; the second may be lessened by the mere avoidance of the particular causes, upon which it depends.

Inflammation may, with great propriety, be divided into the *healthy* and *unhealthy*. Of the first, there can only be one kind; of the second, there must be an infinite number of species, according to the peculiarities of different constitutions, and the nature of diseases, which are numberless. (*Hunter*.) Inflammation may also be divided into the *acute* and *chronic*. This division of the subject is one of the most ancient, and seems to have obtained the sanction of all the best surgical writers. Healthy inflammation is invariably quick in its progress, for which reason, it must always rank as an *acute* species of the affection. However, there are numerous inflammations, controlled by a diseased principle, which are quick in their progress, and are, therefore to be considered as *acute*. Chronic inflammation, which we shall treat of, when we come to the subject of *tumours*, is always accompanied with a diseased action.

PRINCIPLES OF INFLAMMATION.

There is much foundation for believing, that healthy inflammation is invariably an homogeneous process, obedient to ordained principles, and, in similar consti-

tutions*, similar structures, and similar situations, uniformly assuming the same features. If experience reveals to us, that *here* it is commonly productive of certain effects, and *there* it ordinarily produces different ones, the same unbounded source of wisdom communicates to the mind a knowledge, that there is some difference in the tone of the constitution, or in the structure or situation of the parts affected, assignable as the cause of this variety. The nature of the exciting cause can have no share in modifying the appearances of phlegmonous inflammation, whether this be occasioned by the application of heat, or of mechanical violence to the body. Healthy inflammation is always the same in its nature, and all the influence, which the exciting causes can have, is proportioning the degree of inflammation to their own violence. A modern author (*Dr. Smith, in Med. Communications, Vol. 2.*) makes the nature of the exciting cause one principal ground of the specific distinctions in inflammation, and, with good reason, when he takes into the account the actions of morbid poisons, and the qualities of disease in general.

The attentive observation of experience, the only solid basis of all medical, as well as other, knowledge, has informed the practitioner, that parts, which from their vicinity to the source of the circulation, enjoy a vigorous circulation of blood through them, undergo inflammation more favourably, and resist disease better, than other parts, of similar structure, more remote from the heart. The lower extremities are more prone to inflammation, and disease in general, than parts about the chest; when inflamed, they are longer in getting well; and the circumstance of their being depending parts, which retards the return of blood through the veins, must also increase the backwardness of such parts in any salutary process. (*Hunter*.) Healthy inflammation is of a pale red; when less healthy, it is of a darker colour; but, the inflamed parts will, in every constitution, partake more of the healthy red, the nearer they are to the source of the circulation. (*Hunter*.)

Inflammation, when situated in highly organized and very vascular parts, is more disposed to take a prosperous course, and is more governable by art, than in

* Here strength and weakness are alluded to; for, it is impossible that healthy inflammation should prevail in a diseased constitution.

parts of an opposite texture. The nearer also such vascular parts are to the heart, the greater will be their tendency to do well in inflammation. (*Hunter.*) Hence, inflammation of the skin, cellular substance, muscles, &c. more frequently ends favourably, than the same affection of bones, tendons, fasciæ, ligaments, &c. It is also more manageable by surgery; for those parts of the body, which are not what anatomists term *vascular*, seem to enjoy only inferior powers of life, and, consequently, when excited in a preternatural degree, frequently mortify.

But, inflammation of vital parts, though these may be exceedingly vascular, cannot go on so favourably, as in other parts of resembling structure, but, of different functions; because, the natural operations of universal health depend so much upon the sound condition of such organs. (*Hunter.*) The truth of this observation is illustrated in cases of gastritis, peripneumony, &c.

All new-formed parts, not originally entering into the fabric of the body, such as tumours, both of the encysted and sarcomatous kinds, excrescences, &c. cannot endure the disturbance of inflammation long, nor in a great degree. The vital powers of such parts are weak, and when irritated by the pressure of inflammation, these adventitious substances are sometimes removed by the lymphatics, but more commonly slough. This remark applies also to substances generated as substitutes for the original matter of the body; for instance, granulations and callosities. The knowledge of this fact, leads us to a rational principle of cure in the treatment of several surgical diseases. Do we not here perceive the cause, why very large wens are occasionally dispersed by the application of urine, brine, and similar things, which are now in great repute, on this account, with almost every one out of the profession? How many verrucæ, wrongly suspected to originate from a syphilitic cause, are diminished and cured by a course of mercury! It is the stimulus of this mineral upon the whole system, that accomplishes the destruction of these adventitious substances—not its antivenereal quality. Topical stimulants would fulfil the same object, not only with greater expedition, but with no injury to the general health.

In strong constitutions, inflammation, *ceteris paribus*, always proceeds more propitiously, than in weak ones; for, when there is much strength, there is little irritability. In weak constitutions, the operations of inflammations are backward, notwithstanding the part, in which it is seated, may, comparatively speaking, pos-

sess considerable organization, and powers of life. (*Hunter.*)

Healthy inflammation, wherever situated, is always most violent on that side of the point of inflammation, which is next to the external surface of the body. When inflammation attacks the socket of a tooth, it does not take place on the inside of the alveolar process, but towards the cheek. When inflammation attacks the cellular substance, surrounding the rectum, near the anus, the affection usually extends itself to the skin of the buttock, leaving the intestine perfectly sound, though in contact with the inflamed part. (*Hunter.*)

We may observe the influence of this law in the fistula lachrymalis, in diseases of the frontal sinuses, and antrum, and, particularly, in gun-shot wounds. Suppose a ball were to pass into the thigh, to within an inch of the opposite side of the limb, we should not find, that inflammation should be excited along the track of the ball, but, on the side next the skin which had not been hurt. If a ball should pass quite through a limb, and carry into the wound a piece of cloth, which lodges in the middle, equidistant from the two orifices, the skin, immediately over the extraneous body, would inflame, if the passage of the ball were superficial.—(*Hunter.*) Mr. Hunter compared this law with the principle, by which vegetables approach the surface of the earth; but, the solution of it was even too arduous for his strong genius and penetration.

We see three very remarkable effects follow the prevalence of inflammation; viz. adhesions of parts of the body to each other; the formation of pus, or suppuration; and ulceration, a process, in which the lymphatics are more concerned than the blood-vessels. Hence, Mr. Hunter termed the different stages of inflammation, the *adhesive*, the *suppurative*, and the *ulcerative*.

All parts of the body are not equally liable to each of the preceding consequences. (*Hunter.*)

In the cellular membrane, and in the circumscribed cavities, the adhesive stage takes place more readily, than the others. suppuration may be said to follow next in order of frequency; and lastly ulceration.

In internal canals, on the inner surfaces of the eyelids, nose, mouth, and trachea, in the air-cells of the lungs, in the œsophagus, stomach, intestines, pelvis of the kidneys, ureters, bladder, urethra, and in all the ducts and outlets of the organs of secretion, being what are termed *mucous membranes*, the suppurative inflammation comes on more readily, than either the adhesive, or the ulcerative stage. Adhe-

sions, which originate from the slightest degree of inflammation in other situations and structures, can only be produced by a violent kind in the above-mentioned parts. Ulceration is more frequently met with upon mucous surfaces, than adhesions. (*Hunter.*) The cellular membrane appears to be much more susceptible of the adhesive inflammation, than the adipose, and much more readily passes into the suppurative. (*Hunter.*) Thus we see the cellular substance, connecting the muscles together, and the adipose membrane to the muscles, inflaming, suppurating, and the matter separating the muscles from their lateral connexions, and even the fat from the muscles, while the latter substance and the skin are only highly inflamed. (*Hunter.*) But, it must be allowed, that in situations where fat abounds we very frequently meet with abscesses. This is so much the case, that fat has been accounted a more frequent nidus for collections of matter, than the cellular substance. (*Bromfield.*) Abscesses are particularly liable to form in the neighbourhood of the anus, mamma, &c. We have mentioned above the fat's being highly inflamed; an expression not strictly true. Fat has no vessels, principle of life, nor action of its own; consequently, we cannot suppose it can itself either inflame, or suppurate. We know, that it is itself a secretion, and when an abscess forms in it, we understand, that the mode of action in the vessels, naturally destined to deposit fat, has been altered to that adapted to the formation of pus. When we speak of the fat being inflamed; we imply, that the membranous cells, in which it is contained, and by which it is secreted, are thus affected.

The deeply-situated parts of the body, more especially the vital ones, very readily admit of the adhesive stage of inflammation. The circumstance of deeply seated parts not so readily taking on the suppurative stage of inflammation, as the superficial ones do, is strikingly illustrated in cases of extraneous bodies, which, if deeply lodged, only produce the adhesive inflammation. By this process a cyst is formed, in which they lie without much inconvenience, and they may even gradually change their situation, without disturbing the parts, through which they pass. But, no sooner do these same bodies approach the skin, than abscesses immediately arise. (*Hunter.*)

All inflammations, attended with disease, partake of some specific quality, from which simple inflammation is entirely free. When the constitution allows the true adhesive and suppurative stages to occur, it is to be regarded as the most

healthy. Were it in an opposite state, we should see the very same irritation excite some other kind of inflammation, such as the erysipelatous, scrophulous, &c. (*Hunter.*)

In specific inflammations, the position, structure, and distance of the part affected from the source of the circulation, as well as from the surface of the body, seem also to have as much influence as in cases of common inflammation. Upon this point, I feel conscious of being a little at variance with what Mr. Hunter has stated; but the undecided manner in which he expresses himself, not less than the following reflections, encourages me not to desert my own ideas. We see that venereal eruptions sooner make their appearance upon the chest and face, than upon the extremities. No organized part can be deemed exempt from the attack of common inflammation; many appear to be totally insusceptible of the venereal. We know, that scrophulous diseases of the superior extremities take a more favourable course, require amputation less frequently, and get well oftener than when situated in the inferior ones. (*Ford.*) The venereal disease makes more rapid advances in the skin and throat, than in the bones and tendons; we often see it producing a specific inflammation, and an enlargement of the superficial parts of the tibia, ulna, clavicle, cranium, &c. while other bones, which are covered with a considerable quantity of flesh, are very rarely affected. Gouty inflammation is prone to invade the small joints, the rheumatic the large ones.

SYMPTOMS AND NATURE OF HEALTHY INFLAMMATION, OR PHLEGMON.

Redness, swelling, heat, and pain, the four principal symptoms of phlegmonous inflammation, have been accurately noticed by Celsus.* If we refer to any writer on this interesting point of surgery, we shall find the above symptoms enumerated as characterizing phlegmon. In short, this term is usually applied to a circumscribed tumour, attended with heat, redness, tension, and a throbbing pain. These are the first appearances observed in every case of the phlegmon; and when they are slight, and the part affected is of no great extent, they are commonly very little, and sometimes no apparent, influence on the general system. But, when they are more considerable, and the inflammation becomes extensive, a full, quick,

* Notæ verò inflammationis sunt quatuor, rubor, et tumor, cum calore et dolore, lib. 3. cap. 10.

and generally a hard pulse, takes place, and the patient, at the same time, complains of universal heat, thirst, and other symptoms of fever. (*B. Bell.*) While the inflamed part becomes red, painful, and swelled, its functions are also impaired. The same degree of inflammation is said to produce more swelling in soft parts, and less in harder ones. (*Burns.*)

Though the redness, swelling, throbbing, tension, and other symptoms of phlegmonous inflammation, are less manifest, when the affection is deeply situated, yet they certainly exist. When persons die of peripneumony, or inflammation of the lungs, the air-cells of these organs are found crowded with a larger number of turgid blood-vessels, than in the healthy state, and of course the parts must appear preternaturally red. Coagulating lymph, and even blood, are extravasated in the substance of the viscera, which become heavier, and feel more solid. (*Baillie.*)

The extravasation of coagulating lymph which is one of the chief causes of the swelling, is also one of the most characteristic signs of phlegmonous inflammation.

Some writers (*Smith, Med. Commun.*) have confined the seat of phlegmon to the cellular membrane; but, this idea is probably an erroneous one. Had such authors duly discriminated the nature of common inflammation, they would have allowed, that this affection existed, wherever the blood vessels appeared to be more numerous, and enlarged, than in the natural state, accompanied with an effusion of coagulating lymph, whether upon the surface of a membrane, or a bone, or into the interstices of the cellular substance, and attended with acute pain, and a throbbing pulsation in the part affected.

Before proceeding further into the consideration of inflammation, it seems proper to treat of causes.

REMOTE CAUSES.

The remote causes of inflammation are infinite in number; but, very easy of comprehension, because only divisible into two general classes. The first includes all such agents as operate by their stimulant or chemical qualities; for instance, cantharides, heat, &c. The second class of causes are those, which act mechanically, such as bruises, wounds, &c. After this statement, it seems quite unnecessary to give a detail of each particular remote cause.*

* Those, who are curious, may see a list of remote causes in Pearson's Principles of Surgery, p. 15.

Fevers often seem to become the remote causes of local inflammation. In other instances, inflammation appears to arise spontaneously, or, as I should rather say, without any perceptible exciting cause.

The principle on which the application of cold to a part becomes the remote cause of inflammation, is not decidedly known. A modern author offers the following explanation, in lieu of those founded on the doctrines of cold being a stimulus, and a sedative cold may operate on a part in three different ways. First, it may be applied in such a degree, and for such a length of time, as to destroy the vitality of the part directly; in which case, sloughs are formed. Secondly, it may be applied in a less degree, or for a shorter time; and afterwards a stimulant, such as heat, may be applied, which will excite inflammation. The production of inflammation by any agent, depends in a great degree upon the suddenness of the operation of the agent, which excites it; for a quantity of stimulus, which, if suddenly applied, would produce inflammation, may be applied slowly with impunity. Hence, it results, that any given stimulant must more easily produce inflammation in a part, which has a low action, &c. than in one having a vigorous action, &c. Hence, very slight stimuli will induce inflammation in parts which have been weakened by cold. Thirdly, a part sympathises very much with the contiguous ones. If a part be weakened by having its action reduced, and if then the debilitating cause be removed, the action of the part will be increased from sympathy with the neighbouring acting parts. But, as the action ought to be very little, the power being small, inflammation must arise from the action being increased beyond the power. We ought, therefore, in this case, to diminish the action of the neighbouring parts, in order to prevent their extending their action to a part, which is not able to bear it without becoming diseased. (*Burns.*)

PROXIMATE CAUSE.

Numerous opinions have been entertained upon this subject; but, almost every theory has been built upon the supposition of there being some kind of obstruction in the inflamed part.

While the circulation of the blood was unknown, and the hypothetical notions of the power of the liver, in preparing and sending forth, this fluid, continued to prevail, it is not astonishing that the theories of physic should be exceedingly imperfect. So fully persuaded were physicians of the existence and influence of

different humours and spirits, and so little did they know of the regular and constant motion of the blood, that they believed in the possibility of depositions and congestions of the blood, the bile, or lymph; and acknowledged these as the cause of inflammation. Their anatomists taught them, and their professors of physic supported the opinion, that the liver was the centre of the vascular system, from which the blood went forth by day to the extremities, and returned again by night. If then any peccant matter irritated the liver, the blood was sent out more forcibly; and if, at the same time, any part of the body were weakened, or otherwise disposed to receive a greater quantity of blood than the rest, then a swelling was produced by the flow of humours to this place. Fluxions, or flows of humour to a place, might happen either from weakness of the part which allowed the humours to enter more abundantly, or from the place attracting the humours, in consequence of the application of heat or other agents. (Burns.)

The peculiar nature of the swelling thus occasioned was supposed, by the ancients, to depend upon the kind of humour. Blood produced the true phlegmon, bile, erysipelas, &c.

The ancient physicians also entertained an idea, that the blood and humours might slowly stagnate in a part, from want of expulsive power, and this affection was termed a *congestion*, while the expression *fluxion* or *defluxion* was used to denote any swelling arising from the sudden flow of humours from a distant part. The first was formed gradually without much pain, or the feeling of pulsation, and ran its course slowly: the second appeared suddenly, was very painful, had a pulsatory feel, and was rapid in its progress. The ancients, who supposed that the blood had very little motion, and that its course could be easily directed or changed, recommended bleeding from some part which was remote from a recent inflammation, by which they imagined that the current of blood was altered, and a *revulsion* made. A *revulsion* was also made, by raising a tumour in some other part, by means of ligatures, cupping-glasses, &c. or by giving nature an opportunity of discharging the humours from distant parts, by applying leeches or blisters. Hence sinapisms were applied to the feet, in disease of the superior parts. (Burns.)

When blood was drawn from the vicinity of the fluxion, or congestion, the mode was called *derivation* which only differed from *revulsion* in the distance to which the humour was drawn being less. (Burns.)

I shall not enter further into an account
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of the practice of the ancients in the treatment of inflammation; but shall refer the reader to what Mr. Burns has written on the subject. Our present object is only to trace the leading doctrines, which have at different times prevailed, respecting the proximate causes of inflammation.

From the theories of *fluxion* and *congestion*, which were quite incompatible with the laws of the circulation of the blood, we turn our attention to the doctrine of *obstruction*.

Boerrhaave inculcated. (*Aph* 375 et seq.) that inflammation was caused by an obstruction to the free circulation of the blood in the minute vessels, and this obstruction, he supposed, might be caused by heat, diarrhoea, too copious flow of urine, and sweat, or whatever could dissipate the thinner parts of the blood, and produce a thickness or viscosity of that fluid. When the lensor did not exist before the production of inflammation, he imagined, that the larger globules of the blood, got into the small vessels, and thus plugged them up. When, for instance, the perspiration was stopped, the fluid, being retained, dilated the vessels, and allowed some of these mischievous globules to enter, and produce a more permanent obstruction. This circumstance was termed an *error loci*, and was one of the chief causes assigned for inflammation. The obstruction, whether caused by *viscosity* or an *error loci*, was imagined to occasion a resistance to the circulation in the part affected; hence increased it in the other vessels, proving an irritation to the heart, and augmenting the force or attraction of the blood in that part of the vessel which was behind the obstruction. This caused heat and pain, while the accumulation of the blood produced redness; which three symptoms are the essence of the disease. Besides *obstruction*, Boerrhaave also brought into the account an *acrimonious state of the fluids*, which rendered resolution out of the question, and gangrene likely to follow. (*Aph* 388.)

The viscosity of the blood cannot be admitted as the proximate cause of inflammation; because we have no proof, that this state ever exists; or, granting that it did, it would not explain the phenomena. Were a viscosity to occur, it would exist in the whole mass of blood, would affect every part of the body alike, and could not be supposed to produce only a local disorder. How also could such a lensor be produced by causes which bring on inflammation suddenly, without there being time for changes of the fluids to take place? (Burns.)

With regard to the doctrine of *error loci*, or of red globules going into vessels, which

did not formerly transmit them, the fact must be admitted, at the same time, that the conclusion is denied. When the eye becomes inflamed, the tunica conjunctiva is seen with its vessels full of red blood, which in health is not the case; but this redness never appears until the inflammation has commenced, and must, therefore, be considered as an effect, not a cause. Nor can this *error loci* occasion any obstruction in these vessels; for, if they be divided, the blood flows freely, which shews, that they are large enough to allow an easy circulation. (*Burns.*)

Boerrhaave's theory of obstruction was too circumscribed, and too mechanical; it reduced all inflammations to one species. The only distinctions which could have arisen, must have proceeded from the nature of the obstruction itself. This doctrine could never account for the action of many specific diseases and morbid poisons. (*Hunter.*)

As for the supposition of the co-operation of an *acrimony of the fluids*, the proportion of the saline matter of the blood has never been proved to be greater in this, than in any other state of the body. (*Burns.*) Even were a general disorder of this kind to be admitted, no rational explanation of the proximate cause of local inflammation could be deduced from it.

Dr. Cullen attributed the proximate cause of inflammation to a "spasm of the extreme arteries supporting an increased action in the course of them." This theory only differs from that of Boerrhaave in the cause which is assigned for the obstruction. Some causes of inequality in the distribution of the blood, may throw an unusual quantity of it upon particular vessels, to which it must necessarily prove a stimulus. But, farther, it is probable, that to relieve the congestion, the *vis medicatrix naturæ* increases still more the action of the vessels; and which, as in all other febrile diseases, it affects, by the formation of a spasm on their extremities." "A spasm of the extreme arteries, supporting an increased action in the course of them, may, therefore, be considered as the proximate cause of inflammation; at least, in all cases not arising from direct stimuli applied; and, even in this case, the stimuli may be supposed to produce a spasm of the extreme vessels." (*Cullen.*)

The inconsistencies in Cullen's theory are very glaring. The congestion or accumulation of blood, which is only an effect or consequence of inflammation, is set down as the cause of the spasm of the vessels, to which spasmodic constrictions, Cullen, strangely enough, assigns the name of proximate cause. The spasmodic

contraction of the extremities of the vessels, instead of propelling the accumulated quantity of blood, would render the passage of the blood from the arterial into the venous system still more difficult. Spasmodic constriction of the small vessels is so far from being a satisfactory explanation of the proximate cause of inflammation, that even tying a large vessel does not of itself bring on the affection. Phlegmon is also attended with an effusion into the cellular substance from the extremities of the arteries; a circumstance not easily explained upon the principle of obstructed circulation. (*Burns.*)

We shall now notice the celebrated, and very original, opinions, promulgated on this subject by the famous John Hunter. According to him inflammation is to be considered only as a disturbed state of parts, which requires a new, but salutary mode of action, to restore them to that state, wherein a natural mode of action alone is necessary. From such a view of the subject, therefore, inflammation in itself, is not to be considered as a disease, but as a salutary operation, consequent either to some violence, or some disease. Elsewhere, the author remarks, the act of inflammation is to be considered as an increased action of the vessels, which, at first, consists simply in an increase or distention beyond their natural size. This increase seems to depend upon a diminution of the muscular power of the vessels, at the same time that the elastic power of the artery must be dilated in the same proportion. This is, therefore, something more than simply a common relaxation: we must suppose it an action in the parts to produce an increase of size, to answer particular purposes, and this Mr. Hunter would call an act of dilatation. The whole is to be considered as a necessary operation of nature. Owing to this dilatation, there is a greater quantity of blood circulating in the part, which is according to the common rules of the animal economy; for, whenever a part has more to do than simply to support itself, the blood is there collected in larger quantity. The swelling is produced by an extravasation of coagulable lymph, with some serum; but, this lymph differs from the common lymph, in consequence of passing through inflamed vessels. It is this lymph which becomes the uniting medium of inflamed parts; vessels shoot into it; and it has even the power of becoming vascular itself. The pain proceeds from spasm. The redness is produced either by the arteries being more dilated than the veins, or because the blood is not changed in the veins. When a part cannot be restored to health, after injury, by inflammation

alone, or by adhesion, then suppuration, as a preparatory step to the formation of granulations, and the consequent restoration of the part takes place. The vessels are nearly in the same state as in inflammation; but they are more quiescent, and have acquired a new mode of action.

An increased action of the vessels is now almost universally regarded as the proximate cause of inflammation. This opinion is greatly supported from a review of the several exciting causes of the affection, which, being in general of an irritating nature, must, when applied to any living or sensible parts, occasion a preternatural exertion of the vessels. The method of cure, as we shall presently see, tends also to confirm the general doctrine with respect to the cause of inflammation.

SYMPTOMS OF PHLEGMONOUS INFLAMMATION FURTHER CONSIDERED.

The essential symptoms are redness, swelling, heat, and pain.

Redness.—This is manifestly owing to the increased quantity of blood in the inflamed part. More blood must necessarily be contained there, because the vessels, which previously conveyed this fluid, are preternaturally distended, and the small vessels, which naturally contained only lymph, are now so enlarged as to be capable of receiving red blood. Many have supposed, that the redness of common inflammation is partly occasioned by the generation of new vessels. This doctrine, however, seems very questionable. When coagulating lymph is extravasated upon the surface of a wound, an inflamed membrane, &c. I think no one can doubt, that the lymph often becomes vascular, in other words, furnished with new vessels. But, in the extravasated lymph of a phlegmonous tumour, we have no evidence shewing, that there is any generation of new vessels. Were the lymph to be rendered organized and vascular, the swelling and redness would probably be more permanent, and not admit, at least so easily, of resolution. When adhesions form between two inflamed surfaces, the organized substance, forming the connexion, lives after the subsidence of the inflammation, and is a permanent effect. It was probably the enlargement of the small vessels, which led to the theory, that new vessels are formed in inflammation. It has, however, been justly observed, that the supposition easily admits of refutation; for heat, and many other causes of inflammation, operate so quickly, that there can be no time for the formation of any new vessels; and, yet the redness is

as great, and the inflammation as perfect in a minute as in an hour or a day after the application of the exciting cause. (*Burns.*) Another reason, assigned for the redness of inflammation, is that the blood, after it has become venous, retains, more or less, its bright scarlet colour. (*Hunter.*)

Swelling.—This effect arises from several causes. 1. The increased quantity of blood in the vessels. 2. The effusion of coagulating lymph, and deposition of new matter. 3. The interruption of absorption, of late particularly noticed. (*Soemmering de Morb. Vas. Absorb.*)

Pain.—This is observed to be greatest during the diastole of the arteries. The affection is probably owing to the unnatural state of the nerves, and not to mere distention, as many have asserted. Were the latter cause a real one, the pain would always be proportioned to it.

Heat.—It was formerly imagined by many, (*Boerrhaave, Savage, &c.*) who wrote after the discovery of the circulation of the blood, that the heat was produced by the attraction of the red globules, against the sides of the vessels. Modern philosophy, now, however, teaches us, that a fluid may flow, with the utmost velocity, through a pipe, for a thousand years, without producing a single degree of heat. The most commonly received opinion now is, that the production of animal heat depends upon the difference in the capacity of arterial and venous blood for combining with caloric; and that in the minute arteries, the blood is combined with certain substances, in consequence of which its capacity is diminished, and heat is given out. But, when the venous blood has been freed from such substances in the lungs, its capacity is increased, and the heat, which is given out by the decomposition of the air which we inspire, is absorbed. Now, if these things be admitted as facts, the augmented heat of inflammation may be conceived to arise from the increased velocity of the circulation in the part affected. More blood is transmitted into the minute arteries; the capacity of a greater quantity of this fluid for heat is of course there necessarily diminished, and more caloric is extracted.

APPEARANCES OF THE BLOOD IN INFLAMMATION.

The blood, when taken out of the living vessels, spontaneously separates into two distinct parts, the serum and the crassamentum. The last is a compound substance, consisting chiefly of coagulating lymph, and red globules, the most heavy

ingredients in the blood. Blood, taken away from persons affected with inflammation, is longer in coagulating, and coagulates more firmly, than in other instances. Hence, the red globules, not being so soon entangled in the lymph, descend, by their gravity, more deeply from its surface, which, being more or less divested of the red colouring matter, is from its appearance termed the *buffy coat*, or *inflammatory crust*. The firmer and more compact coagulation of the lymph compresses out an unusual quantity of serum from it, and the surface of the sily blood is often formed into a hollow, the edges being drawn inward. (*Hunter*.) These changes in the blood are, in some cases, a more infallible proof of the existence of inflammation, than the state of the pulse itself. At the same time, it is probably only a criterion of some unusual operation going on in the system; for the blood taken from pregnant women is always found to exhibit the above appearances. In peritoneal inflammation, the patient sometimes seems to be in the most feeble state, and the pulse, abstractly considered, would rather induce the practitioner to employ tonics and stimulants, than evacuations; but, should the continuance or exasperation of the disorder, or any other reason, lead the surgeon to use the lancet, then the *buffy coat*, and the *concave surface* of the blood, clear away all doubt concerning the existence of inflammation.

In a few anomalous constitutions, the blood, when drawn, always exhibits the above peculiarities.

TERMINATIONS OF INFLAMMATION.

Inflammation is said to have three different terminations: or, in more correct language, we may say, that, after this process has continued a certain time, it either subsides entirely, induces a disposition in the vessels to form pus, or completely destroys the vitality of the part.

When the inflammation is to end in the first manner, which is the most favourable, the pain becomes less, the swelling subsides, the fever, and every other symptom, gradually abate, till at last the part is wholly restored to its natural size and colour. There is no formation of pus, nor any permanent injury of structure. This termination of inflammation is termed by surgeons *resolution*. It is fortunately the most common, as well as the most desirable manner, in which the affection ends.

If however, notwithstanding the application of the usual remedies, the several symptoms of heat, pain, and redness, in-

stead of diminishing, rather increase; if the febrile symptoms are likewise augmented, and the tumour gradually acquires a larger size, turns soft, somewhat prominent in the middle, or towards its most depending part; if it should next acquire a clear shining appearance, and become less painful, the different symptoms of fever being at the same time diminished, and a fluctuation perceptible in the tumour, the inflammation has ended in *suppuration*.

The worst, but, happily, the least frequent consequence of common inflammation, is the death, or *mortification*, of the part affected. The signs of this disastrous event are a change of colour in the part, which, from being of a bright red, becomes of a livid hue; small vesicles, filled with a thin fetid serum, arise on its surface, and air is plainly felt to exist in the disordered situation. The pain is, indeed, diminished; but the pulse sinks, while the tumour is gradually changed into a black, fibrous mass.

These are the three most usual terminations of inflammation. By many authors, however, another disorder has been treated of, as one in which inflammation is apt to end, viz. *scirrhus*. But, although that complaint may, perhaps, in a few instances, follow inflammation; yet, it is far from being a common consequence of it. Hence, although inflammatory affections may justly enough be mentioned as one of the many exciting causes of *scirrhus*, yet the consideration of this disorder can never with propriety, it is presumed, be introduced into an account of inflammation. (*B. Bell*)

Common inflammation, particularly when it affects glandular parts, is often observed to leave an induration in the part. We know very well, that, when the testis has been inflamed, a hardness of the epididymis frequently remains afterwards during life. Such indurations, however, are not at all malignant, and, consequently, are very different in their nature, from what is implied by a real *scirrhus*.

TREATMENT OF INFLAMMATION.

Removal of the Exciting, or Remote Cause.

After the description, which we have given of inflammation, the reader may easily guess, that the grand principle to be observed in the treatment, is to endeavour to lessen that immoderate action of the arteries, which is now commonly set down as the proximate cause.

The first circumstances to be attended to in all cases, in which resolution is to be attempted, is the removal of all such

exciting causes of the disorder as may happen to present themselves. If the irritation of a splinter should excite phlegmonous inflammation, who would not of his own accord extract the extraneous body?

Foreign substances in wounds frequently excite inflammation, and ought to be taken away as speedily as possible; splintered pieces of bone often give rise to the affection, and require removal: the head of a bone, being out of its place, may press and inflame the part on which it lies; and who does not immediately see the propriety of putting it back into its natural situation? Such exciting causes as these may oftentimes be detected and removed at once, and this is doing a great deal towards the cure of the inflammation. Many of the exciting causes of this affection are only of momentary application; yet, though they no longer exist, the process of inflammation must follow the violence and irritation, which were suddenly produced, and still remain. Hence, besides taking away, if possible, the remote cause, it is proper to moderate, by other means, the increased action of the vessels.

Bleeding.

If the doctrine which we have advanced be true, viz. that inflammation depends upon an increased action of the vessels, and that a greater quantity of blood is impelled into, and circulates through the inflamed part, than in the natural state; it follows that bleeding must be a principal means of relieving inflammation; because it lessens the action of the whole arterial system, and, of course, of that part which is undergoing inflammation; and because it diminishes the quantity of blood transmitted to the part affected, by lessening the whole mass in the circulation.

Bleeding, however, is often misemployed, especially, when regarded as the only remedy for inflammation, and other steps are neglected. The obstinacy and vehemence of the process in weak constitutions prove, that bleeding is not invariably proper. When inflammation is complicated with an unhealthy state of the alimentary canal, blood should be taken away with great circumspection. A great deal of induration, with little pain and heat in the inflamed part; the probability of a long and copious suppuration, as is the case in many compound fractures; and the dependence of the inflammation on local weakness; are particular instances, in which the practitioner should be sparing of this evacuation.

Bleeding is quite unnecessary when the local inflammation and symptomatic fever are trivial, when the patient is feeble or very old, and when the cause of the affection can be entirely removed. (*Rich-ter.*)

On the other hand, bleeding is highly beneficial in all cases, in which the inflammation is uncomplicated with a morbid state of the gastric system, is considerable in extent and degree, and attended with a good deal of ebrile disturbance. The same is also strongly indicated, when the part affected is very sensible, and highly important, in regard to its office in the system. Hence, ophthalmia, or inflammation of the eye, which is a most sensible part, particularly requires a free evacuation of blood. Hence, inflammation of the lungs, brain, or stomach, which are organs, the sound state of which is intimately essential to the regular continuance of all the various operations in the animal machine, particularly demands the employment of the lancet; for, if a successful effort be not promptly made to stop such inflammation, death itself will, in all probability, be the result.

Bleeding is likewise indicated, when the patient is young, robust, and plethoric; when the cause of the disorder can neither be removed nor diminished, and when there is a very strong motive for wishing to avoid the formation of matter. Inflammation of the eye affords an instance illustrative of the truth of the last observation; for, if suppuration be allowed to take place in this organ, the common consequence is so serious a destruction of its internal structure and organization, that the future restoration of sight is totally impossible. Under such circumstances as we have specified, it is frequently necessary to repeat bleeding several times.

The efficacy of bleeding is greater, the sooner it is practised, and the more suddenly the blood is evacuated. Bleeding near the part affected is usually more effectual, than when done in a remote situation. Hence, in inflammation of the eye or brain, it is deemed most advantageous to take blood from the temporal artery.

The preceding remarks chiefly relate to *general* bleeding; for, in phlegmonous inflammation, *topical* bleeding is scarcely ever improper. It is always a point highly worthy of the surgeon's consideration, whether bleeding *in or near the part* will answer better, than taking the blood from the *general habit*; for, certainly less may be removed in this way, so as to have equal effect upon the part inflamed, and,

probably, upon every other disease that is relieved by bleeding, and yet affect the constitution less. Although, in many cases, the general habit may be relieved by bleeding, yet the part affected will always require this evacuation most. That local bleeding has very considerable effects on the inflamed part, is proved by the sudden relief, which leeches, applied in cases of gout, produce. Bleeding by leeches, alone will also remove a tumour in the breast, having all the appearance of a scirrhus, which cannot be considered as inflammatory, so that topical bleeding extends its power further than the mere checking of inflammation. Some part of its effect has been imputed to sympathy. (*Hunter.*) There are three modes of performing topical bleeding; by cupping; by leeches; and by dividing, or scarifying the dilated vessels leading to the inflamed part. Upon the head and face, leeches are commonly employed; upon the chest, either leeches or cupping; upon the abdomen, leeches; and upon the joints, either cupping or leeches. When the eye is inflamed, leeches may either be applied to the adjoining temple; or the dilated vessels of the conjunctiva may be scarified; or both methods may be adopted. When the inflammation extends quite to the surface of the body, leeches are always most eligible, as their bite causes less irritation in inflamed parts, than the punctures of the scarificator, or the pressure of the cupping glasses.

Purging.

The exhibition of mild laxative medicines, and saline purgatives, is a principal means of diminishing inflammation. Purging does not produce such lasting weakness as is the consequence of bleeding, and, consequently, it is scarcely ever omitted, even when taking away blood is deemed improper. Saline purges must lessen the quantity of circulating blood, inasmuch as they increase the secretion from the intestinal arteries. Hence, they must operate beneficially in the cure of local inflammation, much upon the same principle as bleeding does. Mr. Hunter was of opinion that purging lowers action, without diminishing strength, by which we are probably to understand, without producing a very lasting or permanent loss of strength. With respect to mild laxative medicines, none are superior to manna, rhubarb, oleum ricini, and the like; and of the saline purgatives, which are in general preferable to the former ones, the natron vitriolatum, kali tartarizatum, soda phosphorata, and magnesii vitriolata, are the best. We may

here remark, that besides the benefit, which the local inflammation derives from the judicious administration of purgatives, the costiveness and heat, which usually attend the symptomatic fever, are also relieved by the same means.

Nauseating Medicines.

Medicines, which have the power of producing sickness, lessen for a time, the action, and even the general powers of life. This is in consequence of every part of the body sympathizing with the stomach; and the effect may be very quickly excited. Sickness lowers the pulse, makes the small vessels contract, and rather disposes the skin for perspiration. But nothing more than nausea should be caused: for vomiting rather rouses than depresses. (*Hunter.*) Nauseating medicines, employed after bleeding, has been practised once or twice, are often productive of considerable benefit; but there are some affections, in which they cannot be used, such as inflammation of the stomach and intestines. In all superficial inflammations, however, they may be safely and advantageously exhibited, as well as in most inflammatory affections internally situated. In inflammation of the dura mater and brain, and, indeed, in every instance, in which there is an urgent reason for putting as sudden a check as possible to the continuance of the affection, the employment of nauseating doses of antimonium tartarizatum, (emetic tartar) is the one, on which practitioners place the greatest reliance, and it is to be prescribed for the purpose of exciting nausea, as directed below.*

Opium.

The majority of surgeons entertain an insuperable objection to the administration of opiates in almost all cases of inflammation, and the aversion to this practice is for the most part deducible from the recollection of opium being a potent stimulant. The plan, however, has its advocates. (*B. Bell, Richter.*) One of its strongest partisans tells us, that opium particularly lessens the disturbance of inflammation, and it allays pain, which is at once a principal symptom of the process, and a cause of its augmentation, as well as that of the fever. Opium also quiets the inordinate action of the solids, the

* *℞. Antimonii tartarizati grana duo; Aquæ distillatæ uncias quatuor. Misco et cola. Dosis. Uncia dimidia sexta quaque hora.*

mental agitation, and restlessness so powerfully, that it well deserves the name of the grand *antiphlogistic remedy*. It likewise occasions a moisture on the surface of the body, which experience shews is eminently serviceable in all inflammations affecting the skin. When given with this view, it is usually conjoined with antimony, camphor, calomel, or ipecacuanha. The administration of opium is a general practice in all painful inflammations arising from external causes, and it is attended with perfect safety when evacuations from the bowels and bleeding have been previously put in practice. Care must only be taken to give it in sufficient doses; for small quantities not only fail in fulfilling the object, but frequently produce quite an opposite effect. During its employment, the bowels should be kept open by glysters. The efficacy of opium chiefly manifests itself in the early stage of the affection; for, as soon as the inflammatory fever has extended itself to the whole system, it loses its beneficial virtues. Hence, in cases of external injuries, it is to be given the two first days, immediately after bleeding. It is to be given as soon after the accident as possible, in order to tranquillize the mental alarm, and, if convenient, towards the evening, for the sake of procuring for the patient a quiet night. (*Richter*.) Evacu-
 tions being premised, says the other advocate for this medicine, the next object of importance is to procure ease and quietness to the patient, which, in cases of inflammation, are often of more real service, than any other circumstance whatever. The most effectual remedy for this purpose is opium, which, when the pain and irritation are considerable, as very frequently happens in extensive inflammations, should never be omitted. In large wounds, especially after amputations, and other capital operations, and in punctures of all kinds, large doses of opium are always attended with remarkably good effects. In all such cases, however, opium, in order to have a proper influence, should be administered in very large doses; otherwise, instead of proving serviceable, it seems rather to have the contrary effect. This circumstance is, perhaps, the chief reason why opiates in general have been very unjustly condemned in every case of inflammation. (*B. Bell*.)

On the contrary, they who are averse to the use of opium, remark, that, in acute inflammation, daily experience shews, independently of every theory, that the exhibition of this medicine increases the general fever, and aggravates the local action. Even given as a preventive of

inflammation, after operations, anodynes are almost universally hurtful, producing restlessness, heat, thirst, and afterwards head-ach, sickness, and frequently, troublesome vomiting. (*Burns*.)

Upon the whole, candour obliges me to own, that the votes of the majority of surgeons in this country are decidedly against the general use of opium in inflammation; but, after the performance of severe operations, and in all instances, attended with excessive pain, truth, I believe, will justify my saying, that the voice of most practitioners is in favour of the exhibition of this remedy.

DIET AND REGIMEN.

In all cases, the surgeon is to forbid taking wine and spirits, and, when the inflammation is in the least considerable, the same prohibition is to be made in regard to animal food. Watery, cooling, mucilaginous drinks, taken in a lukewarm state, are proper; for they keep off thirst and heat, and tend to sooth the increased action of the whole arterial system. For this purpose, whey, buttermilk, barley-water, decoction of dried fruits, water-gruel, &c. are the best.

The chamber, in which the patient lies, should not be kept warmer than his comfort requires; for, of all things, heat keeps up an increased action in the body, in the most powerful manner. For the same reason, the patient should not be covered with a superfluous quantity of bed-clothes.

The whole body, but more especially the inflamed part, should be preserved as free as possible from every kind of motion. Every one knows, that all motion, exercise, and muscular exertion, accelerate the circulation, and hence they must have a pernicious effect on inflammation, by determining a larger quantity of blood to the part affected.

TOPICAL APPLICATIONS—COLD ONES.

With the exception of what has been stated, concerning topical bleeding, all the foregoing remarks relate to the *general* treatment of inflammation: we shall next consider the *local*.

It has been already observed, that phlegmon is attended with an increase of heat in the part affected, and it is an acknowledged and well known fact, that the action of the arteries, as well as every other operation in the animal economy, is promoted and increased by the influence of heat. For this reason an obvious indication arises, viz. to reduce the temperature of the inflamed part, by the

topical application of cold, and, in particular, by continually abstracting the heat generated in the part, by keeping up a constant evaporation from its surface.

Preparations of lead, and other sedative and astringent substances, are such as are in the greatest repute for bringing about the resolution of inflammation.

I am decidedly averse to entering into minute discussions, concerning the *modus operandi* of such medicines as are recommended. These disquisitions would only extend our remarks to an unnecessary length, and probably fail in conveying satisfactory information to the reader. However, I am firmly of the same sentiment with a preceding systematic writer (*B. Bell*) that, in some circumstances, it may not be improper to deviate so far from the general plan, as to render, as obvious as possible, the propriety of what, at any time may be advanced; for mere practical assertions, unsupported by some foundation in reason, can never prove either so useful or agreeable as they might otherwise be rendered.

We have remarked, that the cold applications, used in the resolution of inflammation, are commonly such as are of an astringent and sedative quality. But the whole class of medicines, which are found to possess these properties, can never be recommended as topical remedies for phlegmonous inflammation. Opium is one of the most powerful of all sedatives; yet, when applied to the surface of the human body, (if the cuticle intervene,) it has little virtue; and, if the part be excoriated, it is always productive of some degree of irritation. Hence, however useful opium may be as a topical application to some particular species of inflammatory affections, which will be specified in the course of this work, we may certainly conclude, that it will never come into general use, as an external local application in inflammatory cases. Similar objections might, perhaps, be made to the employment of nearly all sedatives, in cases of acute inflammation. The *zincum vitriolatum*, *cerussa acetata* (*sugar or acetite of lead*), and vinegar, are the only medicines of the astringent and sedative class, which seem to have acquired permanent celebrity for their efficacy in resolving inflammation.

Extensive experience, and long established trials, have now fully confirmed the virtue of all those local remedies, in which the acetite of lead is the active ingredient. *M. Goulard*, and numerous other French surgeons, found, that the objections to the employment of many other sedative applications in the treatment of inflammation, did not exist

against the use of the preparation of lead. The universal assent of modern practitioners proves, indeed, that the acetite of lead, as a local application for genuine phlegmonous inflammation, is certainly unsurpassed, if not unrivalled, in point of efficacy.

Although *M. Goulard*, in extolling a favourite remedy, has been induced to assert its effects to be more general and considerable than they properly will ever be found to be; yet the world is much indebted to him; not, however, for a new medicine, as every preparation of lead, recommended by him, was formerly, in some form or other, known to every practitioner; but, for introducing into more general use a very effectual remedy for the discussion of inflammatory swellings. (*B. Bell*.)

The preparations of lead certainly merit the appellation of sedatives. When taken internally, many of the most striking effects of this mineral are of a sedative kind. The propriety of the term, however, is more particularly evinced by the immediate and obvious operation of lead, when any of its preparations are outwardly applied to the surface of an inflamed part. An abatement of the different symptoms of pain, and tension, and the communication of an agreeable soothing sensation to the part, are almost always its direct palpable effects.

The preparations of lead are recommended by *M. Goulard*, as almost equally applicable to every stage of inflammation. When swellings have fully suppurated, the employment of, what he calls, the *extractum Saturni*, will almost always render it unnecessary to open them. Even in gangrene, the solution of lead is represented by this zealous writer, as a remedy, deserving the greatest confidence.

But, notwithstanding, the above exaggeration, every man of experience and observation will allow, that, while there is a chance of accomplishing resolution, no local applications to phlegmonous inflammation, are in general so proper, as cold lotions, containing the acetite of lead.

From the poisonous qualities of lead, when taken into the system, and from the possibility of this mineral being absorbed from the surface of the body, objections have arisen against the free use of its preparations, even as outward remedies in cases of inflammation. Certain it is, however, that though the possibility of such absorption is proved by the occurrence of the disorder called the *colica pictorum*, which originates in painters from the white lead absorbed into the system, yet, any ill effects from the use of lead,

as an application to inflamed parts, are so exceedingly rare, that they can hardly form a serious objection to the practice. It is a fact, that, in inflamed parts, there is an impediment to absorption, and this circumstance may tend to render the employment of lead a matter of safety. Mr. B. Bell observes, that in all the experience he has had, of the external application of lead and its preparations, and in many cases, particularly of burns, he has known the greatest part of the surface of the body covered with them for days, nay, for weeks together, he does not recollect a single instance of any disagreeable symptom being ever produced by them.

A lotion composed of cerussa acetata (sugar of lead), vinegar and water, is one very commonly employed.* Occasionally, bread-crumbs are moistened in the fluid, and applied to the part affected, in the form of a poultice; but, linen wet in the lotion, and kept constantly so, is now almost always preferred. Thus a continual evaporation is maintained, and of course a continual abstraction of heat.

The aqua lithargyri acetati is preferred by most surgeons.

About a tea-spoonful of this preparation, mixed with a pint of water, makes a very proper lotion for all ordinary cases.

When the surgeon is afraid to employ a solution of lead, he may try one containing the zincum vitriolatum. For this purpose one dram of this metallic salt is to be dissolved in a pint of water, and linen well wet with the lotion, is to be applied to the inflamed part.

Many practitioners impute very little real efficacy either to the acetate of lead, or sulphate of zinc, contained in the above applications; and, they attribute all the good, that is produced, entirely to the evaporation kept up from the surface of the inflamed part, and to the coldness of the fluid, in which the metallic salts are dissolved. Those, who entertain these sentiments, think the application of cold water alone quite as efficacious, as that of any medicated lotion whatsoever.

There are particular cases of inflammation, in which the extravasation of blood and lymph, into the interstices of the inflamed part, is exceedingly copious, while

the swelling is considerable, and the pain and redness not particularly great. In such instances, it is a grand indication to rouse the action of the absorbents, in order to remove the extravasated fluid, and with this view, a more powerful discutient lotion, than the saturnine one, should be employed. Sometimes, it is better to use embrocations and liniments, than any sort of lotion. A very excellent discutient lotion is one of those mentioned below.*

When the part affected with inflammation is not very tender, or when it lies deep, applications of the vegetable acid are often had recourse to with considerable advantage; and the most effectual form of using it seems to be a poultice made with vinegar and crumb of bread. In such cases, it has been thought, that an alternate use of this remedy, and the saturnine lotion, has produced more beneficial effects, than are commonly observed from a continued use of one of them. (B. Bell.) However, surgeons of the present day seem to think, that vinegar can be as advantageously applied in the form of a lotion, as in that of a poultice, and, certainly, with less trouble.

Alcohol and æther have acquired some celebrity, as local remedies for inflammation. Perhaps, one great reason, why they are not more extensively used in this way, is the expence attending such treatment, as these fluids evaporate with great rapidity. Alcohol may possibly prove useful from its astringent qualities; but, it seems much more rational to impute both its virtue, and that of æther, to the powerful manner, in which the evaporation of such fluids deprive the inflamed part of its heat.

WARM APPLICATIONS, EMOLLIENT POULTICES AND FOMENTATIONS.

The absurdity of attempting to reconcile every useful practice with a philosophical theory, is, in no instance, more strikingly shewn, than in the opposite sorts of local applications, which are of service in inflammation. The generality of cases undoubtedly receive most relief

* R. Cerussæ Acetatæ ℥ss.
Solve in Acet. pur. ℥iv.
Et adde Aq. Fontanæ distill.
℔ij.

The vinegar makes the solution more complete.

Nov. II.

* R. Ammoniac Muriatæ ℥ss.
Aceti;
Spiritus Vini rectificati; sing. ℔ij.
M.

R. Aq. Ammon. Acet.
Spir. Vini rectif.;
Aq. Distillatæ; sing. ℥iv. M.
The Aqua Ammoniac Acet. alone also
does very well.

from the use of cold sedative astringent lotions; but, there are constitutions and parts, which derive most service from the local employment of warm emollient remedies.

Were I to endeavour to define the particular instances, in which the latter applications avail most, I should take upon me a task, which has baffled all the most able surgical writers. The first stage of the acute ophthalmy, and the hernia humoralis, or inflamed testicle, may be specified, however, as examples, in which, generally speaking, warm emollient applications are better, than cold astringent ones. If we may judge by the feelings of certain patients, there are undoubtedly particular constitutions, in which the local use of warm remedies, produces greater relief, than that of cold ones. This circumstance, however, does not generally happen; and, as warm emollient applications of all kinds have the most powerful influence in promoting suppuration, a fact admitted by every experienced practitioner, the use of such remedies, while the resolution of inflammation is practicable, must be highly censurable. But, I am ready to grant, that in all cases of inflammation, which manifestly cannot be cured without suppuration, the emollient plan of treatment ought to be at once adopted; for, the sooner the matter is formed, the sooner the inflammation itself is stopped. The inflammation attending contused and gun-shot wounds, and that accompanying boils and carbuncles, are of this description. The inflammation, originating in fevers, commonly ends in suppuration, and, perhaps, it might be advantageous, in such instances, also, to employ at once the emollient treatment.

Warmth and moisture together, in other words fomentations, are commonly had recourse to in cases of inflammation; but, when the warmth is as much as the sensitive principle can bear, it excites action. Whether it is the action of inflammation, or the action of the contraction of the vessels, is unknown. We see that many patients cannot bear warmth, and, therefore, it might be supposed to increase the action of dilatation, and do harm. But, if the pain should arise from the contraction of the inflamed vessels, benefit would be the result: though we must doubt that this change is produced, as making the vessels contract would probably give ease. (*Hunter.*)

From the preceding observations, we must perceive how vain it is to theorize on this subject, which even puzzled the genius and penetration of a Hunter. In addition to what has been already ob-

served, I feel totally incapable of giving any useful practical advice, with respect to those cases, in which warm emollient applications should be used in preference to cold astringent ones. I can, however, with confidence remark, that the surgeon, who consults the feelings and comfort of the patient on this point, will seldom commit any serious error. Hence, in all cases, in which the first kind of topical applications seem not to produce the wonted degree of relief, let the second sort be tried. From the opportunity of comparison, a right judgment may then be easily formed.

The poultice made of the powder of linseed is so easily prepared, that the old bread and milk poultice is now seldom made. As much hot water is to be put into a basin, as the size of the poultice requires, and then the linseed powder is to be gradually mixed with the water, till the mass is of a proper consistence. Very frequently, a little sweet oil is also added to keep the application longer soft and moist.

Fomentations are only to be considered as temporary applications, while the emollient poultices are the permanent ones. The former are, at most, never used more than three times a day, for the space of about half an hour each time. Two of the best are directed below.*

By pursuing the treatment, recommended above, the resolution of the inflammation will in general begin to take place, either in the course of three or four days, or in a shorter space of time. At all events, it may usually be known before the expiration of this period, how the disorder will terminate. If the heat, pain, and other attending symptoms abate; and, especially, if the tumour begins to decrease, without the occurrence of any gangrenous appearances; we may then be almost certain, that, by a continuance of the same plan, a total resolution will in time be effected.

On the other hand, when all the different symptoms increase, and, particularly when the tumour becomes larger, and softish, attended with a more violent throbbing pain, we may conclude, that the case will proceed to suppuration. Hence, an immediate change of treatment is indicated, and such applications, as were pro-

* R. Lini contusi $\mathfrak{z}i$.
 Chamæmeli $\mathfrak{z}ij$.
 Aq. Distill. \mathfrak{Hvj} . Paulisper
 coque et cola.
 or R. Papaveris albi exsiccati $\mathfrak{z}iv$.
 Aq. Puræ \mathfrak{Hvj} . Coque usque
 remaneant \mathfrak{Hij} . et cola.

per, while resolution seemed practicable, are to be left off, and others substituted. This remark relates to the employment of cold astringent remedies, which, when suppuration is inevitable, only do harm, by retarding what cannot be avoided, and affording no relief of the pain and other symptoms. If the inflammation, however, should already be treated with emollients, no alteration of the topical applications is requisite, in consequence of the inevitability of the formation of matter. Indeed, emollient poultices, and fomentations, are the chief local means both of promoting suppuration, and diminishing the pain, violent throbbing, &c. which always precede this termination of phlegmonous inflammation.

But, besides the substitution of warm emollient applications for cold astringent ones, to the part itself, practitioners have decided, that it is also prudent, as soon as the certainty is manifest, to relinquish the free employment of evacuations, particularly, blood-letting, and to allow the patient a more generous diet. When the system is too much reduced by the injudicious continuance of the rigorous antiphlogistic treatment, the progress of the ensuing suppuration is always retarded in a disadvantageous manner, and the patient is rendered too weak to support, either a long continued, or a profuse discharge, which, it may not be possible to avoid.

On the subject of inflammation, the best works for perusal are; *Van Swieten's Commentaries on Boerhaave; Cullen's First Lines on the Practice of Physic, Vol. 1; John Hunter on Inflammation, &c.; Burns's Disquisitions on the same.*

INGUINAL ANEURISMS. See *Aneurism.*

INGUINAL HERNIA. See *Hernia.*

INJECTION. (from *injicio*, to cast into.) A fluid, intended to be thrown into a part of the body by means of a syringe. Thus port wine and water form an injection, which is used by surgeons for radically curing the hydrocele, and, for this purpose, it is introduced into the cavity of the tunica vaginalis, where it excites the degree of inflammation necessary to produce an universal adhesion between this membrane and the albuginea.

Thus many fluid remedies are introduced into the urethra and vagina for curing the gonorrhœa. In the article *Gonorrhœa*, will be found an account of the best injections employed for its relief. We here subjoin a few particular ones not there noticed.

INJECTIO ACIDI MURIATICI.—*℞. Aquæ distil. ℥iv. Acid. Mur. gutt. viij. Misce.*—Useful when the scalding is a very troublesome symptom.

INJECTIO ALUMINIS. *℞. Alum. ℥j. Aq. pur. ℥vj. Misce.*—Successfully employed by Dr. Cheston, as an injection in affections of the rectum, either when the internal coat is simply relaxed, and disposed to prolapsus, or when it is studded with loose fungated tumours. In such cases, camphor is also of service. The quantity of alum may be increased, if the parts will bear it.

INJECTIO CUPRI AMMONIATI.—*℞. Liquoris Cupri ammon. gutt. xx. Aquæ rosæ ℥iv. Misce.*—Strongly recommended by Mr. Foot.

INJECTIO QUERCUS.—*℞. Decocti quercûs lbj. Aluminis purificati ℥ss. Misce.*—May be used, when the rectum, or vagina, is disposed to a prolapsus from relaxation, or in cases of gleet.

INTERRUPTED SUTURES. See *Sutures.*

INTESTINES WOUNDED. See *Abdomen, Wounds of.*

INTROSUSCEPTION, or *Intussusception*, (from *intus*, within, and *suscipio*, to receive.) Called also *Volvulus*. Is a disease, produced by the passing of one portion of an intestine into another, and it is commonly from the upper passing into the lower part. (*J. Hunter.*)

Mr. G. Langstaff has published an interesting paper, on this subject, in the *Edinb. Surg. Journal, No. XI.*; which I shall take the liberty of freely quoting.

This gentleman remarks, that the small intestines of children are so often affected with introsusception, in a slight degree; that most practitioners must have had opportunities of observing the form of the complaint. The greatest part of three hundred children, who died either of worms, or during dentition, at the Hospital de la Salpêtrière, and came under the examination of M. Louis, had two, three, four, and even more volvuli, without any inflammation of the parts, or any circumstances leading to a suspicion, that these affections had been injurious during life. "These cases (says M. Louis) seem to prove, that introsusception may be formed, and destroyed again by the mere action of the intestines." (*Mem. de l'Acad. de Chirurg. 4to. tom. 4. p. 222.*) This opinion is confirmed by the authority of Dr. Baillie, (*Morbid Anatomy, 2d edit. p. 162.*) who observes, that, "in opening bodies, particularly of infants, an intussusception is not unfrequently found, which had been attended with no mischief; the parts appear perfectly free from inflammation, and they would probably have been easily disentangled from each other by their natural peristaltic motion."

The disease, continues Mr. Langstaff, assumes a more dangerous, and, indeed,

generally a fatal form, when it occurs at the termination of the small intestines in the cæcum. A contracted state of the part to be introsuscepted, and a dilatation of that portion of the canal, into which this part must pass, are essential conditions to the formation of a volvulus; and those exist no where so completely as in the situation here alluded to. The extent, to which the affection proceeds in this situation, would appear almost incredible, if it were not proved by well authenticated facts. A person, who considered the natural situation and connexion of the parts, would of course require the strongest evidence, before he would believe, that the ilium, cæcum, ascending, and transverse portions of the colon, may descend into the sigmoid flexure of the latter intestine; nay more, that they may pass through the rectum, and be protruded in the form of a procidentia ani. Such cases, however, are recorded. (*Langstaff, in Edinb. Med. and Surg. Journal, No. XI.*)

This gentleman next relates the case of a child three months old, the body of which he inspected after death, and found to confirm the truth of the preceding account. The example was particular in there being in addition to an extensive introsusception in the usual way, a smaller invagination in the opposite direction, like what probably occurred in the case related by Mr. Spry; *Med. and Physical Journal, No. XI.* Mr. Home, in the *Med. and Chirurg. Trans. Vol. 1.* mentions an example of a retrograde introsusception, in which a worm was found coiled up round the introsuscepted part. The disease took place in a boy who had swallowed some arsenic.

If the following mode of accounting for introsusception, be just, it will most frequently happen downwards, although there is no reason why it may not take place in a contrary direction; in which case, the chance of a cure will be increased by the natural actions of the intestinal canal tending to replace the intestine; and probably from this circumstance it may oftener occur than commonly appears. (*J. Hunter.*)

When the introsusception is downwards, it may be called *progressive*, and when it happens upwards, *retrograde*. The manner in which it may take place is, by one portion of a loose intestine being contracted, and the part immediately below relaxed and dilated; under which circumstances, it might very readily happen by the contracted portion slipping a little way into that which is dilated, not from any action in either portion of intestine, but from some additional weight in the

gut above. How far the peristaltic motion, by pushing the contents on to the contracted parts, may force these into the relaxed, Mr. Hunter will not determine, but is inclined to suppose that it will not. (*J. Hunter.*)

By this mode of accounting for an accidental introsusception, it may take place either upwards or downwards; but if a continuance or an increase of it arises from the action of the intestines, it must be when it is downwards, as we actually find to be the case; yet this does not explain those in which a considerable portion of intestine appears to have been carried into the gut below: to understand these, we must consider the different parts which form the introsusception. It is made up of three folds of intestine; the inner, which passes down, and being reflected upwards, forms the second or inverted portion, which being reflected down again, makes the third or containing part, that is the outermost, which is always in the natural position. (*J. Hunter.*)

The outward fold is the only one which is active, the inverted portion being perfectly passive, and squeezed down by the outer, which inverts more of itself, so that the angle of inversion in this case is always at the angle of reflection of the outer into the middle portion or inverted one, while the innermost is drawn in. From this we can readily see how an introsusception, once begun, may have any length of gut drawn in. (*J. Hunter.*)

The external portion acting upon the other folds in the same way as upon any extraneous matter, will by its peristaltic motion urge them further; and, if any extraneous substance is detained in the cavity of the inner portion, that part will become a fixed point for the outer or containing intestine to act upon. Thus it will be squeezed on, till at last the mesentery preventing more of the innermost part from being drawn in, will act as a kind of stay, yet without entirely hindering the inverted outer fold from going still further. For it being the middle fold that is acted upon by the outer, and this action continuing after the inner portion becomes fixed, the gut is thrown into folds upon itself; so that a foot in length of intestine shall form an introsusception not more than three inches long. (*J. Hunter.*)

The outer portion of intestine is alone active in augmenting the disease when once begun; but if the inner one were capable of equal action in its natural direction, the effect would be the same, that of endeavouring to invert itself, as in a prolapsus ani; the outer and inner portions, by their action, would tend to draw

in more of the gut, while the intermediate part only would, by its action, have a contrary tendency. (*J. Hunter.*)

The action of the abdominal muscles cannot assist in either forming, or continuing this disease, as it must compress equally both above and below, although it is capable of producing the prolapsus ani. (*J. Hunter.*)

When an introsusception begins at the valve of the colon, and inverts that intestine, we find the ilium is not at all affected; which proves that the mesentery, by acting as a stay, prevents its inversion. (*J. Hunter.*)

From the natural attachment of the mesentery to the intestines, one would, at the first view of the subject, conceive it impossible for any one portion of gut to get far within another; as the greater extent of mesentery that is carried in along with it would render its further entrance more and more difficult, and we should expect this difficulty to be greater in the large intestines than in the small, as being more closely confined to their situation; yet one of the largest introsusceptions of any known was in the colon, as related by Mr. Whateley. (*Vid. Phil. Trans. Vol. 76. p. 305.*)

The introsusception appeared to have begun at the insertion of the ilium into the colon, and to have carried in the cæcum with its appendix. The ilium passed on into the colon, till the whole of the ascending colon, the transverse arch, and descending colon, were carried into the sigmoid flexure and rectum. The valve of the colon being the leading part, it at last got as low as the anus; and when the person went to stool he only emptied the ilium, for one half of the large intestines being filled up by the other, the ilium alone, which passed through the centre, discharged its contents. (*J. Hunter.*)

Two questions of considerable importance present themselves to the mind in considering this subject; whether there are any symptoms, by which the existence of the affection can be ascertained during life? And whether we possess any means of relieving it, supposing, that its existence could be discovered? The symptoms attending an introsusception, are common to inflammation of the intestines, hernia, and obstruction of the canal, from whatever cause, and a volvulus is the least frequent cause of such symptoms. (*Langstaff.*) In the case, published by this gentleman, and in those related by Mr. Hunter and Mr. Spry, the seat of the disease was clearly denoted by a hard tumour on the left side of the abdomen. This circumstance, together with the impossibility of throwing up more than a

very small quantity of fluid in clysters, (*Herin, Spry, Langstaff.*) and the presence of the other symptoms, would lead us to suspect the nature of the disorder. If the invaginated portion descended so low as to protrude through the anus, and we could ascertain, that it was not an inversion of the gut, the cause might be considered as clear, and we should have no hesitation in delivering a prognosis, which, by preparing the friends for the fatal termination, would exonerate us from all blame on its occurrence. (*Langstaff.*)

In the treatment of this disease, bleeding, to lessen the inflammation that might be brought on, and quicksilver to remove the cause have been recommended.

Quicksilver would have little effect either in one way or the other, if the introsusception were downward; for it is to be supposed that it would easily make its way through the innermost contained gut, and, if it should be stopped in its passage, it would, by increasing its size, become a cause (as before observed) of assisting the disease. In cases of the retrograde kind, quicksilver, assisted by the peristaltic motion, might be expected to press the introsusception back; but even under such circumstances it might get between the containing and inverted gut into the angle of reflection, and, by pushing it further on, increase the disease it is intended to cure. (*J. Hunter.*)

Every thing that can increase the action of the intestine downwards is to be particularly avoided, as tending to increase the peristaltic motion of the outer containing gut, and thus to continue the disease. Medicines can never come in contact with the outer fold, and, having passed the inner, can only act on the outer below, therefore cannot immediately affect that portion of the outer which contains the introsusception; but we must suppose that whatever affects, or comes in contact with the larger portion of the canal, so as to throw it into action, will also affect by sympathy any part that may escape such application. Mr. Hunter therefore advises giving vomits, with a view to invert the peristaltic motion of the containing gut, which will have a tendency to bring the intestines into their natural situation.

If this practice should not succeed, it might be proper to consider it as a retrograde introsusception, and by administering purges endeavour to increase the peristaltic motion downwards. (*J. Hunter.*)

I cannot agree with Mr. Langstaff, that it is to be regretted, Hunter's name should be affixed to the preceding proposal, or

that it is an absurd one; for purgatives and emetics were only recommended to increase the peristaltic action, the former downward, the latter upward, according as the supposed nature of the case might require, and this effect they certainly would have, notwithstanding vomiting is an early and constant symptom of the disease, and an insuperable constipation an equally invariable attendant. The method, I allow, however, is not very hopeful, on account of the existence of adhesions. Mr. Langstaff remarks, that the *Recherches Historiques sur la Gastrotomie dans le cas de Volvulus*, par M. Hevin, (*Mem. de l'Acad. de Chirurgie*, Tom 4, 4to.) contain many interesting facts and much sound reasoning. There we find a very ample discussion of the question, concerning the propriety of opening the abdomen, in order to disentangle the intromsuscipated intestine; a proposal which M. Hevin condemns.

If the equivocal and uncertain nature of the symptoms of volvulus, were not sufficient to deter us from undertaking an operation, which, under the most favourable circumstances, could not fail to be extremely difficult, and imminently hazardous to the patient, the state of the invaginated parts will entirely banish all thoughts of such an imprudent attempt. The different folds of the intestine become agglutinated to each other, so that they can hardly be withdrawn after death; (*Simpson, Edinburgh Med. Essays*, Vol. 6. *Hevin's 4th Obs.* *Malcolm, Physical and Lit. Essays*, Vol. 2, p. 360 *Hunter, Med. and Chir. Trans.* and *Soemmering in Trans. of Baillie's Morb. Anat.*) the stricture on the intromsuscipated part, causes it to inflame, and even mortify. (*Soemmering*.) It is very clear, that, in this state of parts, the operation of gastrotomy would be totally inadmissible, even if the symptoms could clearly indicate the nature of the case, and the affected part could be easily reached and examined. (*Langstaff, in Edinburgh Medical and Surgical Journal*.)

The forcible injection of clysters was found useless by Dr. Monro, and the agglutination of the parts must produce an insuperable obstacle to the bowels being pushed back by this means. (*Langstaff*.) Some have proposed the employment of a long bougie, or a piece of whalebone, to push back the intestine; and this proposal may be adopted, when we are furnished with an instrument, adapted to follow the windings of the large intestine to its origin in the right ilium, without any risk of perforating the gut in its course. (*Langstaff*.)

We must confess, both surgery and

medicine are almost totally unavailing in the present disease. Yet here, as in many other instances, the resources of nature are exhibited in a most wonderful and astonishing manner, while those of art completely fail. The invaginated portion of intestine sometimes sloughs, and is discharged *per anum*, while the agglutination of the parts preserves the continuity of the intestinal canal. The annals of medicine furnish numerous instances, in which long pieces of gut have been discharged in this manner, and the patient has recovered. Hence, some hope may be allowed under the most unpromising circumstances. In a case, related in Duncan's Commentaries, eighteen inches of small intestines were voided *per anum*, Vol. 9, p. 278. Three similar instances occur in M. Hevin's Memoir; twenty-three inches of colon came away in one of these, and twenty-eight of small intestines in another. Other cases occur in the Physical and Literary Essays, Vol. 2, p. 361; in Duncan's Essays, Vol. 6, p. 298; in the Medical and Chirurgical Transactions, Vol. 2; where Dr. Baillie states, that a yard of intestine was voided. The patients did not, however, ultimately survive in every one of these instances. (*Langstaff, in Edinb. Med and Surgical Journal*.)

For information concerning intussusceptio, I would particularly refer the reader to M. Hevin, in *Mem. de l'Acad. de Chir.* *Hunter's Observations*, in the *Medical and Chirurgical Transactions*. *L'Encyclopédie Méthodique, Partie Chirurgicale; Art. Gastrotomie.* And *Langstaff's Remarks in the Edinburgh Med. and Surgical Journal, No. II.*

INVERSION OF THE UTERUS.

See *Uterus, Inversion of*.

IRIS, PROLAPSUS OF. As long as the humours, which fill the cavity of the eye, and in which the iris is immersed and suspended, remain in perfect equilibrium with respect to each other, that membrane retains its natural position, and a suitable distance from the cornea. While such an equilibrium continues, the iris, although of a very delicate and yielding texture, contracts, and relaxes itself, without ever forming any irregular fold. But, when the aqueous humour has escaped through an accidental, or artificial opening in the cornea, the iris is pressed forward by the humours situated behind it, and is urged gradually towards the cornea, until a portion of it protrudes from the eye, at the same opening, through which the aqueous humour made its escape. Thus a small tumour of the same colour as the iris forms on the cornea, and is named, by the majority of surgeons,

staphyloma of the iris; but, for the sake of distinguishing the disease more particularly from another, to which the term, *staphyloma* is more properly applicable, Scarpa prefers calling it with Galen, *procidencia*, or *prolapsus of the iris*.

The causes of this complaint are such wounds and ulcers of the cornea, as make an opening of a certain extent into the anterior chamber of the aqueous humour, and such violent contusions of the eye-ball, as occasion a rupture of the cornea. If the edges of a wound in this situation, whether accidental, made for the purpose of extracting the cataract, or evacuating the matter of an hypopium (as is the practice of some), be not brought immediately afterwards into reciprocal contact, or continue not sufficiently agglutinated together to prevent the escape of the aqueous humour from the anterior chamber, regularly as this fluid is reproduced; the iris, drawn by its continual flux towards the cornea, glides between the lips of the wound, becomes elongated, and a portion of it gradually protrudes, beyond the cornea, in the form of a small tumour. The same thing takes place, whenever the eye-ball unfortunately receives a blow, or is too much compressed by bandages, during the existence of a recent wound of the cornea. Also, if the patient should be affected, in this circumstance, with a spasm of the muscles of the eye, with violent and repeated vomiting, or with strong and frequent coughing, a prolapsus of the iris may be caused. When an ulcer of the cornea penetrates the anterior chamber of the aqueous humour, the same inconvenience happens more frequently, than when there is a recent wound of that membrane; for, the solution of continuity in the cornea, arising from an ulcer, is attended with loss of substance, and in a membrane so tense, and compact, as this is, the edges of an ulcer do not admit of being brought into mutual contact.

The little tumour is likewise necessarily of the same colour as the iris, viz. brown, or greyish, being surrounded at its base by an opaque circle of the cornea, on which membrane there is an ulcer, or a wound of not a very recent description.

As it usually happens, that the cornea is only penetrated at one part of its circumference by a wound, or ulcer, so in practice we commonly meet with only one prolapsus of the iris in the same eye. But, if the cornea should happen to be wounded, or ulcerated, at several distinct points, the iris may protrude at several different places of the same eye, forming an equal number of small projecting tu-

mours on the surface of the cornea. Scarpa has seen a patient, who had three very distinct protrusions of the iris on the same cornea, in consequence of three separate ulcers, penetrating the anterior chamber of the aqueous humour; one in the upper, and two in the lower segment of the cornea.

If we reflect a little on the delicate structure of the iris; the great quantity of blood-vessels which enter it, and the numerous nervous filaments, which proceed to be distributed to it, as a common centre; we shall easily conceive the nature, and severity of those symptoms, which are wont to attend this disease, how small soever the portion of the iris projecting from the cornea may be, even if no larger than a fly's head. The hard and continual frictions, to which this delicate membrane is then exposed, in consequence of the motions of the eyelids; together with the access of air, tears and gum to it, are causes quite adequate to the production of continual irritation; and the blood, which tends to the point of the greatest irritation, cannot fail to render the projecting portion of the iris much larger, almost directly after its protrusion, than it was at the moment of its first passing through the cornea. Hence, it becomes, soon after the prolapsus, more incarcerated and irritated, than it was at first. In the incipient state of the complaint, the patient complains of a pain, similar to what would arise from a pin penetrating the eye; next he begins to experience, at the same time, an oppressive sensation of a tightness, or constriction, over the whole eye-ball. Inflammation of the conjunctiva, and eyelids, a burning effusion of tears, and an absolute inability to endure the light, successively take place. As the protruded portion of the iris drags after it all the rest of this membrane, the pupil assumes of mechanical necessity of an oval shape, and deviates from the centre of the iris, towards the seat of the prolapsus. The intensity of the pain, produced by the inflammation, and other symptoms, attendant on the prolapsus of the iris, does not, however, always continue to increase.

Indeed, in practice, cases of old protrusions of the iris often occur, where, after the disease has been left to itself, the pain and inflammation spontaneously subside, and the tumour of the iris becomes almost completely insensible. Scarpa mentions his having seen a man, fifty years of age, who had had a prolapsus of the iris in the right eye ten weeks; it was as large as two grains of millet seed; the patient bore it with the greatest indifference, and without any other inconvenience, than a

little chronic redness of the conjunctiva, and a difficulty of moving the eye-ball freely, in consequence of the friction of the lower eyelid against the tumour formed by the iris. When the extremity of the finger was applied, the little tumour seemed hard and callous to the touch.

This phenomenon was partly owing to the constriction, which the base of the tumour of the iris suffered between the lips of the wound, or ulcer of the cornea. The protruded portion of the iris loses its natural exquisite sensibility, in consequence of such compression, or strangulation. The phenomenon was also partly ascribable to the iris being deprived of its vitality by the induration, and callosity, which were occasioned by the long exposure of this membrane to the air, and tears.

In the early stage of this disease, some direct the iris to be replaced in its proper situation by means of a whalebone-probe; and, in case of difficulty, to make a dilatation of the wound, or ulcer, of the cornea, by an incision, proportioned to the exigency of the case, as we are accustomed to do, in order to return a strangulated intestinal hernia. Others only recommend strangulating the prolapsed portion of the iris, with a view of making it contract and shrink into the eye; or suddenly exposing the eye affected to a very vivid light, in the belief, that, as the pupil then forcibly contracts, the piece of the iris, engaged between the lips of the wound, or ulcer of the cornea, will rise to its proper place. However, Scarpa strongly contends that all such methods are absolutely useless, and even dangerous. Supposing it were possible, by such attempts, to reduce the iris to its proper situation, without tearing, or injuring it in any manner whatever, still the aqueous humour would escape as before, through the wound, or ulcer of the cornea, so that the iris, when replaced, would fall down, the moment afterwards, and project from the cornea, in the same way as before the operation.

It cannot be denied, that the prolapsus of the iris is an afflicting accident: but, when it is remembered, that surgery has no means of suppressing at once, or, at least, of suspending the escape of the aqueous humour through a wound, much less through an ulcer of the cornea, when either exceeds certain limits, the prolapsus of the iris, far from being an evil in such unfavourable circumstances, will be found rather useful, and, perhaps, the only means of preventing the total loss of the organ of sight; for, the flap of the iris insinuates itself, like a plug, between the edges of the wound, or ulcer of the

cornea, and thus completely prevents the exit of the aqueous humour.

In consequence of this fluid being quickly regenerated, and unable to escape any longer through the cornea; it prevents the further protrusion of the iris, removes the rest of this membrane to a greater distance from the cornea, and, by re-establishing the equilibrium between it and the humours of the eye, resists the total loss of sight. If this be evident of itself, it is equally obvious, that every known method, adapted to replace the prolapsus of the iris, must be useless, or dangerous.

In conformity to such principles, there are two principal indications for the surgeon to accomplish, in the treatment of the recent prolapsus of the iris. The first is, to diminish, as speedily as possible, the excess of exquisite sensibility in the protruded part of the iris; the other is gradually to destroy the projecting portion of this membrane, to such a depth, as shall be sufficient to prevent the little tumour from keeping the edges of the wound, or ulcer of the cornea, too much asunder, and, at length, retarding the cicatrization. The adhesion, however, which connects the iris with the inside of the cornea, must not be destroyed.

To fulfil these indications, nothing is more effectual than touching the portion of the iris projecting from the cornea, with the oxygenated muriate of antimony (*butter of antimony*), or with what is more expeditious and convenient, the *argentum nitratum*, so as to form an eschar of such a depth as occasion may require. That this operation may be effected with quickness and precision, it is necessary that an assistant, standing behind the patient's head, should support the upper eyelid with Pellier's elevator; and that the patient, if endued with reason, should keep his eye steadily fixed on one object.

While the assistant gently raises the upper eyelid, the surgeon must depress the lower one, with the index and middle fingers of his left hand; while, with the right, he is to be ready to touch the little prominence formed by the iris, with the *argentum nitratum*, scraped to a point like a crayon. This is to be applied to the centre of the little tumour, until an eschar of sufficient depth is formed. The pain which the patient experiences at this moment, is very acute; but, it subsides as soon as the eye is bathed with warm milk. The caustic, in destroying the projecting portion of the iris, destroys the principal organ of sensibility, by covering it with an eschar, of sufficient depth to protect the part affected from the effect of the friction of the eyelids, and

from coming into contact with the air and tears. This is the precise reason, not only why the sense of pricking and constriction in the eye, of which such patients complain so much, abates after the application of the caustic, but also why the inflammation of the conjunctiva undergoes a considerable diminution, as well as the burning and copious effusion of tears.

As in the case of ulcer of the cornea, these advantages only last while the eschar remains adherent to the little tumour formed by the iris; when it falls off, as it usually does two or three days after the use of the caustic, all the above-mentioned symptoms are rekindled, with this difference, that they are less intense and acute, than they were previously, and the tumour of the iris is not so prominent as it was before the caustic was applied. When these symptoms make their appearance, the surgeon must once more have recourse to the *argentum nitratum*, with the precautions explained above; and he is to employ it a third, and even a fourth time, as occasion may require, until the prominent portion of the iris is sufficiently reduced to a level with the edges of the wound, or ulcer of the cornea, and no obstacle to the granulating process, and complete cicatrization continues.

There is a certain period, (as was stated in the article, *Cornea, Ulcers of*) beyond which the application of caustic to the protruded iris, becomes exceedingly dangerous, though at first it may have been highly beneficial; beyond which, the eschar, which previously soothed the pain, exasperates it, and re-produces the inflammation of the conjunctiva in almost as vehement a degree as in the beginning of the disease. This appears to Scarpa to be the case, whenever the surgeon continues to employ the caustic, after the little tumour of the iris has been destroyed to a level with the external edges of the wound, or ulcer of the cornea, and the application begins to destroy the granulations just as they are originating. Hence, in the treatment of this disease, as soon as the surgeon perceives, that the part of the iris, projecting from the cornea, is sufficiently lowered, and that the application of the *argentum nitratum*, far from allaying, only irritates the disease, he must desist entirely from using the caustic, and be content with introducing between the eye and eyelids, every two hours, a vitriolic collyrium with the mucilage of quince-seeds, or one composed of the sulphate of zinc and white of egg. He is to employ, successively every morning and evening, Janin's oph-

thalmic ointment, qualified with a double, or triple proportion of lard. If the stimulus of such local remedies should not disturb the work of nature, the ulcer is constantly seen to diminish gradually in size, and, in the course of a fortnight, to become covered with a cicatrix.

The adhesion, which the projecting part of the iris contracts to the internal margin of the wound, or ulcer of the cornea, during the treatment, continues the same after the perfection of the external cicatrix, and of course during the rest of the patient's life. Hence, even after the most successful treatment of the prolapsus of the iris, the pupil remains a little inclined towards the place of the cicatrix in the cornea, and of an oval figure. The change in the situation and shape of the pupil causes, however, little or no diminution of the patient's faculty of discerning distinctly the smallest objects; and is much less detrimental to the sight, than one, inexperienced in these matters might conceive; provided the scar on the cornea be not too extensive, nor situated exactly in the centre of this membrane. In the first case, the sight is the less obstructed, as the pupil, which, on the first occurrence of the prolapsus, was narrow, oblong, and drawn considerably towards the wound, or ulcer, gradually enlarges, and forms a less contracted oval. As soon as the wound is completely healed, the pupil tends, in some degree, to occupy its former situation in the centre of the cornea. Richter has, also, noticed this fact.

The mode of treating the prolapsus of the iris here explained, is what Scarpa has found to be the safest, and most effectual of all other methods, that have hitherto been proposed; not excepting that of removing the little tumour, formed by the iris on the surface of the cornea, by a stroke of the scissors.

Certainly, if the success of such a resection were to correspond, in all cases, with the promises, which some surgeons have made, nothing would contribute in a greater degree to expedite the cure of the prolapsus of the iris. But, experience has informed Scarpa, that this resection can only be practised with a hope of success, when the iris has contracted a firm adhesion to the internal edge of the wound, or ulcer of the cornea; and, more especially in that ancient prolapsus of the iris, in which the projecting portion of the iris has become with time almost insensible, hard, and callous, with its base strangulated between the edges of the wound, or ulcer of the cornea, and besides being adherent to them, having also the shape of a slender pedicle. Scarpa adds, he

has seen an incarcerated one fall off of itself.

In such circumstances, the recision of the old prolapsus of the iris is not attended with the least danger; for, after removing with a stroke of the scissors, that prominent portion of the iris, which has already contracted internal adhesions to the ulcerated margin of the cornea, so as to reduce it to a level with the external edges of the ulcer, there is no hazard of renewing the effusion of the aqueous humour, or giving an opportunity for another piece of the iris to be protruded. One, or two applications of the *argentum nitratum* suffice afterwards for the production of granulations on the ulcer of the cornea, and the formation of a cicatrix. But, it is not so, in the treatment of the recent prolapsus of the iris, which has no adhesions to the internal edges of the wound, or ulcer of the cornea.

In four subjects recently affected with prolapsus of the iris, after Scarpa had removed, with a pair of convex-edged scissors, a portion of that membrane projecting beyond the cornea, of about the size of a fly's head, it was with regret that he found on the ensuing day, that a new portion of the iris, not less than the first, had made its way through the ulcer of the cornea, and that the pupil was very much contracted, and drawn considerably further towards the ulcer of the cornea. These circumstances took place, notwithstanding he touched the wound immediately afterwards with the *argentum nitratum*, as well as the edges of the ulcer of the cornea. He has therefore cause to fear, should he ever have occasion to divide such a little tumour again, that it would reappear, and always with an additional protrusion of the iris, and a further distortion of the pupil. Hence, the first lesson has made him content to treat the disease with caustic, in the manner explained above; and all the four subjects in question were successfully cured, excepting that their pupils, in consequence of being drawn too much towards the situation of the ulcer of the cornea, were more covered than they ought to have been, by the cicatrix.

Before concluding this article, we beg the attention of surgeons, to a particular species of prolapsus, much less frequent, indeed, than that of the iris; but, which does occur in practice, and, in Scarpa's opinion, is very improperly termed by modern oculists, "*prolapsus of the tunic of the aqueous humour*." (Janin, Pelliér, Guérin, Gleize, &c.)

This disease consists of a transparent vesicle, filled with an aqueous fluid, and composed of a very delicate membrane,

which projects from the wound, or ulcer of the cornea, much in the same way as the iris does under similar circumstances. Scarpa has several times seen this transparent vesicle full of water, elongating itself beyond the cornea, shortly after the operation for the extraction of the cataract, and sometimes, also, in consequence of an ulcer of the cornea, especially after rescinding a prolapsed portion of the iris.

Oculists are, for the most part, of opinion, that this little transparent tumour consists of the delicate, elastic, diaphanous membrane, which invests the inner surface of the cornea, and is described by Descemet and Demours. "As soon as the membrane lining the cornea (they say) is exposed by the wound, or ulcer of the latter, and the delicate pellicle can no longer resist the impulse of the humours pressing behind it, it is necessitated to yield gradually, to become elongated, and to project from the wound, or ulcer of the cornea, exactly in the form of a pellucid vesicle." But, how remote this theory is from the truth, must be manifest to every one, who reflects at all on the following circumstances: 1. The delicate and elastic pellicle, described by Descemet and Demours, is not separable by any artifice from the inner surface of the cornea, except near where the cornea and sclerotica unite. Since these protruded vesicles make their appearance in practice at every point of the cornea, and even at its very centre, where the above pellicle is certainly neither separable, nor distinct from the compact texture of the cornea; it may at least be asserted, that the tunic or the aqueous humour does not, in every instance, constitute the transparent vesicle in question. 2. It is a well known fact, that this vesicular, pellucid prolapsus happens more frequently after the extraction of the cataract, than on any other occasion. In this case, since the tunic of the aqueous humour has certainly been divided to afford an exit to the crystalline, no one can be of opinion, that the transparent vesicle, which protrudes from the cornea after this operation, ought to be attributed to the distention and protrusion of the tunic of the aqueous humour. 3. If, in cases of ulcers of the cornea, the transparent vesicle should sometimes appear after the recision of the prolapsus of the iris, it is obvious, that if it consisted of the tunic of the aqueous humour, it ought invariably to appear before the prolapsus of the iris. 4. Should the surgeon remove the protruded vesicle to a level with the cornea by a stroke of the scissors, a small quantity of limpid water is seen to ooze

out, at the moment when the incision is made, without any part of the aqueous humour escaping from the anterior chamber. This inconvenience would be inevitable, were the protruded vesicle in question formed by the delicate elastic pellicle, which is said to invest the inner surface of the cornea. Besides, the little transparent tumour disappears when the incision is made; but oftentimes another one, exactly similar to what was cut off, is found in the very same place on the following day. Had the little transparent tumour been composed of the tunic of the aqueous humour, elongated out of the wound, or ulcer of the cornea, it could not at all events have been reproduced at the same part of the cornea.

Actuated by such reflections, it is clear to Scarpa, that the pretended prolapsus, of the tunic of the aqueous humour, is not what it is imagined to be; but, strictly speaking, nothing more than a forcible protrusion of a portion of the vitreous humour, which, from too much pressure being made on the eye, either at the time of the operation, or afterwards, or from a spasm of the muscles of the eye, insinuates itself between the edges of the wound after the extraction of the cataract, and projects in the form of a transparent vesicle. The same thing also happens after ulcers of the cornea, whenever the aqueous humour has escaped, and a portion of the vitreous humour is urged by forcible pressure towards the ulcer facing the pupil; or whenever an elongated piece of the vitreous humour, after the recision of a prolapsed portion of the iris, passes by a shorter route, than through the pupil, between the lips of the ulcer of the cornea. At length, we understand, why in both these instances a transparent vesicle forms, even after the recision of the tunic of the aqueous humour, or ulceration of the cornea; and why it very often reappears in the same place, though it has been cut away to a level with the cornea. It is because one or more cells of the vitreous humour, constituting the transparent vesicle, are succeeded after their removal by other cells of the same humour, which glide between the lips of the wound, or ulcer of the cornea, into the situation of the receding ones.

The treatment of this species of prolapsus consists in removing the transparent vesicle, projecting from the wound, or ulcer, by means of a cutting instrument, and bringing the edges of the wound of the cornea immediately afterwards into perfect apposition, in order that they may unite together as exactly as possible. But, when there is an ulcer

of the cornea, as soon as the vesicle is removed, the sore must be touched with the *argentum nitratum*, so that the eschar may resist any new prolapsus of the vitreous humour, and at the same time dispose the ulcer of the cornea to granulate and heal.

In this kind of prolapsus, what protrudes through the cornea is only a subtile little membrane, filled with water, and quite destitute of sensibility. Its detachment from the rest of the eye, is a matter of trivial importance; while, on the contrary, its presence occasions all the inconveniences of an extraneous substance, that would prevent a wound from uniting, and an ulcer from healing. Hence, the detachment of the protruded vesicle is very justly indicated, and the success of the plan is confirmed by practice; doubtless, because the little transparent tumour can, in general, be expeditiously removed, by a stroke of the curved convex-edged scissors. But if, in some particular cases, the vesicle should not project sufficiently from the wound, or ulcer of the cornea, to be included in the scissors, the same object may be accomplished by puncturing the tumour with a lancet, or couching-needle; for, when the limpid fluid which it contains is discharged, the membrane forming it shrinks within the edges of the wound, or ulcer of the cornea, and no longer hinders the union of the former, or the cicatrization of the latter.

Should the transparent tumour reappear in the same situation, the day after its recision, or puncture, it is right to repeat one of these operations, and to adopt further measures for maintaining the wound of the cornea in contact; or, if it should be an ulcer, the eschar must be made to adhere more deeply to its bottom and sides, so as to form a greater obstacle than before to the escape of the vitreous humour. In such circumstances, the surgeon must take all possible care to obviate such causes as have a tendency to propel the vitreous humour towards the wound, or ulcer, of the cornea; particularly too much pressure on the eyelids, spasms of the muscles of the eye, coughing, sneezing, efforts at stool, and other similar ones; and care must also be taken to check the progress of inflammation.

Pellier's two cases (*Obs. sur l'Œil*, p. 350.) on the treatment of this species of transparent vesicular prolapsus, deserve perusal. To these, if it were requisite, Scarpa says he could add several other similar ones, which have fallen under his own observation, in cases of ulcer of the cornea penetrating the ante-

rior chamber of the aqueous humour, and which were attended with as much success as those related by the French oculist.

The choroid coat is, likewise, not exempt from prolapsus. Scarpa has seen and cured this complaint in M. Bressanini, an apothecary at Bescape. A small abscess, formed between the sclerotica and choroid coats, at the distance of two lines from the union of the cornea with the sclerotica, in the inferior hemisphere of the globe of the eye, in consequence of a severe internal and external ophthalmia, which had been treated, in its incipient state, with repellent remedies. The abscess burst, and discharged a small quantity of thick viscid lymph; then a small blackish body, composed of the choroid coat, presented itself on the outside of the little ulcer of the sclerotica. The treatment consisted in applying the argenti nitratum several times to the projecting portion of the choroides, until it was consumed, and reduced to a lelex with the bottom of the ulcer of the cornea. Then the place healed. The eye remained, however, considerably weakened, and the pupil became afterwards, so much contracted, that it was almost entirely closed. (*Scarpa sulle Principali Malattie degli Occhi. Venezia. 1802.*)

Consult also Richter's *Anfangsgrunde der Wundarzneikunst, Band 3. Von dem Vorfalle der Regenbogenhaut.*

For a description of the manner of dividing the iris, in order to make an artificial pupil, when the natural one is closed, refer to *Pupil, Closure of.*

A wound of the iris is one of the things most to be feared in extracting a cataract. No sooner does any instrument penetrate the eye, than the muscles of this organ usually contract in a spasmodic manner, so as to make great pressure on the part, and to urge forward the cataract and the iris. In this circumstance, we cannot wonder that the latter should now and then be injured by the edge of the instrument. When the iris becomes entangled under the knife, Wenzel asserts, that it may be invariably disengaged without injury, by gently touching the cornea with the finger. Richter justly observes, however, (*Anfangsgr. der Wundarzn*) that this artifice is not unattended with some risk of pressing out the aqueous humour; especially, if the irritation of touching the eye should make it move, or the operator in the least disturb the knife. See *Cataract.*

ISCHURIA. (from *ἰσχω*, to restrain; and *ουρα*, the urine.) A suppression, or stoppage of the urine.

The distinction between a *suppression* and *retention* of urine, is practical and judicious. The former most properly points out a defect in the secretion of the kidneys; the latter, an inability of expelling the urine when secreted. (*Iley*)

The first disease is not very common, is named *ischuria renal*, or *suppression of urine*, and belongs to the province of the physician; the second is an exceedingly frequent disorder, is named *ischuria vesical*, or *retention of urine*, and its treatment is altogether surgical. Every thing relative to it will be found in the articles *Catheter*, and *Urine, Retention of.*

ISSUE signifies an ulcer made designedly by the practitioner, and kept open a certain time, or even the patient's whole life, for the cure, or prevention of a variety of diseases.

The physician, in his practice, has frequent occasion to recommend the making of an issue, and the surgeon finds it a principal means of relief in several important cases, as, for instance, the white swelling, the disease of the hip-joint, caries of the vertebrae, &c. Many persons are never in health, or, at least, fancy themselves always ill, unless they have an issue formed in some part of their body or another. The making of an issue, indeed, is not unfrequently considered as an imitation of nature, who, of her own accord, often forms ulcers and abscesses in various parts of the body (as is not uncommonly conjectured) for the purpose of discharging pernicious humours, whereby people are supposed to be freed from grievous disorders, and have their health preserved. The humoral pathologists were excessively partial to these notions, which, at the present time, will be found by every experienced practitioner to influence the mass of mankind, and render the formation of issues more common, than perhaps is consistent with the better established principles of medical science. Few old subjects will allow a sore of long standing to be dried up (as the expression is), without requiring the surgeon immediately afterwards to make an issue for them. When an ulcer has existed a great length of time, the constitution may possibly become so habituated to it, that the health may really suffer from its being healed. Asthmatic complaints, and severe headaches are frequently observed to follow the cicatrization of an old ulcer; but, whether they would have happened, if an issue had been made in time, is a question difficult of positive determination; for, many persons with old ulcers are not prevented from suffering from asthma, and headach. The plan of making an

issue, however, is commendable both as rational and exempt from danger. Whatever may be the solidity of the theories, which have been offered by medical writers, in regard to issues, the practitioner, who has his eyes open, cannot fail to see the benefit often derived from such means; and if there be any unquestionable facts in medicine and surgery, we may confidently set down amongst them the frequent possibility of relieving one disease by exciting another of a less grievous and more curable nature.

There are two ways of making an issue; one is with a lancet, or scalpel; the other, with caustic.

The place for the issue being fixed upon, the surgeon and his assistant are to pinch up a fold of the integuments, and, with a lancet or knife, make in them an incision of sufficient size to hold a pea, or as many peas as may be thought proper. The pea, or peas are then to be placed in the cut, and covered with a piece of adhesive plaster, a compress, and a bandage. The peas, first inserted, need not be removed for three or four days, when supuration will have begun; but, the issue is afterwards to be cleaned and dressed every day, and have fresh peas put into it. The preceding is the ordinary method of making such issues, as are intended to contain only one or two peas.

When the issue is to be larger, which is generally proper, in cases of diseased vertebræ, white swellings, &c. the best plan is to destroy a portion of the integuments with caustic. The kali purum, blended with quicklime, is mostly preferred for this purpose. The situation and size of the issue having been determined, the surgeon is to take care, that the caustic does not extend its action to the surrounding parts. With this view, he is to take a piece of adhesive plaster, and having cut a hole in it, of the exact shape and size of the issue intended to be made, he is to apply it to the part. Thus the plaster will defend the adjacent skin from the effects of the caustic, while the uncovered portion of integuments, corresponding to the hole in the plaster, is that which is to be destroyed. The caustic is to be taken hold of with a bit of lint, or tow, and, its end, having been a little moistened with water, is to be steadily rubbed upon the part of the skin, where the issue is to be formed. The frictions are to be continued, till the whole surface, intended to be destroyed, assumes a darkish corroded appearance. The caustic matter may now be carefully washed off with some wet tow. The plaster is to be removed, and a linseed poultice applied. As soon as the eschar

is detached, or any part of it is loose enough to be cut away, without pain, or bleeding, the peas are to be inserted and confined in their proper place with a piece of adhesive plaster. Some use beans for the purpose; others beads; which answer very well, and have the advantage of serving for any length of time, when washed and cleaned every day. If the issue is at all of a longitudinal shape, the peas, beans, or beads, may be more easily kept in their places, when strung upon a thread.

Issues ought always to be made, if possible, in a situation, where the peas will not be much disturbed in the ordinary motions of the body, nor interfere with the actions of muscles. The interspaces, between the margins and insertions of muscles, are deemed the most eligible places. Thus, issues in the arms are usually made just at the inferior angle of the deltoid muscle, by the side of the external edge of the biceps. In the lower extremities, issues are often made at the inner side of the thigh, immediately above the knee, in a cavity that may be readily felt there with the fingers. Sometimes, issues are made upon the inside of the leg, just below the knee. For the relief of any affections of the head, or eye, the nape of the neck is commonly selected as a good situation. In caries of the vertebræ, they are made on each side of the spinous processes. In cases of diseased hips, they are formed in a depression just behind and below the trochanter major. When the nature of the disorder does not particularly indicate the situation for the issue, the arm should be preferred to the leg, as issues upon the upper extremities, especially the left arm, are much less annoying, than upon either of the lower limbs.

The great art of keeping an issue open for a long while, consists in maintaining an equal and effectual pressure upon the peas, by which means, they are confined in their places, little depressions are made for them, and the granulations hindered from rising. Compresses of pasteboard and sheet-lead will often be found highly useful. This plan is the surest one of preventing the issue from healing, and the most likely to save the patient all the severe and repeated suffering, which the fresh application of the caustic, or the use of stimulating powders, in order to renew the sore and repress the fungous flesh, unavoidably occasion.

There is a method of making issues with the caustic made in a sort of paste, which is laid upon the part left uncovered by the adhesive plaster. It seems to me to be a more tedious and painful plan, and I do not recommend it.

[Dr. Wistar has contrived a method of forming issues, which is extremely simple and expeditious.—It consists in blistering the skin, and rubbing it for two or three minutes with common caustic.—The caustic acts on the blistered surface with great rapidity.]

It has been suspected, that the pain, caused by the caustic might be lessened, by mixing opium with the application;

but, the idea seems not at all probable; the destruction of a part of the skin must inevitably cause considerable pain, with whatever substance it is produced, and opium itself, so far from being likely to diminish the agony, is itself a violent stimulus, whenever it comes into contact with the exposed extremities of the nerves.

J.

JOINTS, DISEASES OF. The joints are subject to numerous diseases, which are more, or less, alarming, according to their nature. Like all other parts, they are liable to inflammation and abscesses; their capsules frequently become distended with an aqueous secretion, and the disease termed *hydrops articuli*, is produced; but, the most important of all their morbid affections, are, what are called, *white swellings*, and the *disease of the hip-joint*.

WOUNDS OF JOINTS.

Wounds of the large joints, made either by puncture or incision, are of a very dangerous nature, as these parts are surrounded with tendinous and membranous structures, which, though not very sensible in a sound state, yet, when inflamed, become exquisitely sensible, often attended with vehement pain and fever, and sometimes with delirious symptoms. (See *Hunter's Commentaries*, Part I, p. 69.)

Superficial wounds of the joints are often disagreeable cases; but the danger is always increased, when the injury penetrates the capsular ligament. This event may be detected by the introduction of a probe, and often by a discharge of the synovia, which is secreted by glands in the joint to facilitate its motion. But, as a discharge of a similar kind, may proceed from mere wounds of such *bursæ mucosæ*, as lie under the tendons of muscles, in the vicinity of joints, our judgment might be deceived, were we unacquainted with the situation of these little membranous bags. Wounds which penetrate large joints, must be looked upon as much more dangerous, than those, in which only these *bursæ* are opened.

When the large joints, particularly the

knee, are wounded, the stomach is frequently very much affected. I remember being shewn by Mr. Best of Newbury, a man, who, in his occupation as a wheelwright, happened to give himself a wound on one side of the knee: a good deal of inflammation and suppuration ensued; but, what particularly struck me, was the manner in which the man complained of the affection of his stomach.

In speaking of cartilaginous substances in the joints, we shall have occasion to advert again to the danger attendant on wounds of these parts.

INFLAMMATION OF JOINTS.

Idiopathic cases of this kind are not common. The complaint ordinarily originates, in consequence of a contusion, sprain, wound, or some other kind of injury, done to the part affected.

The inflamed joint shews the common symptoms of inflammation; viz. preternatural redness, increased heat, throbbing, pain, and swelling, while the constitution is also disturbed by the usual symptoms of the inflammatory fever. It is highly deserving notice, however, that in these cases, such symptoms are often exceedingly severe, and the pulse is more frequent, and less full and strong, than when parts, more disposed to return to a state of health, are affected. The inflammation first attacks some part of the capsular ligaments, and very quickly diffuses itself universally over their whole extent, as usually happens in all inflammations of smooth membranes.

The capsules of the joints are naturally not very sensible; but, like many other parts similarly circumstanced, they become acutely painful, when inflamed. The complaint is accompanied with an in-

creased secretion of the synovia, which becomes of a more aqueous, and of a less albuminous quality, than it is in the healthy state. Hence, this fluid is not so well calculated for lubricating the particular surfaces, and preventing the effects of friction, as it is in the natural condition of the joint. This circumstance may explain, why a grating sensation is often perceived on moving the patella, when the knee is inflamed.

The capsular ligaments, like other parts, are frequently thickened by inflammation, and, sometimes, coagulating lymph, being effused on their internal surfaces, organized cartilaginous, or osseous bodies, are formed in their cavities.

When the inflammation attains a higher pitch, an abscess may occur in the capsular ligament. This part at length ulcerates, and the pus makes its way beneath the skin, and is sooner, or later, discharged through ulcerated openings.

An abscess rarely takes place in an important articulation, in consequence of acute inflammation, without the system being, also, so deranged, that life itself is imminently endangered. In the violent stage of the inflammation, just before the abscess forms, very severe symptoms of inflammatory fever afflict the patient, and, occasionally, delirium and coma taking place, death itself ensues.

In these cases, the inflammatory fever is very quickly converted into the hectic; indeed, when the abscess has taken place in a large joint, in consequence of acute inflammation, hectic symptoms almost immediately begin to shew themselves, and the strong actions of the common inflammatory fever suddenly subside.

Local consequences, even worse than those above described, may follow inflammation of a joint. As the layer of the capsular ligament, reflected over the cartilages of the articulation is often inflamed, the cartilages themselves are very apt to have the inflammation communicated to them. Parts partaking of a cartilaginous structure, being very incapable of bearing the irritation of disease, often ulcerate, or, in other words, are absorbed, so as to leave a portion, or, the whole, of the articular surface of the bones, completely denuded of its natural covering. At length, the heads of the bones themselves inflame, and become carious; or the consequence may be an anchylosis.

Sometimes, only such parts, as are exterior to the capsular ligament, are affected, and, in this case, the symptoms are never so severe, (*Russell on the Knee*, p. 60.) nor so obstinate, as when the com-

plaint interests the capsular ligament, and parts contained in it. Even when an abscess takes place on the outside of the capsular ligament, the case cannot be considered as dangerous, provided the cavity of the joint be not involved in the inflammatory attack. Every inflammation of a large joint may be deemed a case of considerable importance. I do not mean to assert, that cases, in which the inflammation is mild in degree, and simple in its nature, are dangerous; no—I only wish to inculcate, that though the inflammation be originally genuine, it is always very likely to be converted into one of a specific nature, whenever there is a tendency in the system to scrofulous disorder. A person, whose constitution is scrofulous, may sometimes continue, during life, exempt from any local disease of this specific nature, provided he be fortunate enough to avoid all irritation of parts, on which scrofula is most particularly disposed to make its attack.

Among such parts we must class the joints, especially the knee, hip, elbow, and ankle. Hence, when a joint is inflamed, how mild soever the affection may be, we ought never to forget, that, when there is a tendency to scrofula in the system, the original case of simple inflammation is very apt to be the exciting cause of the white swelling, one of the most severe and intractable diseases, which increase the catalogue of human miseries.

Hence, the curative means should be most rigorously put in execution, not merely on account of an abstract view of the present state of the case; but, also, on account of the opportunity, which is now afforded for a terrible disease to arise, which often remains previously dormant.

It will considerably shorten what we have to say concerning the treatment of inflamed joints, to observe, that the antiphlogistic plan, in the full sense of the expression, is to be strictly adopted. But, as there is a variety of means, often adapted to the same purpose, it seems necessary to offer a few remarks on those, which lay the greatest claim to our commendations. The treatment of an inflamed knee will serve to illustrate that of all other large joints.

There are few other surgical cases, in which general, and, especially topical bleeding is more strongly indicated.

The violence of the inflammation, and the strength, age, and pulse of the patient, must determine, with regard to the use of the lancet; but, the topical application of leeches may be said to be invariably proper. When the leeches fall off,

the bleeding is to be promoted by fomenting the part. The surgeon should daily persist in this practice, until the acute stage of the inflammation has subsided. But, in conjunction with this treatment, we are to keep the joint continually surrounded with linen wet with the saturnine lotion.

In a few instances, however, the patient seems to derive more ease and benefit from the employment of fomentations and emollient poultices, and the feelings of the afflicted should always be consulted; for, if the pain be materially alleviated by this, or that application, its employment will hardly ever be wrong.

Nothing more need be said, concerning the rest of the treatment, proper during the vehemence of the inflammation, as the duty of the surgeon is not materially different from what it is in other inflammatory cases.

As soon as the acute stage of the affection has subsided, the grand object is to remove the effects, which have been left. These are a thickened state of the capsular ligament, and parts surrounding the articulations; a stiffness of the joint, and pain, when it is moved; a collection of fluid in the capsule, &c. This state of the complaint, when neglected, and there is a tendency to scrofula, may prove exceedingly obstinate; and even terminate in an irremediable, specific distemper of the joint.

When this second stage of the disorder seems tardy in going off, the application of a blister is proper, and it should be kept open for a few days, by means of the savin cerate.

In other cases, in which the inflammation has been more trivial, and the effects, which it has left, are slight; lotions, composed of vinegar and sal-ammoniac, suffice for the removal of the chronic complaints, continuing after the abatement of the acute stage of the disorder.

The severity of the constitutional symptoms is mostly, if not always, greater, when the inflammation of a large joint arises from a wound, than when it is the consequence of a bruise, or sprain. (See *Treatise on the Diseases of the Joints*, 1807.)

LOOSE CARTILAGES IN JOINTS.

The existence of extraneous bodies in the articulations is by no means a rare occurrence, though unknown to the ancients.

Pare is the first who speaks of this disorder: he says, that a *hard, polished, white body, of the size of an almond*, was discharged from the knee of a patient, in

the year 1558, in which he had made an incision for an *aqueous aposteme*, (without doubt an *hydrops articuli*.) *Liv. 25, chap. 15.*

One of these extraneous bodies was found on dissection in a knee-joint, by Dr. Alexander Monro. Mr. Simpson extracted one of these some years afterwards, which at first he did not suppose was in the cavity of the articulation, notwithstanding its mobility, and the pain it occasioned. (*Edinb. Med. Essays.*) Since these periods, examples have been multiplied of this disease.

Such detached and moveable cartilages are not peculiar to the joint of the knee, they occasionally occur in other joints of the body; but they are most frequently met with in the knee, and it is in that joint that they produce symptoms which render them the object of a surgical operation. Morgagni has seen them in the ankle; Haller in the joint of the jaw; and Hey in the elbow.

These substances, in their structure, are, as Mr. Home remarks, analagous to bone; but, in their external appearance, bear a greater resemblance to cartilage. They are not, however, always exactly of the same structure, being in some instances softer, than in others. Their external surface is smooth and polished, which, being lubricated by the synovia, allows them to be moved readily from one part of the joint to another; seldom remaining long at rest, while the limb is in motion; when they happen to be in such situations as to be pressed upon with force by the different parts of the joint, they occasion considerable pain, and materially interfere with its necessary motions.

The circumstance of their being loose, and having no remains of a visible attachment, made it difficult to form conjectures respecting their formation; and according to Mr. Home, no satisfactory account of their origin had been given, till Mr. Hunter's observations threw light upon the subject. The circumstances, which led him to the investigation of this subject, appear at first sight so foreign to the purpose, that they require some explanation.

In the course of his experiments and observations, instituted with a view to establish a living principle in the blood, Mr. Hunter was naturally induced to attend to the phenomena, which took place, when that fluid was extravasated, whether in consequence of accidental violence, or other circumstances. The first change which took place he found to be coagulation; and the coagulum thus formed, if in contact with living parts,

did not produce an irritation similar to extraneous matter, nor was it absorbed and taken back into the constitution, but, in many instances, preserved its living principle, and became vascular, receiving branches from the neighbouring blood-vessels for its support; it afterwards underwent changes, rendering it similar to the parts to which it was attached, and which supplied it with nourishment.

In attending to cases of this kind, he found that where a coagulum adhered to a surface, which varied its position, adapting it to the motions of some other part; the attachment was necessarily diminished by the friction, rendering it in some instances pendulous; and in others breaking it off entirely.

Hence it was easy to explain the mode in which those pendulous bodies are formed, which are sometimes attached to the inside of circumscribed cavities, and the principle being established, it became equally easy for Mr. Hunter to apply it under other circumstances, since it is evident from a known law in the animal economy, that extravasated blood, when rendered an organized part of the body, can assume the nature of the parts into which it is effused, and consequently, the same coagulum which in another situation might form a soft tumour, would when situated on a bone, or in the neighbourhood of bone, often form a hard one. The cartilages found in the knee-joint, therefore, appeared to him to originate from a deposit of coagulated blood upon the end of one of the bones, which had acquired the nature of cartilage, and had afterwards been separated. This opinion was further confirmed by the examination of joints which had been violently strained, or otherwise injured, where the patients had died at different periods after the accident. In some of these there were small projecting parts, preternaturally formed, as hard as cartilage, and so situated, as to be readily knocked off by any sudden, or violent motion of the joint. (*Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Vol. 1.*)

One or more of these preternatural bodies may be formed in the same joint. Mr. Home mentions one instance in which there were three; they are commonly about the size of a horse-bean, often much smaller, and sometimes considerably larger; when very large, they do not give so much trouble to the patient as the smaller kind. A soldier in the 56th regiment has one nearly as big as the patella, which occasions little uneasiness, being too large to insinuate itself into the

moving parts of the joint. Morgagni has seen twenty-five in one joint.

If we except making an incision into the joint, for the purpose of extracting the cartilaginous tumours, we are not acquainted with any certain means of freeing a patient from the inconvenience of this complaint. To this plan, the danger attendant on all wounds of so large an articulation as the knee, is a very serious objection. Middleton and Goopb endeavoured to conduct the extraneous body into a situation, where it produced no pain, and to retain it in that position, a long time, by bandages, under the idea, that the cartilaginous substance would adhere to the contiguous parts, and occasion no future trouble. Some will be inclined to think, that no positive conclusion ought to be drawn from the cases brought forward by these gentlemen, because they had no opportunity of seeing their patients again at the end of a reasonable length of time, and we know, that loose cartilages in the joints, sometimes disappear for half a year, and then make their appearance again. Yet, perhaps, the very circumstance of the patients not applying again, may appear to many to justify the inference, that sufficient relief had been obtained.

Mr. Hey, impressed with a just sense of the dangerous symptoms, which have occasionally resulted from the most simple wounds penetrating the knee-joint, very laudably tried the efficacy of a laced knee-cap, and the cases, which he has adduced, clearly demonstrate, that the benefit, thus obtained, is not temporary, at least, as long as the patient continues to wear the bandage. In one case, the method had been tried for ten years, with all the success, which the patient could desire.

Contemplating the evidence, which we have upon this point, and the perilous symptoms, sometimes following wounds of the knee-joint, I am decidedly of opinion, that the effect of a knee-cap, or of a roller and compress, applied over the loose cartilage, when this body is so situated as not to create pain, and to admit of being compressed, ought generally to be tried, before having recourse to excision. I say generally, because the conduct of the surgeon ought, in such cases, to be adapted to the condition, and inclination of the patient. If a man be deprived of his livelihood by not being able to use his knee; if he cannot, or will not take the trouble of wearing a bandage; if he be urgently desirous of running the risk of the operation after things have been impartially explained to him; if a bandage should not be productive of suf-

ficient relief; and, lastly, if excessive pain, severe inflammation of the joint, and lameness, should frequently be produced by the complaint; I think it is the duty of a surgeon to operate. It is very certain, that success has generally attended the operation; but small as the chance is of losing the limb, and even life, in the attempt to get rid of the disease; yet, since the inconveniences of the complaint are, in most cases, very bearable, and are even capable of palliation by means of a bandage, endangering the limb and life in any degree, must seem to many persons contrary to the dictates of prudence. I am ready to allow, with M. Brochier, that the danger, attendant on wounds of the large joints, has always been exaggerated in consequence of ancient prejudices. (*Desault's Journal*, Vol. 2.) But, making every allowance for the influence of prejudice, a man must be very sceptical indeed, who does not consider the wound of so large a joint as the knee, attended with real cause for the apprehension of danger. See Case 2, in my *Treatise on the Diseases of the Joints*. At the end of Mr. Ford's case, (*Med. Obs. and Inquiries*, Vol. 5.) we read on the subject of cutting loose cartilages out of the knee: "The society have been informed of several cases, in which the operation has been performed; some, like this, have healed up, without any trouble; others have been followed with violent inflammation, fever, and death itself."

As the disorder is often attended with a degree of heat and tenderness in the articulation; as the danger of the operation is, in a great measure, proportioned to the subsequent inflammation; and, as much of the danger is at once removed, if the wound unite by the first intention: the advice, to keep the patient in bed, a few days before operating, to apply leeches, and cold saturnine lotions to the knee during the same time, and to exhibit beforehand a saline purgative, is highly prudent.

I shall next introduce an account of the plan of operating, as described by several of the best modern surgeons.

"As these loose bodies cannot always be found, no time can be fixed for the operation; but the patient, who will soon become familiar with his own complaint, must arrest them when in a favourable situation, and retain them there till the surgeon can be sent for.

"Before the operation, the limb should be extended upon a table in an horizontal position, and secured by means of assistants: the loose cartilages are to be pushed into the upper part of the joint above the patella, and then to one side; the

inner side is to be preferred, as in that situation only the vastus internus muscle will be divided in the operation. Should there be several of these bodies, they must be all secured, or the operation should be postponed till some more favourable opportunity, since the leaving of one will subject the patient to the repetition of an operation, not only painful, but attended with some degree of danger.

"The loose bodies are to be secured in the situation above-mentioned by an assistant, a task not easily performed while they are cut upon, from their being lubricated by the synovia; and if allowed to escape into the general cavity, they may not readily, if at all, be brought back into the same situation.

"The operation consists in making an incision upon the loose cartilage, which it will be best to do in the direction of the thigh, as the wound will more readily be healed by the first intention. If the skin is drawn to one side, previously to making the incision, the wound through the parts underneath will not correspond with that made in the skin, which circumstance will favour their union. The incision upon the cartilage must be made with caution, as it will with difficulty be retained in its situation if much force is applied. The assistant is to endeavour to push the loose body through the opening, which must be made sufficiently large for that purpose; but as this cannot always be done, the broad end of an eyed probe may be passed under it, so as to lift it out, or a sharp-pointed instrument may be stuck into it, which will fix it to its situation, and bring it more within the management of the surgeon.

"The cartilages being all extracted, the cut edges of the wound are to be brought together, and, by means of a compress of lint, not only pressed close to one another, but also to the parts underneath, in which situation they are to be retained by sticking plaster, and the uniting bandage.

"As union by the first intention is of the utmost consequence after this operation, to prevent an inflammation of the joint, the patient should remain in bed with the leg extended, till the wound is perfectly united, or at least all chance of inflammation at an end." (*Home, in Med. and Chir. Transactions*, Vol. 1, p. 239, &c.)

In one instance, Desault proceeded in the following manner: the surgeon, after relaxing the capsular ligament by extending the leg, brought the extraneous body on the inside of the articulation against the attachment of the capsular ligament, and secured it in this situation, between the index finger and thumb.

the left hand, whilst an assistant drew the integuments forwards towards the patella. All the parts that covered this extraneous body were now divided by a longitudinal incision, one inch in length, and its extraction accomplished by pushing it from above downwards, and raising it inferiorly with the end of the knife. This substance, on examination, was found similar in colour to the cartilages that cover the articular surfaces: it was three quarters of an inch in length, six lines and an half in width, and three lines in thickness; its surfaces were smooth, one concave and the other convex; its circumference irregular, disseminated with red points, forming small depressions; the inside was ossified, the outside of a cartilaginous texture. As soon as the substance was extracted, the assistant let go the integuments which he had drawn forwards; they consequently returned to their natural situation, on the inner side of the knee-joint, in such a manner, that the external wound in the integuments was situated more inwards than the one in the capsular ligament. Two advantages were procured by this means: on the one hand, air was prevented from penetrating into the articulation; and on the other, the floating portion of capsular ligament, retained inwards by the skin, was more likely to attach itself to the condyle, in case it did not unite to the other portion of the capsule divided near its attachment. The edges of the wound were brought in contact by means of a uniting bandage; dry lint and compresses were applied, and retained on the part by a slight bandage; the limb was kept in a state of extension. (*Desault's Plan, as described by Brothier in Desault's Journal, Tom. 2.*)

The inner surface of the internal condyle of the os femoris presents an extensive and nearly plain surface, which terminates in front and at its upper part by an edge which forms a portion of a circle. If the points of the finger be firmly pressed upon this edge so as to form a kind of line of circumvallation round these (cartilaginous) bodies, they cannot pass into the joint in this direction, nor can they recede in any other, on account of the tense state of the internal lateral ligament. Here these substances are near the surface, and may be distinctly felt; and there is nothing to be divided in order to expose them, but the integuments, fascia, and the capsule of the joint.

In an interesting case, which Mr. Abernethy relates, he observes: "The operation was done in the following manner. Sir Charles Blicke, who assisted me,

pressed the integuments of the knee, gently towards the internal condyle, and then applied his fingers in the manner I have described, round the circular edge of the bone. I also drew the integuments gently towards the inner ham-string, and divided them longitudinally, immediately over the loose substance, to the extent of an inch and an half. This withdrawing of the integuments from their natural situation was designed to prevent a direct correspondence in the situation of the external wound, and that of the capsule of the joint; for when the integuments were suffered to regain their natural position, the wound in them was nearer to the patella, than the wound which was made in the capsule. The fascia which covers the joint being exposed by the division of the integuments, it was divided in a similar direction, and nearly to the same extent. The capsule was now laid bare, and I gently divided it to the extent of half an inch, where it covered one of the hard substances, which suddenly slipped through the opening, and by pressing gently upon the other, it also came through at the same part. The bodies which were thus removed, were about three quarters of an inch in length, and half an inch in breadth. They had a highly polished surface, and were hard like cartilage. The fluid contained in the joint was pressed towards the wound, and about two ounces of synovia were discharged. I then drew the wound of the integuments gently towards the patella, pressed the two sides together, and closed it accurately with sticking plaster, enjoining the patient to keep the limb as free from motion as possible." (*Surgical Observations, 1804.*)

On the preceding subject some observations have been lately published by M. Larrey. (See *Mémoires de Chirurgie Militaire, tom. 2, p. 421, &c.*) With the exception of a few wrong theories, he appears to have given a very fair account of the disease.

HYDROPS ARTICULI.

This signifies a collection of serous fluid in the capsular ligament of a joint. The complaint is attended with more or less swelling, and a fluctuation, but, there is, in general, but little pain. The affection is sometimes situated in the bursæ mucosæ. The knee is more subject, than other joints, to dropsical disease. The complaint is frequently preceded by severe rheumatic affections, and a local injury of the part. When the fluid is not so copious as to produce very great distention of the capsule, a fluctuation is easily distinguish-

able. Also, if the limb be extended, so as to relax the ligament of the patella, pressing the collection of fluid causes a rising of that bone, and a fulness on each side of it. The disease, though unattended with much pain, produces a degree of rigidity in the joint.

Mr. Russell has adopted the opinion, that some cases of this kind are venereal, and others scrophulous; but, he has not supported the doctrine on any solid foundation. Hydrops articuli sometimes follows fevers.

The cure of the above described dropsical affection of the joints, depends upon the absorption of the effused fluid. Such absorption is sometimes altogether spontaneous, and the event may always be excited, and promoted, by mere friction, by rubbing the joint with camphorated mercurial ointment, by repeatedly applying leeches, and particularly, by the employment of a perpetual blister.

The operation of a blister may always be very materially assisted by a bandage, applied with moderate tightness. Among other effectual means of cure, we may enumerate frictions with flannel impregnated with the fumes of vinegar; electricity; and the exhibition of mercurial medicines to open the bowels. When hydrops articuli occurs during the debility, consequent to typhoid, and other fevers, the complaint can hardly be expected to get well before the patient has regained some degree of strength.

Circumstances do not often justify making an opening into the joint; but, excessive distention, in some neglected cases, might certainly be an urgent reason for performing such an operation. Also, if the complaint should resist all other plans of treatment, and the irritation of the tumour greatly impair a weak constitution, the practice would be justifiable. An interesting example of this kind is related by Mr. Latta. (*System of Surgery, Vol. 2. p. 490.*)

It is best to make the opening in such a way, that the wound in the capsular ligament after the operation, will not remain directly opposite the wound in the skin. For this purpose, the integuments are to be pushed to one side, before the surgeon makes an incision through them. (*Encyclopédie Méthod. Part. Chir. Art. Hydro-pisie des Jointures.*)

COLLECTIONS OF BLOOD IN JOINTS.

Most systematic writers speak of this kind of case, though it is certainly a very uncommon one. Tumours, about the joints, composed of blood, and set down in numerous surgical works, as extravasa-

tions within the capsular ligament, are generally on the outside of them.

Certainly, were a collection of fluid to take place in a joint very suddenly, after a sprain, or contusion, and to continue to increase gradually, for some time afterwards, there would be reason for believing, that most of the contents of the tumour was blood. The production of an abscess, and the secretion of any fluid, would have required a longer time.

Were blood known to be undoubtedly effused in a large articulation, no man would be justified in making an opening for its discharge. No bad symptoms are likely to result from its mere presence, and the absorbents will, in the end, take it away. Should an incision be made into the joint, the coagulated state of the extravasated blood would frequently not allow such blood to be discharged.

The best plan is to apply discutient remedies; a lotion of vinegar and sal ammoniac is the best application for the first three or four days, and, afterwards frictions with camphorated liniments may be safely had recourse to.

Mr. Hey has related a case, in which the knee-joint was wounded, and blood insinuated itself into the capsular ligament; yet, though the occurrence could not be hindered, no harm resulted from the extravasation which was absorbed, without having created the smallest inconvenience. (*Practical Observations in Surgery, p. 354.*)

WHITE SWELLING.

The white swelling, or spina ventosa, as it is not unfrequently called, in imitation of the Arabian writers, Rhazes and Avicenna, is in this country, a peculiarly common, and an exceedingly terrible disease. As I have stated in my *Treatise on the Diseases of the Joints*, the people of the continent are, unquestionably, as subject as we are to chronic enlargements of the knee-joint. Foreign surgeons describe numerous varieties of a disease, which many English writers would term, *rheumatic white swellings*, but they acknowledge, that the scrophulous species of this disorder does not commonly occur to their notice. (*Kortum de Vitio Scrophuloso, Vol. 2. p. 333. Brambilla in Acta Acad. Med. Chir. Vindobonensis, Vol. 1. p. 20. Petit sur les Maladies des Os, Vol. 2. p. 359. Edit. 1749.*)

Wiseman was the first who used the term White-Swelling; and the expression is not very unapt, because it conveys an idea of one mark of the distemper, which is, that notwithstanding the increase of

size in the joint, the skin is not inflamed, but retains its natural colour. (*Pott.*)

The varieties of white-swellings are very numerous, and might usefully receive particular appellations. Systematic writers have generally been content with a distinction into two kinds, viz. *rheumatic*, and *scrophulous*.

The last species of the disease they also distinguish into such tumours as primarily affect the bones, and then the ligaments and soft parts; and into other cases in which the ligaments and soft parts become diseased, before there is any morbid affection of the bones.

These divisions of the subject appear hardly comprehensive enough and the propriety of using the term, *rheumatic*, seems very questionable.

Sometimes the bones, ligaments, and cartilages, are hardly at all diseased. The whole disease of the joint appears to arise from an extravasation of glutinous lymph, which is intimately adherent to the most subtle layers of the cellular substance, and to the surface of the tendons, ligaments, and capsule of the articulation. This distemper has been named by Brambilla, *Fungus Articulationis*. *Acta Acad. Medico-Chirurg. Vindob.* p. 1.

Sometimes, the bones are not in the least diseased, though the ligaments and cartilages are much altered, the joint is immensely enlarged, and the severity of the disease has even rendered amputation indispensable.

Sometimes, the ligaments, cartilages, and bones are not the parts, which are chiefly distempered. In the instances, alluded to, the articulation is greatly increased in size, but, most of the swelling originates from a diseased state of the parts on the outside of the capsular ligament. The disease does not consist of a thick kind of lymph, diffused throughout the structure of the parts on the outside of the joint; but, of a morbid change, in which such parts become at once enlarged, thickened, and bereft of all their original firmness. Very frequently, the texture of the heads of the bones is softened, the ligaments are distempered, the cartilages absorbed, and the bones carious.

Sometimes, the surface of the diseased bones are rendered rough and irregular by the secretion of a kind of substance like spermaceti in appearance, but, containing a proportion of phosphate of lime.

It has been too commonly inculcated, that the bones are always carious in this disease. But, as I have explained, caries only comes on in an advanced stage of the malady. The idea of there being invariably a carious affection of the bones led the old surgeons into the most unwarrant-

able practices, with a view of promoting the process of exfoliation.

In numerous cases, in which the articulation is considerably enlarged, the heads of the bones are entirely free from distemper. Mr. Russell has noticed how much the soft parts frequently contribute to the swelling. He describes the appearances on dissection thus: "The great mass of the swelling appears to arise from an affection of the parts, exterior to the cavity of the joint, and which, besides an enlargement in size, seem also to have undergone a material change in structure. There is a larger, than natural, proportion of a viscid fluid, intermixed with the cellular substance; and the cellular substance itself has become thicker, softer, and of a less firm consistence, than in a state of health." (*On the Morbid Affections of the Knee*, p. 30.)

We may infer from what Mr. Russell states, that he is inclined to believe, that the disease always begins in the ligaments and membranes of the articulation, and he even asserts, that *he had never heard nor known of an instance, in which the tibia was enlarged from an attack of white swelling*. P. 37. It is still a very prevailing notion, that, in white swellings, the heads of the bones are preternaturally enlarged.

Deceived by the feel of many diseased joints, and influenced by general opinion, I once imbibed the idea, that there is very frequently a regular expansion of the heads of scrophulous bones. But, excepting an occasional enlargement, which arises from spiculæ of bony matter, deposited on the outside of the tibia, ulna, &c. and which alteration cannot be called an expansion of those bones, I have never been an eye-witness of the head of a bone being of preternaturally large dimensions, in consequence of the disease known by the name of white swelling. I have often been in the habit of inspecting the state of the numerous diseased joints, which are every year amputated at St. Bartholomew's Hospital, and though I have long been attentive to this point, my searches after a really enlarged scrophulous bone have always been in vain. The change, which the head of the tibia undergoes in many cases, is first a partial absorption of the phosphate of lime throughout its texture, while a soft kind of matter seems to be secreted into its substance. In a more advanced stage, and, indeed, in that stage, which most frequently takes place before a joint is amputated, the head of the bone has deep excavations in consequence of caries, and its structure is now so softened, that when an instrument is pushed against the carious part, it easily penetrates deeply into the bone.

A cursory examination of a diseased joint, even when it is cut open, will not suffice to shew, that the heads of the bones have not acquired an increase of size. In making a dissection of this kind, in the presence of a medical friend, I found, that, even after the joint had been opened, the swelling had every appearance of arising from an actual expansion of the bones. The gentleman with me felt the ends of the bones after the integuments had been removed, and he coincided with me, that the feel, which was even now communicated, seemed to be caused by a swelling of the bones themselves. But, on cleaning them, the enlargement was demonstrated to arise entirely from a thickening of the soft parts. I am glad to find, that Mr. Crowther is among those, who now disbelieve in the doctrine of expanded scrophulous bones. (See *Practical Observations on White Swelling, &c.* Edit. 2. p. 14. 1808.)

The soft parts undergo a material change; they are both thickened and softened, and there is a large quantity of a viscid fluid, intermixed with the cellular substance. In short, the whole texture of the cellular membrane becomes thicker and softer, than in the healthy state.

In the cavity of the joint, we sometimes find a quantity of curdy matter, and the cartilages absorbed in various places, but, more particularly round the edges of the articular surfaces.

The knee, ankle, wrist, and elbow, are the joints most subject to white swellings. As the name of the disease implies, the skin is not at all altered in colour. In some instances the swelling yields in a certain degree to pressure; but it never pits, and is almost always sufficiently firm to make an uninformed examiner believe, that the bones contribute to the tumour. The pain is sometimes vehement from the very first; in other instances there is hardly the least pain in the beginning of the disease. In the majority of scrophulous white-swellings, let the pain be trivial, or violent, it is particularly situated in one part of the joint; viz. either the centre of the articulation, or the head of the tibia. Sometimes, the pain continues without interruption; sometimes there are intermissions; and, in other instances, the pain recurs at regular times, so as to have been called by some writers, periodical. Almost all authors describe the patient, as suffering more uneasiness in the diseased part, when he is warm, and, particularly, when he is in this condition in bed.

At the commencement of the disease in the majority of instances, the swelling is very inconsiderable, or there is even no visible enlargement whatever. In the little

depressions, naturally seated on each side of the patella, a fulness first shews itself, and gradually spreads all over the affected joint.

The patient, unable to bear the weight of his body on the disordered joint, in consequence of the great increase of pain, thus created, gets into the habit of only touching the ground with his toes, and the knee being generally kept a little bent in this manner, soon loses the capacity of becoming completely extended again. When white swellings have lasted a good while, the knee is almost always found in a permanent state of flexion. In scrophulous cases of this kind, pain constantly precedes any appearance of swelling; but the interval between the two symptoms differs very much in different subjects.

The morbid joint, in the course of time, acquires a vast magnitude. Still the integuments retain their natural colour, and remain unaffected. The enlargement of the articulation, however, always seems greater than it really is, in consequence of the emaciation of the limb both above and below the disease.

An appearance of blue distended veins, and a shining smoothness, are the only alterations to be noticed in the skin covering the enlarged joint. The shining smoothness seems attributable to the distention, which obliterates the natural furrows and wrinkles of the cutis. When the joint is thus swollen, the integuments cannot be pinched up into a fold, as they could in the state of health, and even in the beginning of the disease.

As the distemper of the articulation advances, collections of matter form around the part, and at length burst. The ulcerated openings sometimes heal up; but, such abscesses are generally followed by other collections, which pursue the same course. In some cases, these abscesses form a few months after the first affection of the joint; on other occasions, several years elapse, and no suppuration of this kind makes its appearance.

Such terrible local mischief must necessarily produce constitutional disturbance. The patient's health becomes gradually impaired, he loses both his appetite and natural rest and sleep; his pulse is small and frequent; an obstinate debilitating diarrhoea, and profuse nocturnal sweats, ensue. Such complaints are, sooner or later, followed by dissolution, unless the constitution be relieved in time, either by the amendment, or removal of the diseased part. In different patients, however, the course of the disease, and its effects upon the system, vary very much in relation to the rapidity with which they occur.

Rheumatic White-Swellings are very distinct diseases from the scrophulous distemper of the large joints. In the first, the pain is said never to occur without being attended with swelling. Scrophulous white-swellings, on the other hand, are always preceded by a pain, which is particularly confined to one point of the articulation. In rheumatic cases, the pain is more general, and diffused over the whole joint.

It seems probable, that all cases, in which the structure of the bones is found quite undiseased, and in which all the mass of disease seems to be confined to the soft parts, are not scrophulous white-swellings. Few persons, who have attained the age of five and twenty, without having had the least symptom of scrophula, ever experience, after this period of life, a first attack of the white-swelling of the strumous kind. All cases, in which the internal structure of the heads of the bones becomes softened, are probably scrophulous.

Mr. Russell has noticed the frequent enlargement of the lymphatic glands in the groin, in consequence of the irritation of the disease when in the knee; but, he justly adds, that this secondary affection never proves long troublesome.

When the bones are diseased, the head of the tibia always suffers more than the condyles of the thigh bone. (*Russell.*) The articular surface of the femur sometimes has not a single rough or carious point, notwithstanding that of the tibia may have suffered a great deal. The cartilaginous coverings of the heads of the bones are generally eroded first at their edges; and, in the knee, the cartilage of the tibia is always more affected than that covering the condyles of the thigh bone. Indeed, when white-swellings have their origin in the bones, and the knee is the seat of the disorder, there is some ground for supposing, that it is in the tibia, that the morbid mischief first commences.

The ligaments of the knee are occasionally so much weakened, or destroyed, by this terrible malady, that the tibia and fibula become, more or less, dislocated backward, and drawn towards the tuberosity of the ischium, by the powerful action of the flexor muscles of the leg.

I have seen a curious species of white-swelling, in which the leg could be bent to each side in a very considerable distance, both when the knee was extended and bent. Such a state implies a preternatural looseness of the ligaments of the articulation.

With respect to the particular causes of all such white-swellings, as come within the class of rheumatic ones, little is known.

External irritation, either by exposure to damp or cold, or by the application of violence, is often concerned in bringing on the disease; but, very frequently, no cause of this kind can be assigned for the complaint. As for scrophulous white-swellings, there can be no doubt, that they are under the influence of a particular kind of constitution, termed a *scrophulous* or *strumous habit*. In this sort of temperament, every cause capable of exciting inflammation, or any morbid and irritable state of a large joint, may bring on such disorder as may end in the severe disease of which we are now speaking.

In a man of a sound constitution, an irritation of the kind alluded to, might only induce common healthy inflammation of the affected joint.

In scrophulous habits, it also seems probable, that the irritation of a joint is much more easily produced than in other constitutions; and no one can doubt, that when once excited in the former class of subjects, it is much more dangerous, and difficult of removal, than in other patients.

The doctrine of particular white-swellings being scrophulous diseases, is supported by many weighty reasons, the opinions of the most accurate observers, and the evidence of daily experience. Wiseman (*Book 4, chap. 4.*) calls the *spina ventosa* a species of scrophula, and tells us, that infants and children are generally the subjects of this disease. The disorder is said by Severinus to be exceedingly frequent in young subjects. Petrus de Marchettis has observed both male and female subjects affected with what are called strumous diseases of the joints, as late as the age of five and twenty; but not afterwards, unless they had suffered from scrophula before that period of life, and had not been completely cured. R. Lowerus also maintains a similar opinion. Even though a few persons may have scrophulous diseases of the joints, for the first time, after the age of twenty-five, this occurrence, like the first attack of scrophula after this period, must be considered as extremely uncommon.

Another argument, in favour of the doctrine, which sets down particular kinds of white-swellings as scrophulous, is founded on the hereditary nature of such forms of disease.

Numerous continental surgeons, particularly Petit and Brambilla, have noticed how very subject the English are both to scrophula and white-swellings of the joints. We every day see, that young persons afflicted with the present disease, are generally manifestly scrophulous, or have once been so. Very often enlarged lym-

phatic glands in the neck denote this fatal peculiarity of constitution; very often the patients are known to have descended from parents who had strumous disorders. (Crowther.)

Besides the general emblems of a scrophulous constitution, which we shall notice in the article *Scrophula*, we may often observe a shining, coagulated, flaky substance, like white of egg, blended with the contents of such abscesses as occur in the progress of the disease. This kind of matter is almost peculiar to scrophulous abscesses, and forms another argument in support of the foregoing observations relative to the share, which scrophula frequently has in the origin and course of many white-swellings.

TREATMENT OF WHITE-SWELLINGS.

In practice we meet with all these cases both scrophulous and rheumatic ones, in two very opposite states; sometimes the diseased joint is at the same time affected with a degree of acute inflammation; in other instances, the malady is entirely chronic.

The imprudence of patients in walking about, and disturbing the diseased part, is very often the occasion of a degree of acute inflammation, which is denoted by the tenderness of the joint when handled by the surgeon, and also by the integuments feeling hotter than those of the healthy knee. Acute inflammation is itself a frequent forerunner of the most inveterate diseases of the joints.

When such state exists, there can be no doubt, that topical bleeding, and cold saturnine lotions, are means which may be eminently serviceable. The antiphlogistic regimen is now strongly indicated. Cooling purges of the saline kind should also be exhibited. Blood may be taken from the diseased part, either by means of leeches or cupping. Mr. Latta gives the preference to the latter method, whenever it can be employed; and he very properly remarks, that little advantages can be expected from topical bleeding of any kind, unless the quantity of blood taken away be considerable. Ten or twelve ounces by cupping should be taken away at a time, and the operation should be repeated at proper intervals, till the tenderness and heat of the skin have entirely subsided. When leeches are used, the number ought to be considerable, and Mr. Latta recommends the application of at least sixteen or twenty. (*System of Surgery*, Vol. 1. chap. 6.)

When the diseased joint is very tense, painful, and inflamed, the pressure of cupping glasses is too irritating.

Though such antiphlogistic means are judiciously put into practice, when acute inflammation prevails; yet such practitioners as lose weeks and months in the adoption of this treatment, are highly censurable. While the skin is hot and tender, while the joint is affected with very acute and general pain, and while the patient is indisposed with the usual symptoms of inflammatory fever, great benefit may be rationally expected from the above plan. When, however, this stage of the disorder is over, and the disease is a truly chronic one, the method becomes ridiculously inert, and, as preventing the employment of a proper plan of treatment may be considered, in a certain degree, conducive to the augmentation of a most cruel distemper. Every conscientious surgeon would shudder to be guilty of recommending inactive measures to oppose an inveterate disease, were he only to have a proper idea of the vast number of lives and limbs which are continually falling sacrifices to such slovenly practice.

Although I am not fortunate enough to coincide with Mr. Crowther on this point, who employs bleeding for a much longer time, than seems to me advantageous, yet I am content to let general experience determine which of us is right. There are some cases, I know, (and one such I had lately under my care in private practice,) which require topical bleeding and cold applications much longer than others. There are other instances, which will never bear the irritation of blisters and the savine cerate, but are exasperated by this treatment. Such, however, is not the nature of the disease in general, when the acute inflammation, accidentally present, has been removed by antiphlogistic means. Having seen numerous white-swelling in St. Bartholomew's Hospital, invariably unretarded by a long recourse to that universal panacea, *white wash*, aided by topical bleeding, I must feel satisfied that the censures I have passed on delaying the application of perpetual blisters, or issues, are not altogether unfounded. It is curious, that, after criticising my advice not to lose weeks and months in trusting to such treatment, when the acute symptoms have ceased, Mr. Crowther should remark; "If Mr. Cooper means by really efficacious measures, the application of blistering plaster, and dressing the surface, after the cuticle is removed, with the savine cerate, or establishing caustic issues on each side of the diseased joint, *I congratulate myself, as having been the means of ascertaining the salutary effect of this treatment!*" P. 63.

Some other passages of my works are

noticed by this unfortunate critic, with similar inconsistency, as I shall take future opportunities of explaining.

It is quite unnecessary to expatiate further on the mode of treating white-swellings complicated with acute inflammation. The most eligible plan of arresting the morbid process in the bones, ligaments, cartilages, and soft parts surrounding the articulation, and the most successful method of lessening the chronic enlargement of the joint, are subjects now demanding our earnest investigation.

The works of Hippocrates, Celsus, Rhazes, Hieron, Fabricius, &c. compared with modern surgical books, will soon convince us, that the practice of the ancients, in the treatment of diseased enlarged joints, does not much differ from the plan now pursued by the best modern surgeons. Mr. Crowther remarks, that the ancients used local and general blood-letting, the actual and potential cautery, with vesicating and stimulating applications to the skin. They further maintained, that sores, produced by these means, should have their discharge promoted, and continued for a considerable length of time.

Topical applications, consisting of strong astringents of the mineral and vegetable kingdom, suffice for the cure of some mild descriptions of white-swellings. A decoction of oak bark, containing alum, is what is recommended for this purpose by Mr. Russell.

My own experience will not allow me to say much in favour of electricity, as an application for the relief of white-swellings. Upon the whole, I must rank electricity among inactive measures; for, though, in a few cases, it has appeared to do good; in others it has done harm, by making the disease more irritable and rapid in its progress; while in most instances, its effects have been so insignificant, as to make it difficult to decide, whether they were of a favourable or an unfavourable nature.

"If the tumour is quite indolent, (says Richerand) the application of galvanism may be proposed; it is not, however, exempt from danger, and on one occasion, where I employed it, lancinating pains and swelling of the joint were brought on by it." (*Nosographie Chirurgicale*, tom. 3. p. 174, Edit. 2.)

Cases occur, in which a lotion composed of sea-water is productive of benefit. I mean to say, that this application frequently diminishes the enlargement of the joint; but it hardly ever accomplishes a perfect cure.

The conjoined operation of sea-air and sea-bathing has undoubtedly a most

powerful influence over scrophulous diseases of the joints, as well as most other strumous disorders; but the application of sea-water alone, in the form of a lotion, cannot be greatly praised, because it prevents the surgeon from having recourse to a better plan of treatment. Even the trial of sea-air and bathing unitedly can only be recommended as an auxiliary plan, to be adopted in conjunction with other more certainly efficacious measures.

Poultices, made of sea-weeds, deserve the same kind of praise as has been given to the sea-water lotion.

Every one is well acquainted with the efficacy of friction in exciting the action of the absorbents. To this principle we are to impute the great benefit, which arises from what is termed, *dry rubbing*, in cases of white-swellings. This kind of friction is performed by the mere hands of an attendant, without using at the same time any kind of liniment, or other application whatsoever, and the rubbing is continued for several hours every day. At Oxford, many poor persons earn their livelihood by devoting themselves to this species of labour, for which they are paid a stipulated sum per hour.

I look upon all mere emollient applications, such as fomentations and poultices, as quite destitute of real efficacy, and, though they serve to amuse the patient, they ought not to be recommended. That surgeon, who merely strives to please his patient's fancy, without doing any real good to him, in regard to his affliction, may be considered as doing harm, because the semblance of something being done too often hinders other really useful steps from being pursued. The French surgeons are particularly liberal in the praises which they bestow on such warm emollient remedies, as poultices, steam of hot water, fomentations, &c. and they adduce instances of white-swellings being cured in this manner. But, whoever has had opportunities of observing the inveterate nature of the disease in this country, will hardly be inclined to recommend the imitation of French practice.

The only method of treatment, which my own personal experience enables me strongly to recommend, consists in keeping up a discharge from the surface of the diseased joint. The opportunities which I have had of observing the effects of blisters, and caustic issues, rather incline me, however, to prefer the former to the latter. I have seen great good derived from both; but more from blisters, than the other kind of issue. There are instances in which I should employ vesicating applications; there are others in

which I should prefer making an eschar with caustic. I have seen many instances in which the application of a blister could never be endured, in consequence of the general inflammatory affection, which it occasioned throughout the diseased joint.

The blister should always be large. Many surgeons, instead of following Mr. Crowther's plan, prefer blistering first one side of the joint, and then the other alternately, for a considerable length of time. "Blisters, (says Mr. Latta) may be put upon each side of the patella, and ought to be of such a size and shape, as to cover the whole of the swelling, on the inside, from the hinder part of the joint, at the edge of the hollow of the thigh, to the edge of the patella, over the whole extent of the swelling above and below. As soon as the blister is taken off from one side, it ought to be applied to the other, and thus repeated alternately, until both swelling and pain be completely removed. When this is the case, the patient ought to be directed to rub the joint well with a liniment, composed of half an ounce of camphor, dissolved in two ounces of oil, with the addition of half an ounce of spir. sal-ammon. caust. or, as it is now called, aqua ammoniæ. This is to be used three times a day; and in this way, (continues Mr. Latta) I have successfully treated many cases of white-swelling." (*Syst. of Surgery, Vol. 1, chap. 6.*)

In the beginning, caustic issues are even more painful, than blisters; but they afterwards become more like indolent sores, and are more easily kept open, for a length of time, than blisters. Such issues are commonly made on each side of the diseased joint, and of about the size of a half-crown. The manner of making the eschars, and keeping those issues open, is explained, in the article *Issue*.

The question has been contested, among surgical writers and practitioners, whether blisters and issues produce benefit, upon the principle of counter-irritation, or in consequence of the discharge, which they occasion. They probably operate efficaciously in both ways; for there is no doubt, that mere rubefacients possess the power of rousing the action of the absorbents, and they also may modify the vascular action of diseased parts. These applications can obviously only act upon the principle of counter-irritation, and, they have not been here recommended particularly for white-swelling, because, it seems to me, that whenever some good might be derived from their employment, much more benefit could always be obtained from blisters and issues. This

sentiment is confirmed by experience, and we must, therefore, impute a great degree of efficacy to the maintenance of a purulent discharge from the vicinity of the diseased part.

We have noticed the efficacy of friction, in exciting the action of the absorbents, by which the thickened state of parts, around the affected joints, may be considerably lessened, and, on this principle, the utility of dry-rubbing arises. We have now to notice the method of producing the same effect by pressure, a plan, which yet seems to merit a more extensive trial. I have seen in St. Bartholomew's Hospital, a few cases, in which the swelling of the joints was most materially diminished, by encircling the morbid articulations with strips of adhesive plaster, applied with moderate tightness.

A somewhat similar plan, though its *modus operandi* is differently accounted for, appears also to have been tried in France. "J'ai dans quelques occasions (says Richerand) obtenu les plus grands avantages de l'application d'un taffetas ciré autour de l'articulation tuméfiée. On coupe un morceau de cette étoffe, assez large pour envelopper la totalité de la tumeur; on enduit les bords d'une gomme dissoute dans la vinaigre, et susceptible de le faire adhérer intimement à la peau; on l'applique ensuite de manière que tout l'accès soit interdit à l'air entre lui et les tegumens. Lorsqu'au bout de quelques jours on lève cet appareil, on trouve la peau humide, ramollie par l'humour de la transpiration condensée en gouttelettes à la surface intérieure du taffetas. Dans ce procédé, on établit un espèce de bain de vapeur autour de l'articulation malade. (*Nosographie Chirurgicale, Tom. 3, p. 175, Edit. 2.*)

My particular friend, Mr. Clement Wilson Cruttwell, of Bath, sent me, some time ago, a very excellent case, illustrative of the efficacy of treatment by pressure. He remarks, that, "After cupping the part, and endeavouring to quiet the inflammation, I used blisters; but they excited such intolerable pain, and produced so great a degree of swelling and inflammation, that I was under the necessity of healing them immediately. After two months strict confinement to bed, and the use of leeches and refrigerant washes, the inflammation having again subsided, and the pain being removed, I again ventured to apply one small blister, and again a similar attack of pain, swelling, and inflammation, was produced. The joint became distended with fluid, of which it had always contained a large quantity, and the irrita-

tion of the constitution was excessive. By the liberal use of opium, I once more succeeded in quieting the disturbance, and, convinced of the hazard of using blisters in such a subject, I applied moderate pressure, by means of a roller, together with a wash, containing a large proportion of spirit, in order to keep up a constant evaporation. The skin, which was before much inflamed, and hard, has become natural and flaccid, the pain has ceased, the swelling has diminished, and I have every prospect of effecting a cure, with the preservation of tolerably free motion in the joint."

Mr. Cruttwell tells me, in a late letter; that this case got completely well, by the treatment with pressure, and has remained so for upwards of six months, under full and free exercise.

This example clearly evinces the impropriety of using blisters in certain constitutions. In some remarks, annexed to the above case, Mr. Cruttwell expresses his conviction, that absolute rest, cold applications, and pressure, would succeed in very many cases, without local counter-irritation. Pressure, he adds, succeeds best, when fluid is effused, and the disease is indolent; but, he is convinced that it may be used with advantage in later stages, when abscesses have formed, and sinuses already exist. Mr. Cruttwell, with his usual accuracy of observation, next reminds me, how very serviceable continued pressure is to the scrophulous finger-joints of children.

From what has been stated, I am firmly of opinion, that all impartial practitioners will be disposed to give pressure a more extensive trial, as a means of relieving a disease which too frequently foils every effort of the most skilful surgeon.

We have noticed, that when the knee is affected, there is a great tendency in the limb to become permanently bent. It might undoubtedly be very judicious to oppose the occurrence of this position, by means of splints, which would also serve to prevent all motion of the diseased joint, an object of the very highest importance. Were the disease to end in ankylosis, the advantage of having the limb in a state of extension need scarcely be mentioned.

Numerous diseased joints are undoubtedly connected with a kind of constitution, called scrophulous. Hence, it seems rational to combine, with the local treatment, the employment of such internal remedies, as have been known to do good in other scrophulous diseases. Hectic symptoms are those, which we commonly have to palliate in these cases. When the appetite is impaired, and the stomach

will bear bark, this medicine should be given with the aromatic confection. Above all internal remedies, opium claims the highest recommendation, as it at once tends to keep off and relieve a debilitating diarrhoea, which too frequently prevails, at the same time that it alleviates pain, and procures sleep. The objection, made against its exhibition, on the ground that it increases perspiration, seems exceedingly frivolous, when the above important benefits are taken into consideration.

Too often, however, the terrible disease of which we are now treating baffles all human skill and judgment, and the unhappy patient's health having declined to the lowest state, he is necessitated to submit to amputation, as the only chance of preserving life. It has been explained in the article *Amputation* that the condition of the patient's health, and not of the diseased joint, can form the only solid reason for recurring to the severe operation of removing the limb. If the patient's constitution be equal to a longer struggle, no man can pronounce, that every prospect of saving the limb is at an end. Many diseased joints, apparently in the most hopeless condition, frequently take a favourable turn, and, after all, allow the limb to be saved. The state of the health is the chief consideration, in forming a judgment respecting the propriety of amputation.

The proposal of cutting out diseased joints has been considered in the article *Amputation*.

DISEASE OF THE HIP-JOINT.

This complaint is very analogous in its nature to the white-swelling of other articulations. In the same way, as the latter disorder, it seems probable that the disease of the hip has its varieties, some of which may be connected with scrophula, while others cannot be suspected to have any concern with a strumous habit. The present complaint is most frequently seen attacking children under the age of fourteen; but, no age, no sex, no rank, nor condition of life is exempt from the possibility of being afflicted, so that though children form a large proportion of those subjects, who are attacked; yet the number of adults, and even of old persons, is considerable.

The approach of the disease of the hip-joint is much more insidious, than that of a white-swelling. Severe pains generally precede the latter affection; but, the only forerunner of the former is frequently a slight weakness, and limping of the affected limb. These trivial

symptoms are very often not sufficiently urgent to excite much notice, and, when observed by superficial practitioners, are commonly neither understood, nor treated according to the dictates of surgical science. As there is, also, very often an uneasiness in the knee, when the hip is affected, careless practitioners frequently mistake the seat of disease, and I have many times seen patients, on their entrance into an hospital, having a poultice on their knee, while the wrong state of the hip was not at all suspected.

This mistake is extremely detrimental to the patient, not on account of any bad effect, resulting from the applications so applied; but, because it is only in the incipient period of the complaint, that a favourable prognosis can be made. In this stage of the disease, mere rest and repeated topical bleeding, will do more good in the course of a fortnight, than large painful issues will afterwards generally accomplish in the long space of a twelvemonth.

The symptoms of the disease of the hip-joint, when only looked for in the situation of that articulation, are not very obvious to the surgical examiner. Though the attention of the surgeon is, in some instances, soon called to the right situation of the disease, by the existence of a fixed pain behind the trochanter major; yet, it is too often the case, that mere pain about an articulation, entirely destitute of visible enlargement and external alteration of colour, is quite disregarded, as a complaint of no importance in young subjects, and as a mere rheumatic, or gouty affection, in adults. Patients frequently complain of most of their painful sensations being in the groin, and all accurate observers have remarked, that, in the hip-disease, the pain is not confined to the real seat of disease, but shoots down the limb, in the course of the vastus externus muscle to the knee.

The early symptoms of disease in the hip-joint are only strongly delineated to such practitioners, as have acquired the necessary information relative to this part of surgery, from careful study, and extensive experience.

We shall next trace those characters of the present disease, which serve to denote its existence.

It is a curious circumstance, that when the functions of a limb are obstructed by disease, the bulk of the member generally diminishes, and the muscles become emaciated. Nearly as soon as the least degree of lameness can be perceived, the leg and thigh have actually wasted, and their circumference has become less.

If the surgeon make pressure on the

front of the joint, a little on the outside of the femoral artery, after it has descended below the os pubis, great pains will be experienced.

The limping of the patient is a clear proof that something about the limb is wrong, and, if such limping cannot be imputed to diseased vertebræ, or some recent accident, and if, at the same time, the above-mentioned emaciation of the limb exists, there is a great cause to suspect, that the hip is diseased, particularly, when the pain is augmented by pressing the front of the acetabulum.

Diseased vertebræ, perhaps, always produce a paralytic affection of both legs at once, and they do not cause painful sensations about the knee, as the hip-disease does.

The increased length of the limb, a symptom that has been noticed by all practitioners since De Haen, is a very remarkable and curious occurrence, in the early stage of the present disease. This symptom is easily detected by a comparison of the condyles of the os femoris, the trochanter major, and malleoli, of the diseased limb, with those parts of the opposite member, taking care that the patient's pelvis is evenly situated. The thing is the more striking, as the increased length of the member is frequently as much as four inches. The rationale of this fact, John Hunter used to explain by the diseased side of the pelvis becoming lower, than the other. (*Crowther*, p. 266.)

The same thing was noticed by Falconer, before Mr. Crowther. (*On Ischias*, p. 9.)

An appearance of elongation of the limb is not exclusively confined to the early stage of the morbus coxarius; it may attend other cases. I remember seeing in one of the wards of St. Bartholomew's Hospital, a little girl, with a diseased knee, whose pelvis was considerably distorted in this manner, so that the limb of the same side appeared much elongated. Her hip-joint was quite sound. This case was pointed out to Mr. Lawrence and myself by Mr. Cother, of Gloucester.

Mr. Ford has very accurately called the attention of surgeons to the alteration, with respect to the natural fulness and convexity of the nates, that part appearing flattened, which is usually most prominent. The glutæus magnus becomes emaciated, and its edge no longer forms so bold a line, as it naturally does at the upper and back part of the thigh, in the sound state of the limb.

Though there may be more pain about the knee, than the hip, at some periods

of the malady in its incipient state, yet, the former articulation may be bent and extended, without any increase of uneasiness; but, the os femoris cannot be moved about, without putting the patient to immense torture.

The patient soon gets into the habit of bearing the weight of his body chiefly upon the opposite limb, while the thigh of the affected side is bent a little forward, that the ground may only be partially touched with the foot. This position is found to be the most comfortable, and every attempt to extend the limb occasions an increase of pain.

This is the first stage of the disease, or the one, which is unaccompanied with suppuration.

The symptoms which precede the formation of pus, vary in different cases, according as there is acute, or chronic inflammation present. When the diseased joint is affected with acute inflammation, the surrounding parts become tense and extremely painful; the skin is even reddish; and symptoms of inflammatory fever prevail. When the severity of the pain abates, a swelling occurs in the vicinity of the joint, and a pointing quickly follows.

When the abscess is a chronic one, there is no particular increase of pain preceding the collection of matter.

Startings and catchings during sleep are said to be among the most certain signs of the formation of matter, in this stage of the disease.

We have noticed the lengthened state of the limb, in the first periods of the hip-disease. This condition is not of very long duration, and is sooner, or later succeeded by a shortening of the affected member. The toes are turned inwards; the great trochanter is approximated to the crista of the os ilium; the leg is in a state of flexion; and all the symptoms of a luxation of the thigh upwards and outwards, may be observed, the head of the bone indeed being actually drawn into the external iliac fossa, and carried betwixt the os innominatum and gluteus minimus, which is raised up by it. (See *Richerand's Nosographie Chirurgicale*, Tom. 3, p. 171, 172, Edit. 2.)

When the retraction is very considerable, it arises from nothing less, than an actual dislocation of the head of the thigh-bone, in consequence of the destruction of the cartilages, ligaments, and articular cavity. This retraction sometimes comes on long before any suppuration takes place. The head of the bone is sometimes dislocated, and the disease terminates in ankylosis, without any abscess whatever.

It is worthy of particular notice, that the head of the bone is always luxated upwards and outwards; and the only exception to this observation, upon record, is a case related by the celebrated Italian practitioner Cocchi, in which a spontaneous dislocation of the thigh-bone, as it is termed, happened upwards, forwards, and a little inwards. (See *Levéillé's Nouvelle Doctrine Chirurgicale*, Tom. 2, p. 595.) On a également vu la tête du fémur luxée en dedans et en bas, et placée sur le trou obturateur, mais ce mode de déplacement consécutif, dans lequel le membre est allongé, est infiniment rare. (*Richerand, Nosographie Chirurgicale*, Tom. 3, p. 172.)

The hip-disease generally induces hectic symptoms, after it has existed a certain time. In some subjects, such symptoms soon come on; in others, the health remains unaffected a very considerable time.

When abscesses of the above description burst, they continue, in general, to emit an unhealthy thin kind of matter for a long time afterwards.

With respect to the morbid anatomy of the disease in its incipient state, little is known. Two dissections related by Mr. Ford are, perhaps, the only ones throwing light upon this point. In one, there was a tea-spoonful of matter in the cavity of the hip-joint. The head of the thigh-bone was a little inflamed, the capsular ligament a little thickened, and the ligamentum teres united in its natural way to the acetabulum. The cartilage lining the cotyloid cavity was eroded in one place, with a small aperture, through which a probe might be passed, underneath the cartilage, into the internal surface of the os pubis, on one side, and, on the other, into the os ischii; the opposite, or external part of the os innominatum shewing more appearance of disease, than the cotyloid cavity. In the other instance, the disease was more advanced. These examples are important, inasmuch as they prove that the hip-complaint primarily affects the cartilages, ligaments, and bones, and not the surrounding soft parts as De Haen, and some others would lead one to believe.

As the disorder advances, the portions of the os ischium, os ilium, and os pubis, composing the acetabulum, together with the investing cartilage, and synovial gland, are destroyed. The cartilage covering the head of the os femoris, the ligamentum teres, and capsule of the joint, suffer the same fate, and caries frequently affects not only the adjacent parts of the os innominata, but also the head and neck of the thigh-bone. The bones of the pelvis, however, are always more

diseased than the thigh-bone, a fact, which displays the absurdity of ever thinking of amputation in these cases. Mr. Ford observes, "In every case of disease of the hip-joint, which has terminated fatally, I have remarked, that the os innominatum has been affected by the caries in a more extensive degree, than the thigh-bone itself." (*Observations on the Disease of the Hip-joint*, p. 107.)

Sometimes, however, the head and neck of the thigh-bone are annihilated, as well as the acetabulum.

External violence; laying down on the damp ground in summer time; and all kinds of exposure, to damp and cold; are the causes to which the disease may sometimes be referred. Scrophula, no doubt, has, frequently, some concern in the origin of the malady; but, oftentimes, no rational cause of the complaint can be assigned.

TREATMENT OF THE DISEASE OF THE HIP-JOINT.

Hippocrates, Celsus, Cælius Aurelianus, &c. convince us in their writings, that the ancients treated the present disease much in the same way as the moderns. Forming an eschar, and keeping the sore open; topical bleeding; cupping; fomenting the part, &c. were all proceedings adopted in the earliest periods of surgery. Drs. Charlton, Oliver, and Falconer, have extolled Bath water, as a most efficacious application to diseased hip-joints, previous to the suppurative stage. However, had not their accounts been exaggerated, all patients of this kind would long ago have flocked to Bath, and the surgeons in other places would never have had further occasion to adopt a more painful mode of treatment.

The plan pursued at Bath, is to put the patient in a warm bath, two or three times a week, for fifteen or twenty-five minutes.

In the early period of the disease, entire rest, the application of fomentations, and the employment of topical bleeding, particularly cupping, are highly proper. Such practice, also, is invariably judicious, whenever the case is attended with symptoms of acute inflammation. When the fomentations are not applied, the *lotio aquæ lithargyri acetati* may be used.

This method of treatment ought never to be employed unless there are manifest marks of active inflammation present. When no such state exists, this plan can only be regarded as preventing the adoption of a more efficacious one, and, therefore, censurable.

As far as morbid anatomy can inform

us, the hip-disease consists of the same alteration of the bones, ligaments, and cartilages, as takes place in the majority of white-swellings. Hence, both diseases should be treated on the same principles. *Quibus diuturno dolore*, says Hippocrates, *ischiadico vexatis coxa excidit, iis femur contabescit et claudicant, nisi urantur*. Forming an eschar, or issue, is the most efficacious plan of treating the disease even now known.

A caustic issue seems to be more beneficial than a blister, in cases of diseased hips. The depression, just before and below the trochanter major is the situation, in which surgeons usually make the issue, and the size of the eschar should be nearly as large as a crown-piece. It is, in general, necessary to keep the issue open a very long time. When the thigh-bone is dislocated, the case mostly ends in ankylosis.

FUNGUS HÆMATODES OF THE HIP-JOINT.

Mr. Burns, in the second volume of his "Dissertations on inflammation," p. 311, has recorded a remarkable instance, in which this joint was affected with that intractable and fatal distemper, the fungus hæmatodes. The case was at first supposed to be the disease, of which we have just been speaking in the preceding section. The limb seemed to be elongated, and issues were employed, without any material benefit. The upper part of the thigh swelled, while the lower wasted away. The patient lost his appetite, had a quick pulse, and passed sleepless nights. The part was rubbed with anodyne balsam, and laudanum given every night; but, these means were only productive of temporary benefit. After some months, a difficulty of making water came on, which ended in a complete retention. It being found impracticable to introduce a catheter, and a large elastic tumour, supposed to be the distended bladder, being felt within the rectum, a trocar was pushed into the swelling. A good deal of bloody fluid was thus discharged. Afterwards a considerable quantity of high-coloured fetid urine continued to escape from the urethra. In about a week from this operation, the patient died.

On dissection, Mr. Burns found the hip-joint completely surrounded with a soft matter, resembling brain, inclosed in thin cells, and here and there other cavities, full of thin bloody water, presented themselves. The acetabulum and head of the os femoris were both carious. The muscles were quite pale, and almost like boiled liver, having lost their fibrous appearance. The same kind of substance

was found in the pelvis, and most of the inside of the affected bones carious. Large cells, containing bloody water, were observed in the diseased substance, and it was into one of such cavities that the trocar had entered when the attempt was made to tap the bladder. See "*Treatise on the Diseases of the Joints*" being the observations for which the prize for 1806 was adjudged by the Royal College of Surgeons, London. Ford's Observations on the Disease

of the Hip-Joint are particularly excellent. See also Crowther on White-Swelling, &c. Edit. 2, 1808. Latta's System of Surgery. B. Bell's Surgery. Falconer on Ischias. Burns on Inflammation, Vol. 2, p. 311. The authors quoted throughout this article, both ancient and modern, may all be consulted with advantage.

JUGULAR VEIN, how to bleed in. See Bleeding.

K.

KALI ÆRATUM.—℞. Kali præparati ℥ss. Aq. distillatæ ℥v. Ammon. præparatæ ʒj. Dissolve the kali in a water-bath; add the ammonia; and, when the effervescence has ceased, let the fluid crystallize. Two drams are given as a lithontriptic, in a pint of distilled water, twice a day, at St. Bartholomew's Hospital. (*Pharmacopœia Chirurg.*)

KALI ARSENICATUM.—℞. Arsenici albi, Nitri purif., sing. ʒj. Crucibulo amplo igne candenti injice nitrum, et liquefacto adde gradatim arsenicum in frustulis donec vapores nitrosi oriri cessaverint. Solve materiam in aquæ distillatæ libris quatuor, et post idoneam evaporationem seponere ut fiant crystalli.

These crystals may be given in the dose of one tenth of a grain, thrice a day. (*Pharm. Sancti Barthol.* 1799.) Justamond strongly recommended the internal exhibition of arsenic in cases of cancer. See Cancer.

KALI PURUM.—This is one of the most useful caustics for destroying funguses, making issues, in cases of diseased vertebræ, white swellings, &c.; and it is recommended to be used in a particular manner, by Mr. Whately, for the cure of strictures in the urethra. When surgeons

prefer opening buboes, or any other abscesses, with caustic, the kali purum is very commonly employed. When surgeons used to cure hydroceles, by destroying a part of the scrotum and tunica vaginalis with caustic, the kali purum, either alone, or mixed with quicklime, was made use of. (See particularly *Vertebra, Diseased; Urethra, Strictures of, &c.*)

KALI SULPHURATUM. Two drams of this, dissolved in a pint of lime or distilled water, make an excellent lotion for the cure of the tinea capitis. Many other cutaneous affections yield, also, to the same remedy. When arsenic has been swallowed as a poison, it is best to give first, twenty grains of zincum vitriolatum, as an emetic the quickest in its operation; and, after keeping up the vomiting by drinking warm water, and, what is better, sweet oil, it is recommended to make the patient drink as much as possible of a solution of the kali sulphuratum, the sulphur of which is known to blunt the activity of the mineral.

KNEE, DISEASES OF. See Joints.

KNEE-CAP, its effects in relieving the inconveniences resulting from cartilaginous substances in the knee. See Joints.

L.

LABIA LEPORINA. See *Harelip*.

LAGOPHTHALMIA, OR LAGOPHTHALMOS. (from *λαγος*, a hare; and *οφθαλμος*, an eye) *The Hare's Eye*. A disease, in which the eye cannot be shut. The following complaints may arise from it; a constant weeping of the organ, in consequence of the interruption of the alternate closure and opening of the eye-lids, which motions so materially contribute to propelling the tears into the nose; blindness in a strong light, in consequence of the inability to moderate the rays, which fall on the eye; on the same account, the sight becomes gradually very much weakened; incapacity to sleep where there is any light; irritation, pain, and redness of the eye, from this organ being exposed to the extraneous substances in the atmosphere, without the eye-lids having the power of washing them away, in the natural manner.

An enlargement, or protrusion of the whole eye, or a staphyloma, may obviously produce lagophthalmos. But, affections of the upper eye-lids are the common causes. Heister says, he has seen the complaint originate from a disease of the lower one. Now and then lagophthalmos depends on paralysis of the orbicularis muscle. A cicatrix, after a wound, ulcer, or burn, is the most frequent cause.

When lagophthalmos arises from a paralytic affection of the orbicularis palpebrarum, let the eye-lids be rubbed with the tinctura cantharidum, and cold water, or the linimentum camphoræ. Electricity is also considered as a principal means of cure, (*Chandler*) together with the exhibition of bark, the use of the shower-bath, &c.

When the affection arises from spasm of the levator palpebræ superioris, electricity, a small blister on the neighbouring temple, and rubbing the eye-lid and eye-brow with the tinctura opii, are good means. Internal anti-spasmodic medicines may also be tried.

When lagophthalmos arises from the contraction of a cicatrix, its relief is to be attempted precisely on the same principles as the ectropium. (See *Ectropium*.) In some cases, it will not be amiss, especially at night, to lay plasters, drawing in contrary directions upon each lid, and

to assist them by a compress and bandage. (*Chandler*.)

The inconveniences, depending on the eye being unable to shelter itself from the light, are to be obviated by wearing a green shade, till the disorder is cured.

Whoever is acquainted with German and is desirous of more minute information on this subject, may find an excellent account of lagophthalmos in *Richer's Anfangsgr. der Wundarzn. Band 2, Von dem Hassenauge*. See also *Chandler on the Diseases of the Eye. Chap. 2*.

LARYNGOTOMY. (from *λαρυγξ*, the larynx; and *τεμνω*, to cut.) The cutting an opening into the larynx. (See *Bronchotomy*.)

LATERAL OPERATION. One mode of cutting for the stone is so termed. (See *Lithotomy*.)

LENS CRYSTALLINE OPAQUE. (See *Cataract*.)

LENTICULAR. (from *lenticulaire*, doubly convex.) An instrument, contained in every trephining case, and employed for removing the jagged particles of bone from the edge of the perforation, made in the cranium with the trephine. One side of its blade is convex, the other concave; and one of its edges is sharp. On the end of the blade is fixed a little shallow cup, with its concavity towards the handle of the instrument. This part serves the purposes of receiving the little pieces of bone, when detached, keeping the end of the blade from hurting the dura mater, and, when applied under the margin of the opening, enables the operator to guide the edge of the instrument all round it, with steadiness and security.

LEUCOMA. (from *λευκος*, white.) Leucoma and albugo are often used synonymously, to denote a white opacity of the cornea. Both of them, as Scarpa remarks, are essentially different from the nebula of the cornea; for, they are not the consequence of chronic ophthalmia, attended with varicose veins, and an effusion of a milky serum into the texture of the delicate continuation of the conjunctiva over the cornea; but, are the result of violent acute ophthalmia. In this stage, a dense coagulating lymph is extravasated from the arteries; sometimes superficially, at other times deeply into the sub-

stance of the cornea. On other occasions, the disease consists of a firm callous cicatrix on this membrane, the effect of an ulcer, or wound, with loss of substance. The term *albugo*, strictly belongs to the first form of the disease; *leucoma* to the last, more particularly when the opacity occupies the whole, or the chief part, of the cornea.

The recent *albugo*, remaining after the cure of a severe acute ophthalmia, is of a clear milky colour; but, when of ancient date, it becomes pearl-coloured. Some cases, which have existed a considerable time, do not seem to have any connexion with the vascularity of the cornea: for they continue insulated in the middle of the transparent portion of this membrane, without occasioning the least uneasiness to the patient, the least disturbance of the rest of the eye, or any attempt of the absorbents to remove them.

The recent *albugo*, provided the organization of the cornea be not destroyed may generally be dispersed by the means employed for the relief of the first and second stages of acute ophthalmia; viz. general and topical blood-letting with internal antiphlogistic medicines, and topical emollients for the first; slightly irritating and corroborant applications for the second. As soon as the inflammation has subsided, the latter should be employed; for, by making the absorbents remove the coagulating lymph, deposited in the cornea, they restore the transparency of this membrane.

But, though this may often be accomplished in the recent state of *albugo*, it is not so easy to be done, when the long duration of the disease has paralyzed the absorbents of the affected part of the cornea; or when the deposition of a dense tenacious substance into its intimate texture, has subverted its organization. In one instance, the matter forming the *albugo* cannot be absorbed; in the other, it leaves the cornea so much injured, after its absorption, that it continues opaque. (*Scarpa*.)

The recent condition of the disease, without disorganization of the structure of the cornea; its occurrence in young subjects, whose absorbents are readily roused by external stimulants; are circumstances very favourable to the cure. The opacity of *albugo* in children, arising from severe ophthalmia after the small-pox, and remaining insulated in the centre of the transparent cornea, very often disappears in the course of a few months, even without the interference of art. Heister, Langguth, and Richter, have made the same observation. The event can only be imputed to the vigorous

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action of the lymphatics in children and to the organization of the cornea not being destroyed. To promote this absorption, *Scarpa* has found the following collyrium a most efficacious one: *R. Ammon. muriatæ. ℥ij. Cupri acetati gr. iv. Aquæ Calcis ℥viij. Misce.* To be filtered, after standing twenty-four hours.

He praises also this ointment: *R. Tutie præpar. ℥j. Aloes. s. p. gr. ij. calomelanos gr. ij. Adipis suillæ. ℥ss. Misce.* And the *unguentum ophthalmicum* of Jaëin. He mentions the gall of the ox, sheep, pike, and barbel, applied to the cornea, two or three times a day, with a small hair pencil, if too much irritation should not be produced. In some subjects, when the eyes are very irritable, and cannot bear the latter applications, *Scarpa* has found the oil of walnuts, when rather rancid, very beneficial; two or three drops being insinuated into the eye, every two hours, for some months. In others, he has found the juice of the lesser centaury, mixed with honey, of service.

It is generally necessary to persevere very strictly, for at least three or four months, before the case can be reckoned incurable.

All the expedients, proposed for the inveterate *albugo* or *leucoma* from a cicatrix, consisting of scraping or perforating the layers of the cornea, and exciting ulceration there, are unavailing. For, though, the enlargement of the cornea, should be lessened by such means, its diaphanous state could not be restored; or should the patient perceive a ray or two of light immediately after the operation, the benefit would only be transient; for, as soon as the wound had healed, the opacity would recur. The formation of an artificial ulcer might prove useful, did *leucoma* depend on a mere extravasation of lymph; but, the fact is, the disease arises from the deposition of an opaque substance, and the disorganization of the texture of the cornea, conjointly; in this lies the difference between *albugo* and *leucoma*.

See *Scarpa sulle Malattie degli Occhi. Venezia; 1802. Richter's Anfangsgrunde der Wundarznei. Band 3. Essays on the Morbid Anatomy of the eye, by J. Wardrop; Edinb. 1808: chap. 11.*

LIGATURE. (from *ligo*, to bind.) In the article *Hæmorrhage*, we have noticed, that the immediate effect of a tight ligature on the artery, is to cut through its middle and internal coats, a circumstance, that tends very much to promote the adhesion of the opposite sides of the vessel to each other. Hence, the form and mode of applying a ligature to an artery should be such as are most certain of dividing the above coats of the vessel, in the most

favourable manner. A broad flat ligature does not promise to answer this purpose in the best manner; because it is scarcely possible to tie it smoothly round the artery, which is very likely to be thrown into folds, or to be puckered by it, and, consequently, to have an irregular bruised wound made in its middle and internal coats. (*Jones*.) A ligature of an irregular form is likely to cut through these coats more completely at some parts than others; and if it does not perfectly divide them, no adhesion can take place, and secondary hemorrhage will follow. A fear of tying the ligature too tight may often lead to the same consequences. These, and many other important circumstances, are noticed in the article *Hemorrhage*.

Ligatures are commonly made of inkle, waxed together with white wax. They should be round, and very firm, so as to allow being tied with some force, without risk of breaking. (See *Jones on Hemorrhage*, p. 172.)

LINIMENT. (from *lino*, to anoint.) A very soft kind of ointment, not much thicker than oil, and intended to be smeared, or rubbed on parts.

We shall only mention here, a few of the most useful ones for surgical purposes.

**LINIMENTUM AMMONIÆ FOR-
TIUS.**—*R.* Aq. ammon. pur. ℥j. Olei olivæ ℥ij. Misce. Used for stimulating the surfaces of parts in which it is wished to excite the action of the absorbents. It is serviceable in removing indurations, stiffness of the joints, &c.

LINIMENTUM CALCIS.—*R.* Aquæ calcis, Olei olivæ, sing. ℥viij. Spirit. vini rectificati ℥j. Misce.—A common application to burns and scalds.

**LINIMENTUM CAMPHORÆ COM-
POSITUM.**—*R.* Camp. ℥ij. Aq. ammon. ℥vj. Spirit. lavend. ℥xvj. Sixteen ounces are to be distilled of the two last ingredients, from a glass retort, and the camphor then dissolved in the distilled fluid.—For bruises, sprains, rigidities of the joints, incipient chilblains, &c.

**LINIMENTUM CAMPHORÆ
ÆTHEREUM.**—*R.* Camphoræ drach. j. Ætheris unc. ss. Olei viperarum drach. ij. Misce. The camphor is to be dissolved in the æther, and the oil afterwards incorporated with it.

This formula, communicated by Mr. Ware, is adapted to those obscure affections of the eye, in which it is not easy to determine, whether the imperfection of the sight proceeds from an incipient-cataract, or a defect of sensibility in the optic nerve.

The mode of applying it is to moisten the finger with it, and to rub it for two

or three minutes together, morning and evening, on the outside and edges of the eye-lids. (*Pharm. Chirurgica*.)

**LINIMENTUM HYDRARGYRI COM-
POSITUM.**—*R.* Ung. hydrargyri fortioris, Adipis suillæ, sing. ℥j. Camph. ℥ij. Spirit. vini rectif. ℥ij. Aq. ammon. pur. ℥j.—The camphor being dissolved in the spirit of wine, add the aq. ammon. and the ointment previously blended with hogs lard (*Pharm. Sancti Barthol.*) A truly excellent formula for all surgical cases, in which the object is to quicken the action of the absorbents, and gently stimulate the surfaces of parts. It is a capital application for diminishing the indurated state of particular muscles, a peculiar affection every now and then met with in practice; and it is particularly well calculated for lessening the stiffness and chronic thickening often noticed in the joints.

**LINIMENTUM SAPONIS COMPO-
SITUM.**—*R.* Sapon. ℥ij. Camph. ℥j. Spirit. rosmarin. ℥ij. Dissolve the soap in spirit, and then add the camphor.—Uses the same as those of the linimentum camph.

LINIMENTUM SAPONIS CUM OPIO.
R. Lin. sapon. comp. ℥vj. Tinct. opii ℥ij. Misce.—For dispersing indurations and swellings attended with pain, but no acute inflammation.

LINIMENTUM TEREBINTHINÆ.
R. Ung. resinæ flavæ ℥iv. Ol. terebinthinæ, q. s. Misce. The celebrated application for burns, recommended by Kentish. (See *Burns*.)

**LINIMENTUM TEREBINTHINÆ
VITRIOLICUM.**—*R.* Olei olivæ ℥x. Ol. terebinth. ℥iv. Acidi vitriol. ℥ij. Misce.—Said to be efficacious in chronic affections of the joints, and in the removal of long existing effects of sprains and bruises. (*Pharm. Chirurgica*.)

LIP, CANCER OF. The lips are subject to ulcers, which put on a very malignant aspect, although they are not in reality malignant; and many of these, occurring just on the inside of these parts, will be found to depend on the bad state of the constitution, and the irritation and disturbance which the sores are continually suffering from the incessant motion of the parts, and their rubbing against a projecting, or rough tooth.

When cancer takes place, it is usually in the lower, and very seldom in the upper lip.

The disease sometimes puts on the appearance of an ulcerated, wart-like excrescence, occasionally acquiring a considerable size. Sometimes it is seen in the form of a very destructive ulcer, which consumes the surrounding substance of the

lip; and, in other examples, the disease resembles a hard lump, which, at length, ulcerates. The disease, in its infancy, is often no more than a pimple, which gradually becomes malignant. Whenever there is reason to believe, that the disease is of an unyielding cancerous nature, the sooner it is extirpated the better. For this purpose, some surgeons admit the propriety of using caustic, when the whole disease can be completely destroyed by one application. But, as the action of caustic is not capable of being regulated with so much precision as the extent of a wound can be, and as caustic will not allow the parts to be united again, the knife is the only justifiable means, especially as it occasions also less pain. Two incisions are to be made, meeting at an angle below, (supposing it to be the lower lip) and including the whole of the disease. The sides of the wound are then to be united with the twisted suture. (See *Hare-lip*.) When the affection is extensive, however, the surgeon is frequently necessitated to remove the whole of the lip, or too much of it to admit of the above plan being followed. This circumstance is particularly unpleasant, as the patient's spittle can only be prevented from continually running over his chin by some artificial contrivance. The deformity also is very great, and pronunciation and swallowing can only be imperfectly performed.

LIPPITUDO (from *lippus*, blear-eyed.) *Blearedness*. The ciliary glands, and lining of the eyelids, only secrete, in the sound state, a mere sufficiency of a sebaceous fluid to lubricate the parts in their continual motions. But, it sometimes happens, from disease, that this sebaceous matter is secreted in too great a quantity, and glues the eyelids together during sleep, so that, on waking, they cannot be easily separated. Hence, the margin of the eye-lids becomes red all round, and the sight itself even weakened.

The best remedies are the unguentum hydrargyri nitrati, smeared, at night, on the edges and inside of the eye-lid with a hair pencil, after being melted in a spoon; the unguentum tutiæ, applied in the same way; and a collyrium, composed of ℞j. of zincum vitriolatum in ℥viij. of aquæ rosæ.

When alterative medicines are requisite, a grain of calomel may be exhibited daily, or a pill containing one grain of calomel, one of sulphur antimonii præcipitatum, and two of guaiacum, put together with soap.

Persons who have lippitudo and cataracts together, bear couching much better, than one would expect from the appearance of the eyes in that disease; and Mr.

Hey never rejects a patient on this account, provided such state is habitual. (*Practical Observations*, p. 51.) Scarpa, however, recommends relieving the lippitudo before undertaking the operation, as we have explained in the article *Cataract*.

See *Chandler on the diseases of the Eyes*, chap. 8. *Scarpa sulle Malattie degli Occhi*, p. 244.

LITHONTRIPTICS. (from *λίθος*, a stone; and *θρυπτω*, to break.) Medicines for dissolving stones in the bladder. (See *Urinary Calculi*.)

LITHOTOMY. (from *λίθος*, a stone; and *τεμνω*, to cut.) The operation of cutting into the bladder, in order to extract a stone.

It has been correctly remarked, that no single operation of surgery has attracted so much notice, or had so much written upon it, as that of lithotomy. A full and minute account of the sentiments of every writer, who has treated of the subject, and a detail of the infinite variety of particular modes of making an opening into the bladder, would occupy as many pages as are allotted to the whole of this dictionary. It must be my endeavour, therefore, rather to describe what is most interesting and important, than pretend to offer an article which is to comprehend every thing.

May I be allowed to premise, that throughout the following columns, I suppose the reader well informed of all that relates to the anatomy of the bladder and adjacent parts, and of the perineum. Without correct knowledge of this kind, a man must be presumptuous, indeed! who will set himself up for a good lithotomist; and if he distinguishes himself at all, it will only be by the murders, which he commits, while his successful feats, if he achieve any at all, will redound little to his honour, since every young student will soon find out, that they are not the effect of science, but of mechanical habit and imitation. I would particularly recommend every one, who would wish to become well acquainted with the anatomy of the pelvis viscera and perineum, with a view to lithotomy, in the first place to dissect these parts himself, and then avail himself of the valuable instructions to be derived on the subject from Winslow's *Anatomy*; Le Dran's *Parallèle des Tailles*; Heister's *Instit. Chirurg.*; Le Cat's *Deuxième Recueil*, planche 5 et 6; Haller's *Inst. Med. of Boerhaave*, and *Elem. Physiol.* Tom. 5; Morgagni, *Adversar. Anat.* 3, p. 82, 97; Camper's plates; Sabatier's *Anatomy*; John Bell's *Principles of Surgery*; Deschamps's *Traité Historique*,

&c. de l'Opération de la Taille, Tom. 1, p. 7, &c.

A few subjects which are closely connected with the present, will be found in other parts of this dictionary. For instance, the nature of stones in the bladder will be considered under the head of *Urinary Calculi*, where also will be seen some observations on lithontriptics. The manner of searching for the stone, or as it is now more commonly expressed, of sounding, will be explained in the article *Sounding*.

Here I shall principally confine myself to the symptoms of the disease, and the chief methods of executing the much diversified operation of lithotomy.

SYMPTOMS OF THE STONE.

The symptoms of a stone in the bladder are, a sort of itching along the penis, particularly at the extremity of the glans; and hence the patient frequently gets a habit of pulling the prepuce, which becomes elongated; frequent propensities to make water, and go to stool; great pain in voiding the urine, and difficulty of retaining it, and often of keeping the feces from being discharged at the same time; the stream of urine is liable to stop suddenly, while flowing in a full current, although the bladder is not empty, so that the fluid is expelled by fits, as it were; the pain is greatest towards the end of, and just after, the evacuation; there is a dull pain about the neck of the bladder, together with a sense of weight, or pressure, at the lower part of the pelvis; and a large quantity of mucus is mixed with the urine; and, sometimes, the latter is tinged with blood, especially, after exercise. (*Sharp, Earle, Sabatier.*)

Frequently (says Deschamps) a patient will have a stone in his bladder a long while without the occurrence being indicated by any symptom, or accident. Most commonly, however, the presence of the stone is announced by pain in the kidneys, more especially in adults and old persons, children scarcely ever suffering in this way, because in them the stone is hardly at all detained in the kidneys and ureters, but descends immediately into the bladder, the preceding tubes being in them more dilatable, and the rudiment, or nucleus of the stone smaller.

It seldom happens, that calculous patients void blood with their urine, before the symptoms and accidents, usually caused by the stone, have taken place. It is not till after the foreign body has descended into the bladder, acquired some size, and presented itself at the orifice of that viscus, that pain is occasioned, par-

ticularly, when the surface of the stone is unequal. The patient then experiences frequent inclination to make water, attended with pain. The jolting of a carriage, riding on horseback, and much walking, render the pain more acute. The urine appears bloody; and its course is frequently interrupted, and sabulous matter and particles of stone are sometimes discharged with it. The want to make water becomes more frequent and more insupportable. The bladder is irritated, and inflames; its parietes become thickened and indurated; and its diameter is lessened. A viscid more or less tenacious matter is observed, in greater or lesser quantity, in the urine, and is precipitated to the bottom of the vessel. The urine becomes black and putrid, and exhales an intolerable alkaliescent smell which is perceived at the very moment of the evacuation, and is much stronger a little while afterwards. The patient can no longer use any exercise, without all his complaints being redoubled. Whenever he walks in the least, the urine becomes bloody; the pain about the hypochondria, which was dull in the beginning, grows more and more acute; the ureters and kidneys participate in the irritation with the bladder; they inflame and suppurate, and very soon the urine brings away with it purulent matter. The fever increases, and changes into one of a slow type; the patient loses his sleep and appetite; becomes emaciated and exhausted; and death at length puts a period to his misery. (See *Traité Historique et Dogmatique de l'Opération de la Taille par J. F. L. Deschamps, Tom. 1, p. 163; Paris, 1796.*)

It is acknowledged by all the most experienced surgeons, and judicious writers upon the present subject, that the symptoms of a stone in the bladder, are exceedingly equivocal, and may be produced by several other disorders. "Pain in making water, and not being able to discharge the urine without the feces, are common consequences of irritation of parts about the neck of the bladder, from a diseased prostate gland, and other causes. The urine stopping in a full stream is frequently caused by a stone altering its situation, so as to obstruct the passage; but the same thing may happen from a tumour, or fungus in the bladder. I have seen an instance of this, where a tumour, hanging by a small pedicle, would sometimes cause obstruction, and by altering the posture, would retire, and give a free passage. The dull pain at the neck of the bladder, and the sensation of pressure on the rectum, are frequently owing to the weight of the stone, &c.; but these may proceed

from a diseased enlargement of the prostate gland. Children generally, and grown persons frequently, are subject to a prolapsus ani, from the irritation of a stone in the bladder; but it will likewise be produced by an irritation in those parts." (*Earle*) The rest of the symptoms are equally fallacious; a scirrhus enlargement of the os tincæ, and disease of the kidneys, may occasion a copious quantity of mucus in the urine, with pain, irritation, &c. "The least fallible sign (says Sir James Earle) which I have remarked, is the patient making the first portion of urine with ease, and complaining of great pain coming on when the last drops are expelled. This may readily be accounted for, from the bladder being at first defended from contact with the stone by the urine; and, at last, being pressed naked against it. But, to put the matter out of all doubt, and actually to prove the existence of a stone in the bladder, we must have recourse to the operation of sounding."

A stone in the ureter, or kidneys, or an inflammation in the bladder, from any other cause, will sometimes produce the same effects; but if the patient cannot urinate, except in a certain posture, it is almost a sure sign the orifice is obstructed by a stone. If he finds ease by pressing against the perinæum with his fingers, or sitting with that part upon a hard body, there is little doubt the ease is procured by taking off the weight of the stone; or, lastly, if, with the other symptoms, he thinks he can feel it roll in his bladder, it is hardly possible to be mistaken; however, the only sure judgment is to be formed from searching. (*Sharp on the Operations*.)

An enlarged prostate gland is attended with symptoms resembling those of a stone in the bladder; but, with this difference, that the motion of a coach, or horse, does not increase the grievances, when the prostate is affected, while it does so in an intolerable degree in cases of stone. It also generally happens, that the fits of the stone come on at intervals; whereas, the pain from a diseased prostate is neither so unequal, nor so acute.—(*Sharp in Critical Enquiry*, p. 165, Edit. 4.)

Though, from a consideration of all the circumstances above related, the surgeon may form a *probable* opinion of there being a stone in the bladder, yet he must never presume to deliver a *positive* one, nor ever be so rash as to undertake lithotomy, without having greater reason for being certain that there is a stone to be extracted. Indeed, all prudent surgeons, for centuries past, have laid it down as an invariable maxim, never to deliver a

decisive judgment, nor undertake lithotomy, without having previously introduced a metallic instrument, called a sound, into the bladder, and plainly felt the stone.

However, were the symptoms most unequivocal, there is one circumstance which would always render it satisfactory to touch the stone with an instrument, *just before venturing to operate*; I mean the possibility of there actually being a stone in the bladder to-day, and *not to-morrow*. It is now a well-known fact, that stones are occasionally forced, by the violent contractions of the bladder, during fits of the complaint, between the fasciculi of the muscular coat of this viscus, together with a portion of the membranous lining of the part, so as to become what is termed encysted. The opening into the cyst is frequently very narrow, so that the stone is much bigger than the orifice of the cyst, in consequence of which it is impossible to lay hold of the extraneous body with the forceps, and the operation would necessarily become fruitless. (*Sharp's Critical Enquiry*, p. 228, Edit. 4.)

In the article *Urinary Calculi*, I have noticed the probability of this having occurred in some of the instances, in which Mrs. Stevens's medicine was supposed to have actually dissolved the stone in the bladder; for, an encysted stone is not likely to be hit with the sound, nor to cause any inconvenience, compared with what a calculus, rolling about in the bladder, usually occasions.

It is noticed by Deschamps, that when the stone is lodged in an excavated corner of the bladder, in a particular cyst, or depression; when it projects but very little, when it cannot shift its situation in the bladder, so as to fall against the orifice of this viscus; and when it is also smooth, polished, and light; the patient may then have it a long while, without experiencing any afflicting symptoms. He may even live to an advanced age, if not without some degree of suffering, at most with such pain as is very supportable. Daily experience proves, that persons may live a considerable time, with one, two, or even three stones in the bladder, and, during the whole of their lives, have not the least suspicion of the existence of these foreign bodies.

According to Deschamps, this must have been the case of M. Portalieu, a taylor, in the street Sepulchre. This individual, eighty years old, was frequently attacked with a retention of urine from paralysis, and had consulted Deschamps two years previously. This surgeon introduced a sound several times, and distinctly felt a stone in the bladder. The

patient, however, never had any symptom of the disorder, not even up to the period when Deschamps was writing down the case in his excellent treatise. Very large and exceedingly rough stones have also been found in the dead bodies of certain persons, who had never complained of the symptoms of the disease. But, cases of this kind must be extremely rare, because it is well known, that the pain, which a stone produces, is less in a ratio to its size, than to its shape and situation. A small stone, owing to its situation, may be more painful, than an enormous calculus, which fills the bladder, as is proved by the following case, cited by Deschamps.

Pochet, a watchmaker, until the age of 45, had never had any infirmity, except that of not being able to retain his water a long while. One day, while he was carrying a very heavy pendulum, he made some exertion, which, probably by changing the situation of the calculus, caused at the instant an acute pain in the hypogastric region. Symptoms of the stone soon came on; the pain became intolerable; and the patient went into the Hôpital de la Charité. He was sounded; the stone was felt, and judged to be of considerable size. The incision in the neck of the bladder not sufficing for its extraction, the patient was put to bed again. The next morning, he was operated upon above the pubes by Frère Come, who extracted an oval calculus, that weighed twenty-four ounces. The patient died four and twenty hours after this second operation. This case proves then, that very large stones may lie a long while in the bladder without occasioning any serious complaints, since the preceding patient apparently had such a calculus a long time, without suffering inconvenience from it, and it seems likely that he might have continued well still longer, had it not been for the accidental effort, which first excited the symptoms. (*Deschamps, in Traité Historique, &c. de la Taille, Tom. 1, p. 166, 167.*)

With perfect impartiality, I shall next concisely describe the various methods of cutting for the stone, beginning with the most ancient, called the *apparatus minor*, and ending with the modern proposal of employing a knife in preference to a gorget.

OF THE APPARATUS MINOR, CUTTING ON THE GRIPE, OR CELSUS'S METHOD.

The most ancient kind of lithotomy was that practised upwards of two thou-

sand years ago, by Ammonius, at Alexandria, in the time of Herophilus and Erasistratus, and by Meges, at Rome, during the reign of Augustus; and, being described by Celsus, is named, *Lithotomia Celsiana*. From cutting directly on the stone, fixed by the pressure of the fingers in the anus, it has been called, *cutting on the gripe*, a knife and a hook being the only instruments used. The appellation of the *lesser apparatus*, was given to it by Marianus, to distinguish it from a method which he described, called the *apparatus major*, from the many instruments employed.

The operation was done in the following way. The rectum was emptied by a glyster, a few hours previously; and, immediately before cutting, the patient was desired to walk about his chamber, to bring the stone down to the neck of the bladder; he was then placed in the lap of an assistant, or secured as now, in the lateral operation. The surgeon then introduced the fore and middle fingers of his left hand, well oiled, into the anus; while he, at the same time, pressed with the palm of his right hand on the lower part of the abdomen, above the pubes, to assist in bringing down the stone. With the fingers, it is next to be griped, pushed forward toward the neck of the bladder, made to protrude, and form a tumour on the left side of the perinæum. The operator then took a scalpel, and made a lunated incision through the skin and cellular substance, directly on the stone, and near the auns, down to the neck of the bladder, with the horns towards the hips. Then, in the deeper and narrower part of the wound, is to be made a second incision, also transverse, into the neck of the bladder itself, till the flowing out of the urine shews the incision to exceed in some degree, the size of the stone. The calculus, being strongly pressed upon with the fingers, next started out of itself, or was extracted with a hook for the purpose. (*Celsus, lib. 7, cap. 26. J. Bell's Principles, Vol. 2, p. 42. Allan on Lithotomy, p. 10.*)

The objections to cutting on the gripe, are, the impossibility of always dividing the same parts; for, those which are cut will vary, according to the degree of form employed in making the stone project in the perinæum. When little exertion is made, if the incision be begun just behind the scrotum, the urethra may be altogether detached from the prostate; if the stone be much pushed out, the bladder may be entered beyond the prostate, and both the vesiculæ seminales and vasa deferentia inevitably suffer. Lastly, if the

parts are just sufficiently protruded, the bladder will be cut upon its neck, through the substance of the prostate gland. (*Allan on Lithotomy. Burns, in Edinburgh Surgical Journal, No. XIII. J. Bell, Vol. 2, p. 59.*)

The preceding dangers were known to Fabricius Hildanus, who attempted to obviate them by cutting on a staff, introduced along the urethra into the bladder. He began his incision in the perinæum, about half an inch on the side of the raphe; and he continued the cut, inclining the knife, as he proceeded, towards the hip. He continued to divide the parts till he reached the staff; after which, he enlarged the wound to such an extent, as to permit him easily to extract the stone, which he had previously brought into the neck of the bladder, by pressure with the fingers in the rectum. He employed a hook to extract the stone. (*Burns*) In this way Mr. C. Bell has operated with success. (*J. Bell*.)

The apparatus minor, as practised by Fabricius, with the aid of a staff, is certainly so simple and safe an operation for children, that we must lament its present utter neglected state. You cut, says an eminent writer, upon the stone, and cut of course, with perfect security, an incision exactly proportioned to its size. There is no difficult nor dangerous dissection; no gorget, nor other dangerous instrument, thrust into the bladder, with the risk of its passing betwixt that and the rectum; you are performing, expressly, the lateral incision of Raw and Cheselden, in the most simple and favourable way. (*J. Bell*) The *prisca simplicitas instrumentorum* seems, indeed, as the latter gentleman remarks, to have been forsaken, for the sake of inventing more ingenious and complicated operations.

Celsus has delivered one memorable precept in his description of lithotomy, *ut plaga paulo major, quàm calculus sit*; and he seems to have known very well, that there is more danger from lacerating, than cutting the parts.

The simplicity of the operation emboldened every quack to undertake its performance; and thus, by diminishing the emolument of regular practitioners, became the grand cause of its downfall. (*See Heister on this subject.*) It was longer practised, however, than all the other methods; and was performed at Bourdeaux, Paris, and other places in France, on patients of all ages, by Raoux, even as late as 140 years ago. Frère Jacques occasionally had recourse to it; and it was successfully executed by Heister. (*Part 2, chap. 140.*) A modern author

recommends it always to be preferred on boys, under fourteen. (*Allan, p. 12.*)

APPARATUS MAJOR.

So named from the multiplicity of instruments employed; or the Marian method, from having been first published by Marianus Sanctus, in 1524, as the invention of his master, Johannes de Romanis. (*See Marianus de lapide Vesicæ per incisionem extrahendo*)

This operation, which came into vogue, as we have noticed, from avaricious causes, was rude and painful in its performance, and very fatal in its consequences. The apology for its introduction, was the declaration of Hippocrates, that *wounds of membranous parts are mortal*. It was contended, however, that such parts might be dilated with impunity; and, on this principle of dilatation, Romanis invented a complex and dangerous plan of operating; one very incompetent to fulfil the end proposed; one, which, though supposed only to dilate, really lacerated the parts. (*Burns*)

The operator, kneeling on one knee, made an incision, with his razor, along the perinæum, on one side of the raphe; and, feeling with his little finger for the curve of the staff, he opened the membranous part of the urethra; and, fixing the point of the knife in the groove of his staff, gave it to an assistant to hold, while he passed a probe along the knife into the groove of the staff, and thus into the bladder. The urine now flowed out, and the staff was withdrawn. The operator next took two conductors, a sort of strong iron probes; one, named the female conductor, having in it a groove, like one of our common directors; the other, the male conductor, having a probe point, corresponding with that groove. The grooved, or female conductor, being introduced along the probe into the bladder, the probe was withdrawn, and the male conductor passed along the groove of the female one, into the bladder. Then commenced the operation of dilating. The lithotomist took a conductor in each hand, and, by making their shafts diverge, dilated, or, in plain language, tore open the prostate gland. (*J. Bell*.)

It would be absurd in us to trace the various dilating instruments, contrived for the improvement of this barbarous operation, by the Collots, Le Dran, Paré, &c. Among the numerous glaring objections to the apparatus major, we need only notice the cutting the bulb of the urethra, not dividing the membranous part of the urethra, nor the transversalis

perinei muscle, which forms a kind of bar across the place where the stone should be extracted; the laceration of the neck of the bladder; frequent impotency afterwards, and extensive fatality.—Paré, Le Dran, Le Cat, Mery, Morand, Marschal, Raw, and all the best surgeons in Europe, most strangely practised this rash method, for two hundred years, till Frère Jacques, in 1697, taught at Paris the original model of lithotomy, as commonly adopted at the present day.

OF THE HIGH OPERATION.

This method of cutting for the stone, was first published in 1561, by Pierre Franco, who, in his Treatise on Hernia, says, he once performed it on a child, with very good success, but discourages the farther practice of it. After him, Rossetus recommended it, with great zeal, in his book intitled *Partus Cesarius*, printed in 1591; but he never performed the operation himself.—Monsieur Tolet makes mention of its having been tried in the Hôtel-Dieu, but without entering into the particular causes of its discontinuance, says only, that it was found inconvenient. About the year 1719, it was first done in England, by Mr. Douglas; and after him, practised by others. (*Sharp's Operations*.)

The patient being laid on a square table, with his legs hanging off, and fastened to the sides of it by a ligature, passed above the knee, his head and body lifted up a little by pillows, so as to relax the abdominal muscles, and his hands held steady by some assistants; inject through a catheter, into the bladder, as much barley-water as he can bear, which, in a man, is often about eight ounces, and sometimes twelve.

The bladder being filled, an assistant, in order to prevent the reflux of the water, must grasp the penis, the moment the catheter is withdrawn, holding it on one side, in such a manner as not to stretch the skin of the abdomen; then, with a round-edged knife, make an incision about four inches long, between the recti and pyramidal muscles, through the membrana adiposa, as deep as the bladder, bringing its extremity almost down to the penis; after this, taking a crooked knife, continue the incision into the bladder, carrying it a little under the os pubis; and immediately upon the water's flowing out, introduce the fore-finger of your left hand, which will direct the forceps to the stone. (*Sharp's Operations*.)

Although this is one of the easiest, and, to all appearance, the safest method of

operating, several objections soon brought it into disuse. 1. The irritation of a stone often causes such a thickened and contracted state of the bladder, that this viscus will not admit of being distended so as to rise above the pubes. 2. If the operator should break the stone, the fragments cannot be easily washed away, and remaining behind would form a nucleus for a future stone. 3. The urine may become extravasated. 4. The danger of exciting inflammation of the peritonæum. 5. The injection itself is exceedingly painful, and, however slow the fluid be injected, the bladder can seldom be dilated enough to make the operation absolutely secure; and, when hastily dilated, it is sometimes even burst, or, at least, its tone destroyed. We need not enumerate other inconveniences. (See *Sharp, Allan, &c.*)

Some of the objections, however, do not apply to certain instances. In many men, we know by searching, that their bladder is very large, so that we can run no risk of meeting with it in a contracted state, and therefore, the objection is of no weight, when we are certain, that the bladder extends itself a considerable way above the pubes, and will admit a large quantity of injection. Stones are sometimes known to be of large size, and they are less likely to be broken in this, than any other kind of lithotomy, so that the objection of the difficulty of extracting small ones and fragments, is less forcible. The excoriations, from the effusion of urine all over the skin near the wound, may be prevented by embrocations, ointments, &c. The abscesses and gangrenes, arising from the extravasation of urine in the cellular substance, may be very much prevented by the introduction of a cannula, as practised in the puncture of the bladder above the os pubis. (*Sharp in Critical Enquiry*.)

This celebrated surgeon remarks, in the same chap. I, that he should not be surprised, if hereafter, on particular occasions, the high operation should be revived and practised with success.

LATERAL OPERATION.

So named from the prostate gland, and neck of the bladder, being laterally cut.

It was invented by an ecclesiastic, who called himself Frère Jacques: he came to Paris in 1697, bringing with him abundance of certificates of his dexterity in operating; and making his history known to the court and magistrates of the city, he got an order to cut at the Hôtel-Dieu,

and the Charité, where he performed this operation on about fifty persons. His success did not answer the promises he had made, and from that time his reputation seems to have declined in the world, if we may give credit to Dionis, who has furnished us with these particulars.—(*Sharp's Operations.*)

Frere Jacques used a big round staff without a groove, and when it was introduced into the bladder, he depressed its handle, with an intention of making the portion of this viscus, which he wished to cut, approach the perinæum. He then plunged a long dagger-shaped knife into the left hip, near the tuber ischi, two fingers breadth from the perinæum, and pushing it towards the bladder, opened it in its body, or as near the neck as he could, directing his incision upward from the anus. He never withdrew his knife, till a sufficient opening was made for the extraction of the stone. He used sometimes a conductor to guide the forceps, but more commonly, directed them with his finger, which he passed into the wound after withdrawing the knife. When he got hold of the stone, he used to draw it out in a quick rough manner, heedless of the bad consequences. His only object was to get the stone extracted, and he disregarded every thing else; all preparatory means, all dressings, all after treatment. (*Allan, p. 23.*)

Totally ignorant of anatomy, and thus rude and indiscriminate in practice, Frere Jacques soon sunk into disrepute. However, there were several eminent surgeons, who conceived, from considering the parts, which he cut, that his method might be converted into a most useful operation. (*Sharp's Operations.*)

The principal defect, in his first manner of cutting, was the want of a groove in his staff, which made it difficult to carry the knife into the bladder. At length, Frere Jacques was prevailed upon to study anatomy, by which his judgment being improved, he readily embraced several improvements, which were suggested to him. Indeed, we are informed, that he now succeeded better, and knew more, than is generally imagined. Mr. Sharp says, that when he himself was in France in 1702, he saw a pamphlet, published by this celebrated character, in which his method of operating appeared so much improved, that it scarcely differed from the practice of that time. Frere Jacques had learnt the necessity of dressing the wound after the operation, and had profited so much from the criticisms of Mery, Fagon, Felix, and Hunauld, that he then used a staff with a groove, and, what is more extraordinary, had cut thirty-eight

patients successively, without losing one. (*Sharp's Operations.*)

In short, as a modern writer has observed, he lost fewer patients, than we do at the present day, in operating with a gorget. He is said to have cut nearly 5000 patients in the course of his life, and, though persecuted by the regular lithotomists, he was imitated by Marschall at Paris, Raw in Holland, and by Bamber and Cheselden in England, where his operation was perfected.—(*Allan.*)

For a particular history of Frere Jacques, and his operations, Allan refers us to *Bussiere's Letter to Sir Hans Sloane, Philos. Trans. 1699. Observations sur la Maniere de tailler dans les deux Sexes, pour l'Extraction de la Pierre, pratiquée par F. Jacques, par J. Mery. Lister's Journey to Paris in 1698. Cours d' Operations de Chirurgie, par Dionis. Garengot's Traité des Operations, Tom. 2. Morand, Opuscules de Chirurgie, Part 2.*

Among the many, who saw Frere Jacques operate, was the famous Professor Raw, who carried his method into Holland, and practised it with amazing success. He never published any account of it himself, though he admitted several to his operations; but, after his death, his successor Albinus, gave the world a very circumstantial detail of all the processes, and mentions, as one of Raw's improvements, that he used to open the bladder, between the neck and the ureter. But, either Albinus, in his relation, or Raw himself in supposition, was mistaken; since it is almost impossible to cut the bladder in that part upon the common staff, without also wounding the neck. (*Sharp in Operations, and Critical Enquiry.*)

Raw's method was objectionable, even when accomplished, as the urine could not readily escape, and became extravasated around the rectum, so as to produce terrible mischief. There is little doubt, that Raw's really successful plan, was only imitative of Frere Jacques' second improved one, though he had not the honour to confess it. (See *Ferrius de Calculo Vesicæ.*)

Dr. Bamber was the first man in England, who made a trial of Raw's method on the living subject, which he did in St. Bartholomew's Hospital. Cheselden, who had been in the habit of practising the high operation, gladly abandoned it, on receiving the account of Raw's plan and success, and, a few days after Bamber, he began to cut in this way in St. Thomas's Hospital.

Cheselden used at first to operate in the following manner. The patient be-

ing placed, and tied much in the same way, as is done at this day, the operator introduces a hollow grooved steel catheter into the bladder, and with a syringe, mounted with an ox's ureter, injects as much warm water into it, as the patient can bear without pain. The water being kept from running out by a slip of flannel tied round the penis, the end of the catheter is to be held by an assistant, whose principal care is to keep it from rising, but not at all to direct the groove to the place, where the incision is to be made.

With a pointed convex-edged knife, the operator beginning about an inch above the anus, on the left side of the raphe, between the accelerator urinæ, and erector penis, makes an incision downwards, by the side of the sphincter ani, a little obliquely outwards as it descends, from two and a half to four inches in length, according to the age of the patient, or size and structure of the parts. This incision, he endeavours to make all at one stroke, so as to cut through the skin, fat, and all, or part, of the levator ani, which lies in his way. This done, he passes his left forefinger into the middle of the wound, in order to press the rectum to one side, that it may be in less danger of being cut; and taking a crooked knife in his other hand, with the edge on the concave side, he thrusts the point of it through the wound, close by his finger, into the bladder, between the vesicula seminalis and os ischium of the same side. This second incision is continued upwards, till the point of the knife comes out at the upper part of the first. The incision being completed, the operator passes his left forefinger through the wound into the bladder, and having felt, and secured the stone, he introduces the forceps, pulls out his finger, and extracts the stone.

As the bladder was distended, Cheselden thought it unnecessary to cut on the groove of the staff, and that, as this viscus was sufficiently pressed down by the instrument, the forceps could be very well introduced, without the use of any director, except the finger. (*Postscript to Douglas's History of the Lateral Operation.* 1726.)

With respect to this first of Cheselden's plans, Sharp says, the operations were exceedingly dexterous; but the wound of the bladder retiring back, when it was empty, did not leave a ready issue for the urine, which, insinuating itself among the neighbouring muscles and cellular substance, destroyed four of the ten that he practised it upon, and some of the others narrowly escaped. (*Sharp's Operations.*)

Cheselden, finding that he lost so many of his patients, in imitating Raw, as Albinus directed, began to adopt a new manner of operating, founded on the anatomy of the parts, which he thus describes: "I first make as long an incision as I well can, beginning near the place, where the old operation ends, and cutting down between the musculus accelerator urinæ and erector penis, and by the side of the intestinum rectum: I then feel for the staff, and cut upon it the length of the prostate gland straight on to the bladder, holding down the gut all the while with one, or two fingers of my left hand." (*Anatomy of the Human Body, Edit. 1730.*)

It deserves to be remarked, it was Cheselden's second manner of cutting, that has been described in the *Opuscule de Chirurgie* of M. Morand, who was deputed, and had his expences defrayed, by the Royal Academy of Sciences in Paris, to come over to England, and learn from Mr. Cheselden himself, his way of operating for the stone; and, accordingly we find, that most French authors, taking their account from M. Morand, describe Mr. Cheselden's second, not his third operation, as that which he invented, and bears his name. But, that Mr. Cheselden never resumed his second manner of cutting, may be presumed from his continuing to describe the third only in all the editions of his anatomy published after 1730. (See a note by J. Thomson, M.D. annexed to his new edition of *Douglas's Appendix.* Edinburgh, 1808.)

The instruments, which Cheselden employed in his third, and most improved, mode of cutting for the stone, were a staff, an incision knife, a gorget, a pair of forceps, and a crooked needle carrying a waxed thread. The patient being placed on a table, his wrists are brought down to the outsides of his ankles, and secured there by proper bandages, his knees having first been bent, and his heels brought back near his buttocks.

Mr. Cheselden used then to take a catheter, first dipped in oil, and introduce it into the bladder, where having searched for, and discovered the stone, he used to give the instrument to one of his colleagues, whom he desired to satisfy himself, whether there be a stone, or not. The assistant, standing on his right hand, held the handle of the staff between his fingers and thumb, inclined it a little towards the patient's right thigh, and drew the convex side close up to the os pubis, in order to remove the urethra as far as possible from the rectum.

The groove of the staff being thus turned outwardly and laterally, Cheselden used to sit down in a low chair, and,

keeping the skin of the perinæum steady with the thumb and forefinger of his left hand, he made the first, or outward incision, through the integuments, from above downwards, beginning on the left side of the raphe, between the scrotum and verge of the anus, almost as high up as where the skin of the perinæum begins to form the bag containing the testicles. Thence, he continued the wound obliquely outwards, as low down as the middle of the margin of the anus, at about half an inch distant from it near the skin, and, consequently, beyond the tuberosity of the ischium. He was always careful to make this outward wound as large as he could with safety. Having cut the fat rather deeply, especially near the rectum, he used to put his left forefinger into the wound, and keep it there till the internal incision was quite finished; first to direct the point of his knife into the groove of his staff, which he now felt with the end of his finger, and likewise to hold down the rectum, by the side of which his knife was to pass, and so prevent its being wounded. This inward incision Cheselden made with more caution, than the former. His knife first entered the groove of the rostrated, or straight part of the catheter, through the sides of the bladder, immediately above the prostate, and, afterwards, the point of it continuing to run in the same groove in a direction downwards, and forwards, or towards himself, he divided that part of the sphincter of the bladder, which lies upon that gland, and then he cut the outside of one half of it obliquely, according to the direction and whole length of the urethra, that ran within it, and finished his internal incision, by dividing the muscular portion of the urethra on the convex part of his staff.

A sufficient opening being made, Cheselden used to rise from his chair, his finger still remaining in the wound. Next he put the beak of his gorget in the groove of the staff, and then thrust it into the bladder. The staff was now withdrawn, and, while he held the gorget with his left hand, he introduced the forceps with the flat side uppermost, sliding them with great caution along the concavity of the gorget. When they were in the bladder, he withdrew the latter instrument, and taking hold of the two branches of the forceps with both his hands, he searched gently for the stone, having them still shut. As soon as this was felt, he used to open them, and try to get the lower blade under the stone, that it may fall more conveniently into their chops, and be laid hold of. This being done, the stone was extracted with a very slow mo-

tion, in order to give the parts time to stretch and dilate, turning the forceps gently in all directions.

When the stone was very small, and did not lie well in the forceps, Cheselden used to withdraw them, and introduce his finger into the bladder, in order to try to turn the stone, and disengage it from the folds of the lining of the bladder, in which it is sometimes entangled. Then the gorget was passed in again on the upper side of his finger, and turned as soon as the latter was pulled out; the forceps were introduced, and the stone extracted.

To preserve a soft stone from breaking, during its extraction, he used to put one or more of his fingers between the branches of his forceps, to prevent any greater pressure upon it than what was just necessary to hold it together. But, when it did break, or there were more than one, he used to extract the single stones, or fragments, one after another, repeating the introduction of his fingers and forceps, as often as there was occasion. Cheselden took care not to thrust the forceps so far into the bladder as to bruise, or wound its opposite side; and he was equally careful not to pinch any folds of its inner coat. In this way, Cheselden saved 50 patients out of 52, whom he cut successively in St Thomas's Hospital. (*Appendix to the History of the Lateral Operation, by J. Douglas. 1731.*)

Cheselden, with all the enthusiasm of an inventor, believed, that he had discovered an operation, which was not susceptible of improvement; yet, he himself changed the manner of his incision no less, than three times in the course of a few years. 1st, He cut into the body of the bladder, behind the prostate, when he imitated Raw. 2dly, He cut another part of the bladder, viz. the neck and the thick substance of the prostate; this is his lateral mode of incision. 3dly, He changed a third time, not the essential form of the incision, but, the direction, in which he moved the knife; for, in his first operation, when imitating the supposed operation of Raw and Frere Jacques, he struck his knife into the body of the bladder, betwixt the tuber ischii and the vesiculæ seminales, and all his incision lay behind the prostate gland. In his second operation, he struck his knife into the membranous part of the urethra, immediately behind the bulb, and ran it down through the substance of the gland; but, his incision stopped at the membranous part, or body, of the bladder. But, in his third operation, he, after very large external incisions, struck his knife deeply into the great hollow under the tuber

ischii, entered it into the body of the bladder, immediately behind the gland, and, drawing the knife towards him, cut through the whole substance of the gland, and even a part of the urethra, "cutting the same parts the contrary way." By carrying the forefinger of the left hand before the knife, in dissecting towards the body of the bladder, he protected the rectum more perfectly, than he could do in running the knife backwards along the groove of the staff; and by striking his knife into the body of the bladder, and drawing it towards him, through the whole thickness of the gland, he was sure to make an ample wound. (*J. Bell's Principles of Surgery, Vol. 2, Part 1, p. 152.*)

LATERAL OPERATION AS PERFORMED AT THE
PRESENT DAY WITH CUTTING GORGETS.

The gorget is the same instrument as the conductor used by Hildanus; but, having a cutting edge; and it was used in the Marian operation as a dilator and conductor for the forceps. Sir Cæsar Hawkins thought, that, when its right side was sharpened into a cutting edge, it might be pushed safely into the bladder, guided by the staff, and make the true lateral incision, in the left side of the prostate gland, more easily, and with less risk of injuring the adjacent parts, than Cheselden could do with the knife, and surgeons were pleased with a contrivance, which saved them from the responsibility of dissecting parts, with the anatomy of which all were not equally well acquainted. (*J. Bell, Allan.*)

When the patient is of a plethoric habit, 16, or 20 ounces of blood should be taken from his arm two days before the operation; a brisk purge administered the day before; and a clyster injected a couple of hours before cutting, in order to empty the rectum, and render it less liable to be wounded. It is to be lamented, that these prudent steps are so often neglected.

As it is advantageous to have the bladder somewhat distended with urine, the patient should be requested to retain it a certain time before being cut. When this cannot be done, as in children, some advise tying a ligature round the penis, or applying, what is called, a jagum, to prevent the patient from making the evacuation. The best practitioners in London, however, do not commonly adopt this method.

Before the operation, the following instruments should all be arranged ready on a table: three grooved staffs, of various sizes; a sharp gorget with a beak

nicely and accurately adapted to the grooves of the staffs, so as to glide easily and securely; a large scalpel for making the first incisions; forceps, of various sizes, for extracting the stone; a blunt-pointed bistoury for enlarging the wound in the prostate, if the incision of the gorget is not sufficiently large, as the parts should never be lacerated: a pair of Le Cat's forceps with teeth for breaking the stone, if too large to come through any wound reasonably dilated; a syringe for injecting the bladder, if necessary, to wash out clots of blood, or particles of the stone; a scoop for the latter purpose; two garters to tie the patient's hands to his feet.

After introducing the staff, and feeling that the stone is certainly in the bladder, the patient is to be secured in the same position, as we described in the account of Cheselden's latest method of operating.

The assistant, holding up the scrotum, with his left hand, is with his right to hold the staff, inclining its handle towards the right groin, to make the grooved convexity of the instrument turn towards the left side of the perineum. Some operators, also, like the assistant to depress the handle of the staff towards the patient's abdomen, in order to make its convexity project in the perineum, while others condemn this plan, asserting, that it withdraws the instrument from the bladder. (*Allan, &c.*)

The first incision should always commence, below the bulb of the urethra, over the membranous part of this canal, at the place, where the operator means to make his first cut into the groove of the staff, and the cut should extend about three inches, obliquely downward, to the left of the raphe of the perineum, at equal distances from the tuberosity of the ischium and the anus. In a large man, the first cut should pass the anus an inch and a half or more; for, it is a general rule in surgery to make free external incisions, by which the surgeon is enabled to conduct the remaining steps of his operation with greater facility, and no where is it so necessary as where a stone is to be extracted. (*Allan.*) The next object is to divide the transversales perinæi muscles, which stand, like a bar, across the triangular hollow, out of which alone the stone can be easily extracted. An opening is next to be made into the membranous part of the urethra, and now the operator has to accomplish a very important object, and one which is, for the most part, very much neglected; I allude to dividing the urethra, with the knife, as far as possible along the groove of the staff, towards the

bladder. When this is properly done, very little remains to be effected by that rougher instrument, the gorget.

Having placed the beak of the gorget in the groove of the staff, the operator takes hold of the latter instrument himself, raises its handle from the right groin, so that it may form nearly a right angle with the body, and he stands up. Before attempting to push the gorget onwards into the bladder, he should slide it backwards and forwards, with a wriggling motion, that he may be sure its beak is in the groove of the staff. The bringing forward the handle of the latter instrument, so as to elevate its point, before introducing the gorget into the bladder, is also of immense importance, for, it is by this means, that the gorget is introduced, along the groove of the staff in the axis of the bladder, the only direction, unattended with risk of wounding the rectum. In fact, the gorget should be introduced nearly in a direction, corresponding to a line drawn from the os coccygis to the umbilicus.

As soon as the gorget is introduced, the staff is to be withdrawn. Some operators next pass the forceps, along the concave surface of the gorget, into the bladder; while others, with every appearance of being right, recommend the cutting gorget to be withdrawn immediately it has completed the wound; for, then the bladder contracts violently, and its fundus would be very apt to be cut, if the gorget were not withdrawn. This should be done in the same direction, in which it entered, pressing it towards the right side to prevent its making a second wound in coming out. If the operator should prefer passing the forceps into the bladder, along the gorget, the latter instrument must be kept quite motionless, lest its sharp edge should do mischief; and, at all events, immediately the forceps is in the bladder, the cutting gorget is to be withdrawn.

Some operators withdraw the cutting gorget, and introduce a blunt one for the guidance of the forceps; a step certainly unnecessary, as the latter instrument will easily pass, when the incision into the bladder is ample and direct, as it ought always to be.

The operator has next to grasp the stone with the blades of the forceps; for which purpose, he is not to expand the instrument, as soon as it has arrived in the bladder; but, he should first make use of the instrument as a kind of probe, for ascertaining the exact situation of the stone. If this body should be lodged at the lower part of the bladder, just behind its neck, the operator is to open the in-

strument immediately over the stone, and, after depressing the blades a little, is to shut them, so as to grasp it. Certainly, it is much more scientific to use the forceps at first, merely to ascertain the position of the stone; for, when this is known, he is much more able to grasp the extraneous body in a skilful manner, than if he were to open the blades of the instrument immediately without knowing where they ought next to be placed, or when shut. No man can doubt, that the injury which the bladder frequently suffers, from rough, reiterated, awkward movements of the forceps, is not an uncommon cause of such inflammation of this viscus, as too often extends to the peritonæum, and occasions death.

When the surgeon cannot readily get hold of the stone with the forceps, he should introduce his fore and middle fingers into the rectum, and raise the extraneous body up, when it may generally be easily grasped. The stone should be held with moderate firmness to keep it from slipping from the blades, but, not so forcibly as to incur the risk of its breaking.

Sometimes, the extraction of the stone is attended with difficulty, owing to the operator having chanced to grasp it in a transverse position, in which circumstance, it is better to try to change its direction, or let it go altogether, and take hold of it in another manner. When the stone is so large, that it cannot be extracted from the wound, without violence and laceration, the surgeon may either break the stone with a strong pair of forceps, with teeth constructed for the purpose; or he may enlarge the wound with a probe-pointed crooked bistoury, introduced under the guidance of the forefinger of the left hand. The latter plan is generally the best of the two; for, breaking the stone is an exceedingly unpleasant circumstance, as it creates such a danger of calculous fragments remaining behind.

However, as nothing can justify the exertion of force in pulling out a stone, if the operator should be afraid of making the wound more ample, (its being already large and direct) he must break the stone, as above described. As many of the fragments are then to be extracted with the common lithotomy forceps, as can be taken away in this method, after which the surgeon should introduce his finger, in order to feel, whether any pieces of the stone still remain behind. Perhaps, some of these may be most conveniently taken out with the scoop; but, if they are very small, it is best to inject lukewarm water with moderate force into the

wound, for the purpose of washing them out.

The stone should always be examined immediately it is extracted; because, its appearance conveys some information, though not positive, concerning the existence of others. If the stone is smooth on one surface, the smoothness is generally found to arise from the friction of other stones still in the bladder; but, when it is uniformly rough, it is a presumptive sign, that there is no other one remaining behind. In every instance, however, the surgeon should introduce his forefinger, for the purpose of examining; for, it would be an inexcusable neglect to put the patient to bed, with another stone in his bladder.

After the operation, a simple pledget should be laid on the wound, and supported with a T bandage; the patient should lie in bed on his back, with his thighs closed; folded cloths should be laid under him to receive the urine; and a large opiate administered, as after all grand operations.

OF SOME PARTICULAR METHODS AND INSTRUMENTS.

M. Foubert, a very eminent surgeon at Paris, devised and practised a plan of his own, which however, has not been considered by others, as worthy of being imitated. The patient, having retained his urine, so as to distend his bladder, an assistant, with a convenient bolster, presses the abdomen a little below the navel, in such a manner, that by pushing the bladder forwards, he may make that part of it protuberant, which lies between the neck and the ureter. The operator, at the same time, introduces the fore-finger of his left hand up the rectum, and drawing it down towards the right buttock, pushes in a trocar on the left side of the perinæum, near the great tuberosity of the ischium, and about an inch above the anus. Then the trocar is to be carried on parallel to the rectum, exactly between the erector penis and accelerator urinæ muscles, so as to enter the bladder on one side of its neck. As soon as the bladder is wounded, the operator withdraws his fore-finger from the anus.

In the upper part of the cannula of the trocar, there is a groove, the use of which is to allow some urine to escape, immediately the instrument enters the bladder, that the trocar may not be pushed in any further; but, its principal use is for guiding the incision. As soon as the urine began to flow, Foubert, retracting the trocar a little, without drawing it quite out of the cannula, introduced the point

of a slender knife into the groove in the cannula; and, by the guidance of this groove, he ran it onwards into the bladder, and was aware of the knife having actually entered this viscus, by the urine flowing still more freely. Then raising the knife from the groove, he made his incision, about an inch and a half in length, through the neck of the bladder, by moving the knife from that point, at which it had entered upwards towards the pubes. And, finally, by moving the handle more largely, than the point of the knife, he opened the outer part of the wound to whatever extent the size of the stone seemed to require, and then, withdrawing the knife, he introduced a blunt gorget to guide the forceps.

An effort was made by Thomas to improve this method; but, he failed; and it was never much adopted. The inability of many bladders to allow being distended, is an insuperable objection; for, without this, the trocar is liable to pass between the bladder and rectum, and even through the bladder into the pelvis. (*Mémoires de l'Acad. de Chir.* 663, vol. 1. *Le Dran's Parallèle.* *Sharp's Critical Inquiry.* *J. Bell's Principles*, vol. 2.)

About the middle of the last century, Frere Cosme constructed for lithotomy, a knife, concealed in a sheath, out of which it started on touching a lever. This instrument is entitled to particular attention, because it is still used in several parts of the continent, and even in this country, by the surgeons of the Westminster Hospital. Frere Cosme made the same external incisions, as in the lateral operation, and, after dividing the membranous part of the urethra, he inserted into the groove of the staff the point of his *lithotome*, or *bistourie cachée*, and pushed it into the bladder, after which the staff was withdrawn. The edge of the knife was then turned sideways, and the lever in the handle being touched, the blade started from its sheath, and, being drawn out, divided the prostate and neck of the bladder. The danger of wounding the pudic artery; of injuring the bladder in more places than one, if collapsed; and of cutting the rectum, if the edge of the instrument should be inclined too much downward; are the objections, which have been urged against the employment of the lithotome of Frere Cosme. The second is the only one, that has much validity, and even it might be done away, by not introducing the instrument too far, and yet carrying on the incision just as far laterally, as would be the effect of having more of the instrument to withdraw from the bladder. If this were not done, the wound would be too small to

admit of the stone being extracted, without laceration.

Le Cat, a surgeon, of Rouen, in Normandy, devised a mode of lithotomy, which would be too absurd to be described, were it not so much renowned. He thought the neck of the bladder might be dilated, like that of the wound, and his operation was deformed with all the cruelty of the Marian method, and every error attendant on the infant state of the lateral operation. He first introduced a long big staff; he cut forward with a common scalpel, through the skin and fat, till he could distinguish the bulb, the naked urethra, and the prostate gland. Secondly, with another knife, called urethrotome, having a groove on one side, he opened the urethra, just before the prostate, and, fixing the urethrotome in the groove of the staff, and holding it steady, rose from the kneeling posture, in which he performed the outward incision.—Thirdly, holding the urethrotome in the left hand, he passes another knife, the cystotome, along the groove of the urethrotome, and the beak of the cystotome being lodged in the groove of the urethrotome, it was pushed forwards, through the substance of the prostate gland into the bladder. Fourthly, drawing the cystotome a little backwards, he gives the staff to an assistant to hold steadily, and lifting a blunt gorget in the right hand, he places the beak of it in the groove of the cystotome, and runs it onwards, till it glides from the groove of the cystotome, along the groove of the staff into the bladder. Then, true to the principles of the apparatus major, and, never forgetting his own peculiar theory, *little incision, and much dilatation*, he forced his fingers along the gorget, dilated the neck of the bladder, and so made way for the forceps. (*J. Bell's Principles, Vol. 2.*)

In 1741, Le Dran described an operation, the introduction of which has been claimed by several since his time. A staff being introduced, and two assistants keeping open the patient's knees, while a third stands on one side of him on a chair, (Le Dran says,) "I then raise up the scrotum, and directing the last assistant to support it with both hands, so as to avoid bruising it, by pressing it either against the staff, or the os pubis, I place his two forefingers on each side of the part, where the incision is to be made; one of the fingers being laid exactly along that branch of the ischium, which rises towards the pubes, and the other pressed upon the raphe, that the skin may be kept fixed and tight. While I thus place the fingers of the assistant, who supports the scrotum, I still keep hold of

the handle of the staff, and direct it so as to form a right angle with the patient's body; at the same time, taking care, that the end of it is in the bladder. This position is the more essential, as all the other instruments are to be conducted along the groove of this. If the handle of the staff were kept inclined towards the belly, the end of it would come out of the bladder, and the gorget, missing its guide, would slip between that and the rectum.

"The staff being rightly placed, I take the knife from the assistant, who holds the instruments, and put it into my mouth; then pressing the beak of the staff against the rectum, I feel the curvature of it through the perinæum. The incision ought to terminate, an inch and a half, below where we feel the bottom of the curvature. If we do not carry this incision sufficiently low, it may happen not to be of a size to allow the extraction of a large stone, and might lay us under the necessity of extending it further afterwards, for the skin will not lacerate here, nor easily give way for the passage of the stone. I therefore begin the incision from the lower part of the os pubis, continuing it down to the place, that I before directed for its termination; after which I pass the point of the knife into the groove of the staff, and cutting from below upwards, without taking the point out of the groove, I open the anterior part of the urethra, as far as the incision, that is in the skin.

"The beak of the staff, which was pressed upon the rectum, must now be raised and pressed against the os pubis. At the same time, I turn the handle towards the right groin, that the groove, which is at the beak of the staff, may face the space, between the anus and the tuberculum ischii on the left side. Then carrying the point of the knife down the groove, I slide it along the beak, turning the edge, that it may face the space, between the anus and tuberosity of the ischium. By this incision, I exactly divide the bulb of the urethra, and by doing this on its side, we are sure to avoid wounding the rectum, which, for want of this precaution, has been often cut. This first incision being made, I again pass the point of the knife into the curvature of the staff to the part, where it bears against the perinæum, and direct it to be held there by the assistant, who supports the scrotum. This done, I take a large director, the end of which is made with a beak, like that of a gorget, and conveying this beak, upon the blade of the knife, into the groove of the staff, I draw the knife out. I then slide the beak of this

director, along the groove of the staff, into the bladder, and I withdraw the staff by turning the handle towards the patient's belly. The following circumstances will sufficiently satisfy us, that the director is introduced into the bladder; first, if it strikes against the end of the staff, which is closed; secondly, if the urine runs along the groove. I next feel for the stone with this director, and, having found it, endeavour to distinguish its size and surface, in order to make choice of a proper pair of forceps; that is, one of a stronger, or weaker make, or of a large or small size, agreeably to that of the stone; after which I turn the groove, towards the space, between the anus and tuberosity of the ischium, and, resting it there, convey a bistoury along the groove, the blade of which is half an inch broad, and about three quarters of an inch long. I continue the incision, made by the knife in the urethra, and entirely divide the prostate gland laterally, as also the orifice of the bladder; and, I am very certain, that the introducing the use of these two instruments, which are not employed by other lithotomists, does not prolong the operation a quarter of a minute, but, rather shortens the time, both by facilitating the dilatation, that is afterwards to be made with the finger, and by rendering the extraction of the stone more easy. The bistoury being withdrawn, the groove of the director serves to guide the gorget into the bladder. I then introduce my forefinger along the gorget (which is now easily done, as the urethra and prostate, being divided, do not oppose its entrance) and with it I dilate the passage for the stone, in proportion to the size, of which I discover it to be. This dilatation being made, I withdraw my finger, and use the proper forceps." (*Le Dran's Operations*, edit. 6, 1784, London.)

The high operation, which we have already described, was introduced by Franco, in 1561, and was again revived in 1658, by Frere Cosme, with what were supposed to be some improvements. The latter proposed to open the bladder in perinæo, and then, through an opening made just above the pubis, he introduced a scalpel with a button-point, with which he slit up, for an inch or two, the linea alba, the knob on the end of the knife pushing aside the peritonæum. After this, he introduced, by the aperture in perinæo, a staff, with which he projected the bladder through the opening, between the recti muscles: this done, he cut into the front of the bladder, and either with his finger and thumb, or with a pair of forceps, he took out the stone.

In this way, he extracted a calculus from the bladder, weighing 24 ounces. Were it not for the danger attendant on the double incision into the bladder, and the protraction of the operation by the dissection about the perinæum, this plan might, with propriety, be adopted. Indeed, as modified by Deschamps, who, in place of the puncture in perinæo, perforates the bladder from the rectum, it has met with the approbation of Dr. Thomson, of Edinburgh, who considers this, on particular occasions, to be the most advisable mode of operating. It is evident, however, that if the bladder be thickened and indurated, it will be impossible to raise it above the pubes with the cannula, and, consequently, the plan is only admissible when we have reason to suppose that the stone is too large to be removed from the perinæum, and the bladder is healthy. The puncture from the rectum is simple, attended with no increase of danger, allows the bladder to be elevated by the cannula, and secures a depending outlet for the urine. We avoid thus the necessity of any discharge by the wound above the pubes, we run no risk of the urine insinuating itself into the cellular membrane; no inflammation is excited; no sinuses are formed. (*Burns, in Edinb. Surg. Journal*, No. 13.)

The danger of the beak of the gorget slipping out of the groove of the staff, is one of the chief objections urged against the employment of the first of these instruments. To obviate this, Sir Charles Blicke had the groove of the staff, and the beak of the gorget, so constructed that they locked into each other, and continued fixed till near the extremity of the staff. The contrivance, though plausible and ingenious, is not much used; the point of contact of the beak and body of the instrument is necessarily so small, that it is liable to break. It is allowed, however, that this objection might be removed; but another one is still urged, viz. the beak and groove catching on each other, so as to resist the efforts made to introduce the gorget into the bladder. Every operator knows, that much of the safety of the lateral operation, as performed at present, depends on the ease with which the beak of the gorget slides along the groove of the staff. Le Cat, in 1747, is said to have devised a similar instrument.

Some operators seem to have a good deal of trouble in dissecting into the groove of the staff. Sir James Earle invented an instrument to render this more easy. It consists of a short staff, with an open groove, connected by a hinge, with the handle of another staff of the usual

size, shape, curvature, and length, which may be called the *long staff*. The hinge, by means of a pin, is capable of being dis-jointed at pleasure. The short staff is sufficiently curved to go over the penis and scrotum, and long enough to reach to that part of the long staff which is just below the beginning of its curvature. The end of the short staff, made somewhat like a pen, with the sides sharpened and finely pointed, is adapted to shut into the groove of the long staff, and its cutting edges are defended from being injured by a proper receptacle which is prepared for it in the groove of the long staff. When the instrument is shut, the groove of the short staff leads into that of the long one, so as to form one connected and continued groove. The short staff is rendered steady by the segment of an arch projecting from the long one through it.

The long staff, separated from the short one, is first introduced in the usual manner, and, the stone having been felt, the short staff is to be put on the other at the hinge. The incision is then to be made in the usual manner, through the skin and cellular membrane, and a second incision through the muscles, so as nearly to lay bare the urethra. The operator then being perfectly convinced, that the extremity of the long staff is sufficiently within the bladder, must bring the end of the short staff down, and press it against the urethra, which it will readily pierce, and pass into the cavity prepared for it in the groove of the long staff. The two staffs being now firmly held together by the operator's left hand, nothing remains to be done, except applying the beak of the gorget, to the groove of the short staff, and push it on till it be received in the groove of the long one; and if this latter be made with a contracted groove, it will just enter where the contraction begins, and thus must be safely conducted into the bladder. (*Earle on the Stone; Appendix; Edit. 2, 1796;*) Deschamps describes an instrument, invented by Jarda, a surgeon of Montpellier, which bears a resemblance to Earle's double staff, but was more complicated, being designed to support the scrotum, and also press the rectum out of the way.

With respect to the method of using the double staff, would it be proper, immediately after piercing the urethra with the point of the short staff, to plunge the gorget into the bladder, without having previously divided with a knife the membranous part of the urethra? The reader will hardly approve of this plan, whatever opinion he may entertain of the utility of the instrument.

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The late Mr. Dease, of Dublin, and Mr. Muir, of Glasgow, considering that the gorget was more apt to slip from the staff in consequence of the latter being curved, and that its beak never slips from the groove of the staff in operating on women, proposed, like Le Dran, to convert the male into the female urethra. They introduce, as usual, a curved grooved staff into the bladder, make the common incision, and open the membranous part of the urethra: but, instead of introducing a gorget on the curved staff, they conduct along the groove a female one into the bladder, and immediately withdraw the other. The gorget is then introduced. This method certainly removes the danger arising from the slipping of the latter instrument.

LITHOTOMY, AS PERFORMED WITH A KNIFE, INSTEAD OF A CUTTING GORGET, BY SEVERAL OF THE MODERNS.

We have already described, how Frere Jacques and Cheselden used to operate with a knife, without any cutting gorget, in the early state of the lateral operation. The success, which attended the excellent practice of the latter surgeon, certainly far exceeds what attends the present employment of the gorget, for, out of 52 patients, whom he cut successively for the stone, he only lost two; and out of 213, of all ages, constitutions, &c. only 20. These facts are strongly in favour of abandoning the use of the gorget, and doing its office with a knife.

The objections to the gorget are numerous and well founded. In the hands of many skilful operators, its beak has slipped out of the groove of the staff, and the instrument has been driven either between the rectum and the bladder, or into the intestine instead of the latter viscus. Sir James Earle remarks: "I have more than once known a gorget, though passed in the right direction, pushed on so far, and with such violence, as to go through the opposite side of the bladder." Bromfield, even when operating with a blunt gorget, burst through the bladder and peritonæum, so that the abdominal viscera came out of the wound. (P. 270.) I knew of one instance in which the gorget, slipping from the staff, completely severed the urethra from the bladder; the stone was not taken out, and the child died.

We will suppose, however, that the preceding dangers of the gorget are surmounted, as they certainly may be, by particular dexterity, seconded by the confidence of experience. The gorget is introduced, but whatever kind of one has been used, the wound is never sufficiently

A a

large for the easy passage of any stone, except one below the ordinary size. Camper has noticed this fact: "*Hawkensius solo conductore, cujus margo dexter in aciem assurgit, idem præstat: omnes plagam dilatant, ut calculum extrahant: dilacerentur igitur semper vesicæ ostium et prostata.*" (P. 114.) Dease says: "In all the trials that I have made with the gorget on the dead subject, I have never found the opening into the bladder sufficiently large for the extraction of a stone of a middling size, without a considerable laceration of the parts. I have frequently taken the largest-sized gorget, and could not find, in the adult subject, I ever entirely divided the prostate gland, if it was any way large; and in the operations that were performed here on the living subject, if the stone was large, the extraction was painfully tedious, and effected with great difficulty, and, in some cases, not at all."

I shall dismiss this part of the subject with referring the reader to the spirited and correct remarks on the objections to the gorget in Mr. John Bell's Principles, Vol. 2, Part 2.

The latter author recommends the external incision, in a large man, to commence about an inch behind the scrotum, and to be carried downwards three inches and a half, midway between the anus and tuberosity of the ischium. The fingers of the left hand, which at first kept the skin tense, are now applied to other purposes. The fore finger now guides the knife, and the operator proceeds to dissect through fat and cellular substance, and muscular and ligamentous fibres, till the wound is free and open, till all sense of stricture is gone; for it is only by feeling opposition and stricture, that we recognize the transverse muscle. When this hollow is fairly laid open, the external incision, *which relates merely to the free extraction of the stone, is completed.* If it were the surgeon's design to operate only with the knife, he would now push his fingers deeply into the wound, and, by the help of the fore-finger, dissect from the urethra along the body of the gland, till he distinguished its thickness and solidity, and reached its back part. Then plunging his knife through the posterior portion of the gland, and settling it in the groove of the staff, he would draw it firmly and steadily towards him, at the same time pressing it into the groove of this instrument, and then the free discharge of the urine, assuring him that the prostate and neck of the bladder were divided, he would lay aside his knife, pass the left fore-finger into the bladder, with-

draw the staff, and introduce the forceps, (*John Bell, p. 197.*)

Mr. Charles Bell describes the following method of operating with a knife, instead of a gorget. A staff grooved on the right side, a scalpel with a straight back, and the common lithotomy forceps, are the indispensable instruments. The staff is kept in the centre, and well home into the bladder. The surgeon making his incision under the arch of the pubes, and by the side of the anus, carries it deeper towards the face of the prostate gland: cutting near to the staff, but yet not cutting into it, and avoiding the rectum by pressing it down with the finger. Now carrying the knife along the staff, the prostate gland is felt. The point of the knife is run somewhat obliquely into the urethra, and into the lateral groove of the staff, just before the prostate gland. It is run on, until the urine flows. The fore-finger follows the knife, and it is slipped along the back of it, until it is in the bladder. Having carried the fore-finger into the bladder, it is kept there, and the knife is withdrawn. Then the forceps, directed by the finger, are introduced. (*C. Bell's Operative Surgery, Vol. 1, p. 361.*)

Mr. Allan Burns, of Glasgow, recommends the following plan: "The plan, says he, introduced by Cheselden, and revived by Mr. J. Bell, I would assume, as the basis of the operation; but still, along with their mode, I would blend that of Mr. Dease, by which, I imagine, we may overcome some of the disadvantages attendant on each considered individually.

"For more than twelve months, I have been in the habit of shewing such an operation, which is as simple in its performance, as the one in general use, is attended with less danger to the patient, permits of an incision varying in size, according to the wish of the operator, and completely prevents injury of the rectum, or pudic artery. To perform this operation, I introduce into the urethra a common curved staff, then make the usual incision into the perinæum, divide fully and freely the levator ani, so as to expose the whole extent of the membranous part of the urethra, the complete extent of the prostate gland, and a portion of the side of the neck of the bladder. When this part of the operation is finished, I open the membranous part of the urethra, and introduce through the slit, a straight or female staff, with which I feel the stone, and then withdraw the curved staff. This done, I grasp the handle of the staff firmly in my left hand, and with the right lay

hold of the knife. Having ascertained, that the two instruments are in fair contact, I rest the one hand upon the other, pressing them together, and then by a steady extraction, I pull out the knife and staff together, which is preferable to drawing the knife along the staff, it prevents the risk of the one slipping from the other; it guards the bulb of the urethra, and every other part from injury; for, between them and the cutting instrument, the staff is interposed;" &c. "When introducing the knife, the side of the blade must be laid flat along the fore-finger of the right hand, which is to project a little beyond the point. In this state the finger and knife are to enter the wound, opposite the tuber-ischii; but, in proportion as they pass along, they are to be inclined forward, till at last, with the point of the finger, the staff is to be felt through the coats of the bladder, a little beyond the prostate, and rather higher than the orifice of the urethra. Here the knife is to be pushed, with the finger, through the bladder, and when the point is fairly fixed in the groove of the staff the operation is to be finished by the steady extraction of both instruments." (*Allan Burns, in Edinburgh Surgical Journal, No. 13.*)

The knife of Cheselden does not require so much violence to divide the parts as the gorget does; cannot slip in some instances before, in others behind the bladder; and it will make a wound sufficiently ample for the easy extraction of the stone, without the least laceration. The possibility of its wounding the rectum, Mr. Thomson thinks might be obviated by employing it as follows: "After having made the external incisions, and divided the membranous part of the urethra, in the way that is usually done for the introduction of the beak of the gorget, a straight-grooved staff is to be introduced into the groove of the curved staff, and pushed along it into the bladder. The curved staff is then to be withdrawn, and the surgeon, laying hold of the handle of the straight staff with his left hand, and turning the groove upwards and a little outwards, presses the back of it downwards towards the right tuber ischii, and holds it steadily in that position. The point of a straight-backed scalpel being now introduced into the groove of the staff, with its cutting edge inclined upwards and a little outwards, is to be pushed gently forwards into the bladder. The size of the scalpel need only be such as will make a wound in the prostate gland and neck of the bladder, sufficiently large to admit the fore-finger of the left hand. The scalpel being re-

moved, this finger is to be introduced into the bladder, through the wound which has been made, and the staff may then be withdrawn. With the finger the surgeon endeavours to ascertain the size and situation of the stone. If, after this examination, he judges the incision in the neck of the bladder to be too small for the easy extraction of the stone, he next introduces into the bladder a straight probe-pointed bistoury, with its side close to the fore part of his finger, and its cutting edge upwards. By turning this edge towards the left side, and by keeping the point of his finger always beyond the point of the bistoury, he may safely divide, in the direction of the first incision as much of the prostate gland, and neck of the bladder, as he shall deem necessary." See *Observations on Lithotomy, &c. with a Proposal for a New Manner of Cutting for the Stone, by J. Thomson, M.D. one of the Surgeons of the Royal Infirmary, &c. Edinb. 1808.* In this small work, the reader will find additional particulars.

Mr. Allan, who is a strenuous advocate for using the knife instead of the gorget, directs us, after laying bare the urethra, and bringing the staff so as to form a right angle with the patient's body, to feel that the instrument is fairly lodged in the bladder. The operator is to use the fore-finger of his left hand as a director in feeling for the groove in the staff, and in distinguishing the prostate gland; and, with this finger, he is to depress the rectum, and direct the deeper part of his dissection. "Feeling the gland, with the point of the fore-finger of the left hand, and the groove of the staff in the upper part of the wound, the assistant is desired to steady his hand, and the operator, holding his knife as he does a writing pen, his fingers an inch and a half from the point, turns up its edge towards the staff, and strikes its point through the membranous part of the urethra into its groove, half an inch before the prostate gland. He now turns the back of the knife to the staff, slides it a little backwards and forwards in the groove, that he may be sure he has fairly entered; then shifts the fore-finger, with which he guides the incision, places it under the knife, and carries always before the point of it, to prevent the rectum being wounded; he then lateralizes the knife, enters the substance of the prostate, is conscious of running the scalpel through its solid and fleshy substance, and judges, by the finger, of the extent of the incision, which he now makes. The urine flows out; he slips in the finger into the opening, withdraws the scalpel,

and gives it to an assistant, who hands him the forceps, which he passes into the bladder, using the fore-finger of his left hand, which is still within the wound, as a conductor. The forceps instantly encounter the staff, which serves to conduct them safely into the bladder, while the finger guides them through the wound;" &c. (*Allan on Lithotomy*, p. 48, Edinb. 1808.)

I leave the reader to judge, which of the foregoing modes of operating with a knife, claims the preference. Perhaps Cheselden's manner, which is also Mr. John Bell's, is as deserving of recommendation as any.

Mr. Lawrence has, very obligingly, allowed me to insert in this work the following case, in which he performed lithotomy with a common knife, and without any gorget. He describes the method which he took, as follows: "On the first of December, 1808, I performed the operation of lithotomy on Mr. Richard Cooper, aged 63, in the presence of Mr. Crowther, surgeon to Bridewell and Bethlem Hospitals, Mr. Barnes, a pupil of St. Bartholomew's, and some other gentlemen. The patient was very fat, particularly about the nates and perinæum, so that my fore-finger was buried beyond the middle joint before I had laid bare the groove of the staff, which I made a point of doing behind the bulb of the urethra, having always considered any division of the bulb to be perfectly useless, and even prejudicial. I continued the incision through the prostate, and neck of the bladder, with the same instrument that was used for making the first cut, (a common scalpel,) carried horizontally, with its back in the groove of the staff, until it reached the bladder, and then moved obliquely outwards and downwards, so as to obtain a cut of the requisite size in the neck of that viscus. The quantity of fat was so considerable, that I could barely feel the stone with the end of my fore-finger pushed as high up as possible. I employed the left fore-finger as a conductor for the forceps, and extracted, without the least violence, a stone measuring five inches in its greatest, and four in its least, circumference. No unpleasant symptom followed the operation, not the slightest mark of inflammation, nor the least pain, nor tension of the abdomen.

"I have publicly demonstrated to the pupils of St. Bartholomew's the mode of operating with an ordinary knife, and have repeatedly practised it in the dead subject, without ever experiencing the slightest difficulty in making an open-

ing of any extent that I wished into the bladder."

[It is not my intention in this place to decide whether the gorget ought to be renounced in the operation of lithotomy and the scalpel substituted or not; but I wish to declare my opinion, that many of the accidents which have occurred in this operation are owing to the construction of the gorget, the beak of which prevents the possibility of having an edge, perfectly keen, contiguous to the beak. The consequences of the gorget being dull at this place, are, first, That the urethra is sometimes thrown into folds before the blade of the instrument, and in this manner the beak is forced out of the groove in the staff. Secondly, When the gorget enters the bladder, it enters with a jerk and with more violence than the surgeon intended. A gorget has been constructed by Dr. Physick, in which this objection is entirely obviated, by having the blade separable from the beak. This instrument is described in the *Med. Museum*, vol. I.]

LITHOTOMY IN WOMEN.

Women suffer much less from the stone than men, and far less frequently stand in need of the operation of lithotomy. It is not, however, that their urine will not so readily produce the concretions, which are termed urinary calculi. The reason is altogether owing to the shortness, largeness, and very dilatable nature of the female urethra; circumstances, which in general render the expulsion of the stone with the urine almost a matter of certainty. The records of surgery present us with numerous instances, where calculi of vast size have been spontaneously voided through the meatus urinarius, either suddenly without pain, or after more or less time and suffering. Heister mentions several well authenticated examples of this kind. Middleton has also related a case, where a stone, weighing four ounces, was expelled in a fit of coughing, after lodging in the passage a week. Collot speaks of another instance, where a stone about as large as a goose's egg, after lying in the meatus urinarius seven or eight days, and causing a retention of urine, was voided in a paroxysm of pain. A remarkable case is related by Dr. Molineux

* The above patient afterwards died in a kind of fit; but to all appearances, from a cause, which had no connexion with the operation.

in the early part of the Philosophical Transactions: a woman voided a stone, "the circumference of which measured the longest way seven inches and six-tenths, and round about, where it was thickest five inches and three-quarters; its weight near two ounces and a-half troy.

Sometimes, after the passage of large calculi, the patient has been afflicted with an incontinence of urine; but, in general, this grievance lasts only a short time.

The naturally large size and dilatable nature of the female urethra, have suggested the plan of endeavouring to expand this passage by various means, so that a stone in the bladder may be taken out with a pair of forceps, without having occasion to employ any cutting instrument whatsoever. This method was proposed by Douglas nearly a century ago, who not only recommended the use of sponge for the purpose, but also dried gentian root, as being more gradual in its expansion, and better adapted to the object.

Mr. Bromfield has published the case of a young girl, in whom he effected the necessary dilatation by introducing into the meatus urinarius, the appendicula cæci of a small animal in a collapsed state, and then filling it with water by means of a syringe. The piece of gut, thus distended, was drawn out, in proportion as the cervix vesicæ opened, and, in a few hours, the dilatation was so far accomplished, that the calculus had room to pass out. (See *Chirurgical Obs. and Cases*, Vol. 2, p. 276.)

Mr. Thomas very recently met with a case, in which, after dilating the meatus urinarius with sponge tent, he succeeded in extracting an earpicker which lay across the neck of the bladder. The passage was so much enlarged, that the left fore-finger was most easily introduced, and (says this gentleman) "I believe had the case required it, both thumb and finger would have passed into the bladder, without the smallest difficulty." After adverting to this, and other facts, proving the ease, with which the female urethra can be dilated, Mr. Thomas remarks: "If these relations can be credited, and there is no reason why they should not, I can hardly conceive any case, in a young and healthy female subject, and where the bladder is free from disease, where a very large stone may not be extracted, without the use of any other instrument, than the forceps, the urethra having first been sufficiently dilated by means of the sponge tents. For this purpose, the blades of the forceps need not be so thick and strong, as those commonly employed. (See

Medico Chirurgical Transactions, Vol. 1, p. 123—129.)

Some surgeons have extracted stones from the female bladder in the following manner: the patient having been placed in the position commonly adopted in the lateral operation, a straight staff, with a blunt end, is introduced into the bladder, through the meatus urinarius. The surgeon then passes along the groove of the instrument the beak of a blunt gorget, which instrument becoming wider towards the handle, effects a part of the necessary dilatation. The staff being withdrawn, and the handle of the gorget taken hold of with the left hand, the right fore-finger with the nail turned downwards, is now introduced slowly along the concavity of the instrument. When the urethra and neck of the bladder have thus been sufficiently dilated, the finger is withdrawn, and a small pair of forceps passed into the bladder. The gorget is now removed, and the stone taken hold of, and extracted. (See *Sabatiér's Médecine Opératoire*, tom. 2. p. 103.)

Notwithstanding these favourable accounts of the practice of dilating the female urethra, for the purpose of removing calculi from the bladder, the generality of surgeons prefer the plan of making an incision. It is certain, that some patients have found the method insufferably tedious and painful. But the strongest objection to the practice has arisen from the incontinence of urine, which occasionally follows any great distention of the urethra and neck of the bladder. Mr. Thomas believes, however, that this unpleasant symptom is quite as often a consequence of the operation of lithotomy, as now usually performed. (*Medico Chirurgical Transactions*, Vol. 1, p. 127.)

Lithotomy on females is much more easy of execution, and less dangerous than the same operation on the male subject. It may be done in various ways; but, the surgeons of the present time constantly follow the mode of making the requisite opening by dividing the urethra and neck of the bladder. A straight staff, or director, is introduced through the meatus urinarius; the groove is turned obliquely downwards and outwards, in a direction parallel to the ramus of the left os pubis; and a gorget, or knife, is thus conducted into the bladder, and makes the necessary incision. Some operators prefer the lithotome caché, which, after being introduced, is opened as far as is deemed proper, and then drawn out with its edge turned obliquely outwards and downwards.

The French surgeons Louis and Flurant, were the inventors of particular bis-

touries for dividing both sides of the female urethra at once. The instrument of the former effected this purpose, in passing from without inwards; that of the latter, in passing from within outwards. Flurant's bistoury bears some resemblance in principle to Frère Côme's lithotome caché, or to the cutting forceps, with which Franco used to divide the neck of the bladder. The reason, assigned in recommendation of these bistouries, is, that they serve to make a freer opening for the passage of large stones, than can be safely made by cutting only in one direction. At present, however, they are never used. Were the stone known to be very large, Sabatier seems to prefer the apparatus altus.

A case may present itself, in which the posterior part of the bladder drawn downwards by the weight of the stone, may displace a portion of the vagina, and make it protrude at the vulva in the form of a swelling. Here, there would be no doubt of the propriety of cutting into the tumour, and taking out the foreign body contained in it. Rousset performed such an operation, and Fabricius Hildanus in a case, where the stone had partly made its way into the vagina, enlarged the opening, and successfully extracted the foreign body.

M. Mery once made the proposal of cutting into the posterior part of the bladder, through the vagina, after introducing a common curved staff; but the apprehension of urinary fistulæ made him abandon the project.

The existence of extraordinary circumstances may always render a deviation from the common modes of operating not only justifiable, but absolutely necessary. Thus, Tolet met with a case, where a woman had a prolapsus of the uterus, with which the bladder was also displaced. In the latter viscus, several calculi were felt. An incision was made into it, and the stones extracted, after which operation, the displaced parts were reduced, and a speedy cure followed. (*Sabatier's Médecine Opératoire*, tom. 2, p. 107.)

TREATMENT AFTER THE OPERATION.

If the internal pudental artery should have been cut, and bleed profusely, the best plan is to introduce into the wound a piece of firm sponge, with a large cannula passed through its centre. The expanding property of the sponge, on its becoming wet, will make the necessary degree of compression of the vessel, which lies too deeply to be tied. The coagula should be washed out of the bladder, if they should appear to have lodged in it, by injecting luke-warm water.

I cannot say, that it has fallen to my

lot to see many cases (out of the great number which I have seen in Bartholomew's Hospital), in which death could be imputed to hemorrhage, notwithstanding the bleeding has often been so profuse, and from so deep a source, just after the operation, as to leave no doubt, that it proceeded from the internal pudental artery. Such hemorrhage generally stopped before the patient was put to bed.

The majority of patients who die after lithotomy, perish of peritoneal inflammation. Hence, on the least occurrence of tenderness over the abdomen, copious venesection should be put in practice. At the same time, eight or ten leeches should be applied to the hypogastric region. The belly should be fomented, and the bowels kept open with the oleum ricini. The feebleness of the pulse should not deter the practitioner from using the lancet; this symptom is only fallacious; and it is attendant on all inflammation within the abdomen. Together with the above measures, the warm bath, a blister on the lower part of the abdomen, and emollient glysters, are highly proper. I have seen several old subjects die of the irritation of a diseased thickened bladder, continuing after the stone was extracted. They had not the acute symptoms, the inflammatory fever, the general tenderness and tension of the abdomen, as in cases of peritonitis; but they referred their uneasiness to the lower part of the pelvis; and instead of dying in the course of two or three days, as those usually do, who perish of peritoneal inflammation, they, for the most part, lingered for two or three weeks after the operation. In these cases, opiate glysters, and blistering the hypogastric region, are the best measures. In some instances of this kind, abscesses form about the neck of the bladder.

Whoever wishes to acquire a perfect knowledge of the history of lithotomy should consult the following works: *Celsus de Re Medicâ*, lib. 7. cap. 26. *Remarques sur la Chirurgie de Chauliac*, par M. Simon de Mingelouzeaux, tom. 2; Bourdeaux, 1663. *La Légende du Gascon* par Drelincourt; Paris, 1665. *Van Horne's Opuscula*. *Marianus de Lapide Vesicæ, per Incisionem extrahendo*; 1552. *Parallèle des Différentes Manières de tirer la Pierre hors de la Vessie*; 1730. *Sharp's Operations*. *Sharp's Critical Enquiry*. *Le Dran's Operations*, Edit. 5; London, 1781. *Franco's Traité des Hernies*; 1561. *Rosetus de Partu Cesario*. *Traité de la Lithotomie*, par Tolet. *Heister's Surgery*, Part 2. *Lithotomia Douglassiana*; 1723. *Morand de alto Apparatu*. *Observations sur la Manière de Tailler, &c. pratiquée par Frère Jacques*; par J. Mery. *Cours d'Opérations de Chirurgie* par Dionis. *Traité des*

Opérations par Garengot, tom. 2. Morand Opuscules de Chirurgie. Bertrandi Traité des Opérations. Index Supellectilis Anatomica Raviana; Leida, 1725. Le Cat, Recueil de Pièces sur l'Opération de la Taille, Part 1; Rouen, 1749. Cosme, Recueil de Pièces Anatomiques importantes sur l'Opération de la Taille; Paris, 1751—1753. J. Douglas, Postscript to Hist. of the Lateral Operation; 1726. Cheselden's Anatomy, 1730; and subsequent editions. J. Douglas, Appendix to Hist. of the Lateral Operation; 1731. A short Historical Account of Cutting for the Stone, by W. Cheselden, in his own last edition of his Anatomy. Falconet in Thes. Chirurg. Halleri; thes. 103, t. 4, p. 196. Hartinkel. Tractatus de Vesicae Urinariae calculo, &c. 1785. Traité Historique et Dogmatique de l'Opération de la Taille par J.F.L. Deschamps, in four tomes 8vo, Paris, 1796. This last work is a very complete and full account of the subject up to the time of its publication, and well merits a careful perusal. Richerand's Nosographie Chirurgicale, tom. 3, p. 500, &c. Edit. 2. Leveillé's Nouvelle Doctrine Chirurgicale, tom. 3, p. 533. John Bell's Principles of Surgery, Vol. 2. Part 1. Burns, in Edinb. Med. and Surg. Journal, January, 1808. C. Bell's Operative Surgery, Vol. 1. 1807. Sabatier, de la Médecine Opératoire, tom. 2, 1796. Thomson's Observations on Lithotomy; Edinb. 1808. Allan's Treatise on Lithotomy; Edinb. 1808. Earle's Practical Observations on the Stone; 1796. Edit. 2. Œuvres Chirurgicales de Desault par Bichat; tom. 2.—For a minute description and delineations of the parts concerned in the operation, see Camper's Demonstrationes Anatomico-pathologicae, lib. 2.

LOTION, (from *lavo*, to wash.) *Lotio*. An external fluid application. Lotions are usually applied by wetting linen in them, and keeping it on the part affected.

The following are some of the most useful in the practice of surgery.

LOTIO ALUMINIS.—*℞*. Aluminis purif. \mathfrak{z} ss. Aquæ distillatæ lbj. Misco.—Sometimes used as an astringent injection; sometimes as an application to inflamed parts.

LOTIO AMMONIÆ ACETATÆ.—*℞*. Aquæ ammon. acetatæ; Spirit. vin. rectific.; Aquæ distillatæ; sing. \mathfrak{z} iv. Misco.—Properties discutient.

LOTIO AMMONIÆ MURIATÆ.—*℞*. Ammon. muriatæ \mathfrak{z} j. Spirit. roris-mariini lbj.—Has the same virtues as the preceding. Justamond recommended it in the early stage of the milk-breast.

LOTIO AMMONIÆ MURIATÆ CUM ACETO.—*℞*. Ammon. Mur. \mathfrak{z} ss. Aceti, Spirit. vinos. rectific. sing. lbj. Misco. This is one of the most efficacious

discutient lotions. It is, perhaps, the best application for promoting the absorption of extravasated blood, in cases of ecchymosis, contusions, sprains, &c.

LOTIO AMMONIÆ OPIATA.—*℞*. Spiritus ammon. comp. \mathfrak{z} iiiss. Aquæ distillatæ \mathfrak{z} iv. Tinct. Opii \mathfrak{z} ss. Misco.—Applied by Kirkland to some suspicious swellings in the breast, soda and bark being also given internally.

LOTIO CALCIS COMPOSITA.—*℞*. Aquæ calcis lbj. Hydrargyri muriati \mathfrak{z} j. Misco.—Properties strongly astringent. Ring-worms, tetters, and some other cutaneous affections yield to this application, which, however, should generally be diluted. In the latter state, it may occasionally be used as an injection for various purposes.

LOTIO GALLÆ.—*℞*. Gallarum contusarum \mathfrak{z} ij. Aquæ ferventis lbj. To be macerated one hour, and strained.—This astringent lotion is sometimes used with a view of removing the relaxed state of the parts, in cases of prolapsus ani, prolapsus uteri, &c.

LOTIO HYDRARGYRI AMYGDALINA.—*℞*. Amygdalarum amararum \mathfrak{z} ij. Aquæ distill. lbj. Hydrarg. mur. \mathfrak{z} j. Rub down the almonds with water, which is to be gradually poured on them; strain the liquor, and then add the muriated mercury. This will cure several cutaneous herpetic affections.

LOTIO HYDRARGYRI MURIATI.—*℞*. Hydrargyri muriati g. ijss. Arabici gummi \mathfrak{z} ss. Aquæ distillatæ lbj. Misco.—This is the injection of corrosive sublimate in use at St. Bartholomew's Hospital.

LOTIO HYDRARGYRI MURIATI COMPOSITA.—*℞*. Hydrarg. mur. g. x. Aq. distillat. bullientis \mathfrak{z} iss. Tinct. canthar. \mathfrak{z} ss. Misco.—This was ordered by Dr. H. Smith, to be applied every night to scrophulous swellings.

LOTIO HELLEBORI ALBI.—*℞*. Decocti hellebori albi lbj. Kali sulphurari \mathfrak{z} ss. Misco.—This is occasionally employed as an application for curing tinea capitis, and some other cutaneous diseases.

LOTIO KALI SULPHURATI.—*℞*. Kali sulph. \mathfrak{z} ij. Aquæ distill. lbj. Misco.—It is used in the same cases as the preceding one.

LOTIO LITHARGYRI ACETATI.—*℞*. Aquæ litharg. acet. \mathfrak{z} ij. Aq. distill. lbj. Spirit. vinos. tenuioris \mathfrak{z} ij. The first and the last ingredients are to be mixed before the water is added.

This is the common whitewash, an application that is so universally known as the usual saturnine application in cases of inflammation, &c. that we need say nothing more concerning it.

LOTIO OPII.—℞. Opii purif. ℥jss. Aquæ distillatæ ℥ij. Misc. —A very excellent application to irritable painful ulcers of every description. It is best to dilute it, especially at first.

LOTIO PICIS.—℞. Picis liquidæ ℥iv. Calcis ℥vj. Aquæ ferventis ℥iij. —To be boiled till half the water is evaporated. The rest is then to be poured off for use. This application is sometimes employed for the cure of tinea capitis; it is also of singular service in removing an extensive scorbutic redness, frequently seen on the legs, together with old ulcers.

LOTIO ZINCI VITRIOLATI.—℞. Zinci Vitriolati ℥j. Aq. ferventi lbj. Misc. This is sometimes used by practitioners in lieu of the lotio aq. litharg. acet. The free external application of lead has sometimes been suspected of bringing on bad effects, in consequence of absorption; and some surgeons, therefore, advise the employment of this lotion instead of it, which in all probability, also, is equally efficacious. When diluted, by adding two pints more water, it forms the common injection, so much recommended in cases of gonorrhœa.

LUES VENEREA. *Venereal disease.*—See this article.

LUMBAR ABSCESS. *Psoas Abscess.* By these terms are understood chronic collections of matter, which form in the cellular substance of the loins, behind the peritonæum, and descend in the course of the psoas muscle. Patients in the incipient stage of the disease, cannot walk so well as usual; they feel a degree of uneasiness about the lumbar region; but in general, there has been no acute pain, even when the abscess has acquired such a size as to form a large tumour, protruding externally. In short, the psoas abscess is the best instance, which can possibly be adduced, in order to illustrate the nature of those collections of matter, which are called chronic, and which form in an insidious manner, without serious pain, or any other attendant of acute inflammation.

The abscess sometimes forms a swelling above Poupart's ligament; sometimes below it; and frequently the matter glides under the fascia of the thigh. Occasionally, it makes its way through the sacro-sciatic foramen, and assumes rather the appearance of a fistula in ano. When the matter gravitates into the thigh, beneath the fascia, Mr. Hunter would have termed it a disease *in*, not *of*, the part. The uneasiness in the loins, and the impulse communicated to the tumour by coughing, evince, that the disease arises in the lumbar region; but, it must be confessed, that we can hardly ever know the existence of

the disorder, before the tumour, by presenting itself externally, leads us to such information. The lumbar abscess is sometimes connected with diseased vertebra, which may either be a cause, or an effect, of the collection of matter.—The disease, however, is frequently unattended with this complication.

The disease of the spine, we may infer, is not of the same nature as that treated of by Pott, as there is usually no paralysis. When the bodies of patients with lumbar abscesses are opened, it is found, that the matter is completely enclosed in a cyst, which, in many cases, is of course, very extensive. If the contents of such abscesses were not circumscribed by a membranous boundary in this manner, we should have them spreading among the cells of the cellular substance, just like the water in anasarca. The cysts are both secreting and absorbing surfaces, as is proved by the great quantity of matter, which soon collects again after the abscess has been emptied, and by the occasional disappearance of large palpable collections of matter of this kind, either spontaneously, or in consequence of means which are known to operate by exciting the action of the absorbents. In short, the cyst becomes the suppurating surface, and suppuration is now well ascertained to be a process, similar to glandular secretion. While the abscess remains unopened, its contents are always undergoing a change; fresh matter is continually forming, and a portion of what was in the cyst before, is undergoing an incessant removal by the absorbents. This is not peculiar to lumbar abscesses; it is common to all, both chronic and acute, buboes and suppurations in general. It is true, that, in acute abscesses, there often has not been time for the formation of so distinct a membrane as the cyst of a large chronic abscess; but its matter is equally circumscribed by the cavities of the cellular substance being filled with a dense coagulating lymph; and though it generally soon makes way to the surface, it also is occasionally absorbed.

The best modern surgeons, make it a common maxim to open very few acute abscesses; for, the matter naturally tends with great celerity to the surface of the body, where ulceration allows it to escape spontaneously; after which, the case generally goes on better, than if it had been opened by art. But, in chronic abscesses, the matter has not that strong tendency to make its way outward; its quantity is considerably increasing; the cyst is, of course, incessantly growing larger and larger; in short, the matter, from one ounce, often gradually increases

to the quantity of a gallon. When the disease is at length opened, or bursts by ulceration, the surface of the cysts, irritated by the change, inflames; and its great extent, in this circumstance, is enough to account for the terrible constitutional disorder, and fatal consequences, which too frequently soon follow the evacuation of the contents of such an abscess. Hence, in cases of chronic suppurations of every kind, and not merely in lumbar ones, it is the surgeon's duty to observe the opposite rule to that applicable to acute cases; and he is called upon to open the collection of matter, as soon as he is aware of its existence, and its situation will allow it to be done.

Certainly, it would be highly advantageous to have some means of ascertaining whether the vertebrae are also diseased; for, as in this instance, the morbid bones would keep up suppuration, until their affection had ceased, and there would be no reasonable hope of curing the abscess sooner, it might be better to avoid puncturing it under such circumstances. The propriety of this conduct seems the more obvious, as issues, which are the means most likely to stop and remove the disease of the spine, are also such as afford most chance of bringing about the absorption of the abscess itself. However, if the collection cannot be prevented from discharging itself, and ulceration is at hand, it is best to meet the danger, make an opening with a lancet, in a place at some distance from where the pointing threatens, and afterwards heal it, in the way we shall presently detail.

Though we have praised the prudence of opening all chronic abscesses while small, the deep situation of the lumbar one, and the degree of doubt always involving its early state, unfortunately prevent us from taking this beneficial step in the present case. But, still the principle is equally praiseworthy, and should urge us to open the tumour as soon as the fluctuation of the matter is distinct, and the nature of the case is evident. For this purpose, Mr. Abernethy employs an abscess lancet, which will make an opening large enough for the discharge of those flaky substances so frequently found blended with the matter of lumbar abscesses, and by some conceived to be an emblem of the disease being serophulous. Such flakes seem to consist of a part of the coagulating matter of the blood, and are very commonly secreted by the peculiar cysts of serophulous abscesses. The puncture must also be of a certain size, to allow the clots of blood, occasionally mixed with the matter, to escape. Mr.

Abernethy considers the opening of a lumbar abscess, a very delicate operation. Former surgeons used to make large openings in these cases; let out the contents; leave the wound open; the usual consequences of which were, great irritation and inflammation of the cyst; immense disturbance of the constitution; putrefaction of the contents of the abscess, in consequence of the entrance of air into its cavity, and, too often, death. While such practice prevailed, very few afflicted with lumbar abscesses, were fortunate enough to escape. The same alarming effects resulted from allowing the abscess to attain its utmost magnitude, and then burst by ulceration. If then a more happy train of events depend upon the manner, in which lumbar abscesses are punctured, the operation is certainly a matter of great delicacy.

Until the collection is opened, or bursts, the patient's health is usually little, or not at all impaired; indeed, we see in the faces of many persons with such abscesses, what is usually understood by the picture of health. Hence, how likely our professional conduct is to be arraigned, when great changes for the worse, and even death, occur very soon after we have let out the matter, seemingly, and truly, in consequence of the operation. Every plan, therefore, which is most likely to prevent these alarming effects, is entitled to infinite praise; and such, I conceive, is the practice recommended by Mr. Abernethy.

This gentleman's method is to let out the matter, and heal the wound immediately afterwards by the first intention. He justly condemns all introductions of probes, and other instruments, which only irritate the edges of the puncture, and render them unlikely to grow together again. The wound is to be carefully closed with sticking plaster, and it will almost always heal.

Doing this, does not put a stop to the secretion of matter within the cavity of the abscess. Of course, a fresh accumulation takes place; but, it is obvious that the matter, as fast as it is produced, will gravitate to the lowest part of the cyst, and, consequently, the upper part will remain for a certain time undistended, and have an opportunity of contracting.

When a certain quantity of matter has again accumulated, and presents itself in the groin, or elsewhere, which may be in about a fortnight after the first puncture, the abscess is to be punctured again, in the same manner as before, and the wound healed in the same way. The quantity of matter will now be found

much less, than what was at first discharged. Thus the abscess is to be repeatedly punctured at intervals, and the wounds as regularly healed by the first intention, by which method, irritation and inflammation of the cyst will not be induced, the cavity of the matter will never be allowed to become distended, and it will be rendered smaller and smaller, till the cure is complete.

In a few instances, you may, perhaps, be unable to persevere in healing the repeated punctures it may be necessary to make; but, after succeeding once or twice, the cyst will probably have enjoyed sufficient opportunity to have contracted itself so much, that its surface will not now be of alarming extent. It is also a fact, that the cyst loses its irritability, and becomes more indolent, and less apt to inflame, after the contents have been once or twice evacuated, in the above way. Its disposition to absorb becomes also stronger.

The knowledge of the fact, that the cysts of all abscesses are absorbing surfaces, should lead us never to neglect other means, which Mr. Abernethy suggests, as likely to promote the dispersion of the abscess, by quickening the action of the absorbents. Blisters kept open with savine cerate, issues, electricity, occasional vomits of zincum vitriolatum, are the means most conducive to this object. When the vertebræ are diseased, issues are doubly indicated.

In the latter complication, the case is always dangerous. If an opening should have been made in the abscess, the cyst is at first more likely to be irritated, than when the bones are not diseased, and the affection of the spine is rendered much less likely to undergo any improvement, in consequence of the mere formation of an outward communication. The same bad effect attends necrosis; in which case, the absorption of the dead bone is always retarded by the presence of unhealed fistulæ and sores, which lead down to the disease.

Mr. Crowther has succeeded in dispersing some large lumbar abscesses without opening them. Large blisters, applied to the integuments covering the swelling, and kept open with the savine cerate, effected the cure. When this gentleman punctures such collections of matter, he uses a small trocar, which he introduces at the same place as often as necessary. He observes, that the aperture so made does not ulcerate, and allows no matter to escape after being dressed. I cannot, however, discover any reason for his preferring the trocar to the abscess lancet, except that the cannula enables the sur-

geon to push back with a probe any flakes of lymph, &c. which may obstruct its inner orifice. But, this is scarcely a reason, when Mr. Abernethy informs us, that the opening, made with an abscess lancet, is large enough to allow such flakes to be discharged; and, when they stop up the aperture, a probe might also be employed to push them back. A wound made with a cutting instrument will, *ceteris paribus*, always more certainly unite, by the first intention, than one made with such an instrument as a trocar. Mr. Crowther may have succeeded in always healing the aperture; but, I do not believe, that other practitioners would experience equal success. Were the tumour not very prominent, from the quantity of matter being small, suddenly plunging in a trocar might even endanger parts, which should, on no account, be injured.

Some writers recommend opening lumbar abscesses with a seton. The matter being made to form as prominent a swelling as possible, by pressing the abdomen, and putting the patient in a position, which will make the contents of the abscess gravitate towards the part where the seton is to be introduced, a transverse cut is first to be made in the integuments down to the fascia. A flat trocar is next to be introduced within the incision, which should only be just large enough to allow the instrument to pass freely up under the skin, for at least three quarters of an inch; when the hand is to be raised, and the trocar pushed obliquely and gently upwards, till the cannula is within the lower part of the sac. The trocar must now be withdrawn, and the matter allowed to flow out gently, stopping it every now and then for some minutes. The assistant must now withdraw his hand, to take away the pressure, and the thumb of his left hand upon the opening of the cannula, holding it between his fore and middle fingers. It must then be pushed upward, nearly to the top of the tumour, where its end may be distinctly felt with the fore-finger of the right hand. As soon as it can be plainly felt, it must be held steadily in the same position, and the trocar is to be introduced into it again, and pushed through the skin, at the place where it is felt, and the cannula along with it. The trocar being next withdrawn, a probe, with a skein of fine soft silk, dipped in oil, must be passed through the cannula, which being now taken away leaves the seton in its place. A pledget of a mild ointment is then to be applied over the two openings, the more completely to exclude the air. A

fresh piece of the silk is to be drawn into the abscess, and that which was in before, cut off, as often as necessary. (See *Latta's System of Surgery*, Vol. 3. p. 307.)

Mr. Crowther states, that Deckers, who wrote in 1696, discharged a large abscess, in a gradual manner, with a trocar, the cannula of which was not withdrawn, but was stopped up with a cork, and the latter let out at intervals. B. Bell also advises the cannula not to be taken out.

I cannot quit this subject without mentioning a remarkable case of lumbar abscess, which I lately saw in Christ's Hospital, under the care of Mr. Ramsden. The tumour extended from the ilium and sacrum below, as high up as the ribs. The diameter of the swelling, from behind forward, might be about six or eight inches. It was attended with so strong a pulsation, corresponding with that of the other arteries, that several eminent surgeons in this city considered the case as an aneurism of the aorta. After some weeks, as the tumour increased in size, the throbbing of the whole tumour gradually became fainter

and fainter, and, at length, could not be felt at all. The tumour was nearly on the point of bursting. Mr. Ramsden suspected, that it was an abscess, and determined to make a small puncture in it. The experiment verified the accuracy of his opinion; a large quantity of pus was evacuated at intervals; but, the boy's health suffering, he went to his friends at Newbury, and I have not yet heard the event. I have never seen any popliteal aneurism, whose pulsations could be more plainly seen and strongly felt, than those of the abscess we have just been describing. The rationale I must leave to the speculative reader.

I shall conclude with expressing my decided preference to Mr. Abernethy's plan of treating lumbar abscesses.

Consult *Abernethy's Surgical and Physiological Essays*, Part 1. and 2. *Crowther's Observations on White Swelling*, &c. 1808. *Latta's System of Surgery*, Vol. 3.

LUNAR CAUSTIC. See *Argentum Nitratum*.

LUXATION. (from *luxo*, to put out of joint.) A dislocation. See this word.

M.

MAMMA, REMOVAL OF. The operation of cutting away a diseased breast, is done nearly in the same manner as the removal of tumours in general, and is indicated whenever the part is affected with an incurable disease, which admits, however, of being entirely removed with the knife. When the breast is affected with scirrhus, or ulcerated cancer, the imprudence of tampering with the disease cannot be too severely censured. Were the disorder unattended with a continual tendency to increase, some time might properly be dedicated to the trial of the internal remedies, and external applications, which, have acquired any character for doing good in these unpromising cases. But, unfortunately, by endeavouring to cure the disease by medicine, we only afford time for it to increase in magnitude, and, at length, to attain a condition, in which even the knife cannot be employed so as to take away the whole of the diseased parts. When the case is marked by those characteristic features, of scirrhus, which are noticed in the article *Cancer*, the sooner the tumour is cut out, the better.

There are also some malignant kinds of sarcoma, to which the female breast is subject, (as will be explained in the article *Tumour*;) which cannot be removed at too early a period after their nature is suspected, or known. Indeed, though there is not equal urgency for the operation when the tumour is only an indolent, simple, fatty, or sarcomatous disease, yet, as all these tumours are continually growing larger, and little success attends the attempt to disperse them, the practitioner should never devote much time to the trial of unavailing medicines and applications, and let the swelling attain a size, which would require a formidable operation for its excision. Besides, every simple, fleshy, or fatty tumour, is always accompanied with a certain hazard of changing into a malignant, or cancerous one.

Certainly, there are many swellings and indurations of the breast, which it would be highly injudicious and unnecessary to extirpate, because they generally admit of being discussed. Such are many tumours, which are called *schrophulous*, from their affecting patients of

this peculiar constitution; such are nearly all those indurations, which remain after a sudden and general inflammatory enlargement of the mamma; such are most other tumours, which acquire their full size in a few days, attended with pain, redness, &c; and, of this kind, also, are the hardness in the breast, occasioned by the mammary abscess.

In the removal of all tumours, their malignant or cancerous nature makes it necessary to observe one important caution in the operation, viz. not to rest satisfied with cutting away the tumours just at their circumference; but to take away also a considerable portion of the substance, in which they lie, and with which they are surrounded. In cutting out a cancerous breast, if the operator were to be content with merely dissecting out the disease, just where his eyes and fingers might equally lead him to suppose its boundary to be situated, there would still be left behind white diseased bands, which radiate from the tumour into the surrounding fat, and which would inevitably occasion a relapse. In a vast proportion of the cases also, in which cancer of the breast unfortunately recurs after the operation, it is found, that the skin is the part, in which the disease makes its reappearance. Hence, the great prudence of taking away a good deal of it in every case suspected to be a truly scirrhus or cancerous disease. This may also be done so as not to prevent the important objects of uniting the wound by the first intention, and covering the whole of its surface with sound integuments. So frequently does cancer recur in the nipple, whenever it does recur any where, that many of the best modern operators always make a point of removing this part in every instance, in which it is judged expedient to take away any portion of the skin at all. The surgeon, indeed, would be inexcusable, were he to neglect to take away such portion of the integuments covering scirrhus tumours, as is evidently affected, appearing to be discoloured, puckered, and closely attached to the diseased lump beneath. Nor should any gland, in the axilla, at all diseased, nor any fibres of the pectoral muscle, in the same state, be ever left behind. There is no doubt, that nothing has stamped operations for cancers with disrepute, so much as the neglect to make a free removal of the skin, and parts surrounding every side of the tumour. Hence the disease has frequently appeared to recur, when, in fact, it had never been thoroughly extirpated; the disease, though entirely a local affection, has been deemed a constitutional one: and the operation

frequently rejected as ineffectual and useless.

But, strongly as I have urged the prudence, the necessity of making a free removal of the skin covering, and of the parts surrounding, every cancerous or malignant tumour, the same plan may certainly be regarded as unnecessary, and, therefore, unscientific, in most operations for the removal of simple, fatty, or fleshy tumours. However, even in the latter cases, when the swelling is very large, it is better to take away a portion of skin; for, otherwise, after the excision of the tumour, there would be a redundancy of integuments, the cavity of which would only serve for the lodgment of matter. The loose superfluous skin also would lie in folds, and not apply itself evenly to the parts beneath, so as to unite favourably by the first intention; nor could the line of the cicatrix itself be arranged with such nice evenness as it might be, were a part of the redundant skin taken away at the time of operating.

The best method of removing a diseased breast is as follows: The patient is usually placed in a sitting posture, well supported by pillows and assistants; but the operator would find it equally convenient, if not more so, to remove the tumour with his patient in a recumbent position; and it certainly is better whenever the operation is likely to be long, or much blood to be lost, which circumstances are very apt to bring on fainting. I remember, that Mr. Abernethy, in his lectures, used to recommend the latter plan; which, however, without the sanction of any great name, or authority, possesses such obvious advantages, as will always entitle it to approbation.

The arms should be confined back, by placing a stick between them and the body, by which means, the fibres of the great pectoral muscle will be kept on the stretch, a state most favourable for the dissection of the tumour off its surface. The stick also prevents the patient from moving her arm about, and interrupting the progress of the operation.

When the tumour is not large, and only a simple sarcoma, free from malignancy, it will be quite unnecessary to remove any of the skin, and, of course, this need only be divided by one incision, of a length proportionate to the tumour. The cut must be made with a common dissecting knife; and, as the division of the parts is chiefly accomplished with the part of the edge towards the point, the instrument will be found to do its office best when the extremity of the edge is made of a convex shape, and this part of the blade is turned a little back, in the

way in which dissecting knives are now often constructed. The direction of the incision through the skin should be made according to the greatest diameter of the tumour to be removed, by which means it will be most easily dissected out.

The direction of the incision is various with different practitioners; some making it perpendicular, others transverse. In general, the shape of the tumour must determine which is the best. In France, it has been said, that when the incision follows the second direction, it heals more expeditiously, because the skin is more extensible from above downward, than laterally, particularly towards the sternum, and, consequently allows the sides of the wound the more readily to be placed in contact; and that the action of the pectoral muscle tends to separate the edges of the wound when it is perpendicular. On the other hand, it is allowed, that the wound, made in the latter manner, is the most favourable for the escape of the discharge, if suppuration should occur. (See *Desault par Bichat*, p. 312. *Tom. 2.*)

The cut through the skin should always be somewhat longer than the tumour; and as it is, perhaps, the most painful part of the operation, and one attended with no danger whatever, it should be executed with the utmost celerity. Pain is certainly more or less to be dreaded, according to its duration. The fear, however, of giving pain has probably led many operators to err, by not making their first incision through the integuments large enough, the consequence of which has often been, that there was not room enough to get at the tumour so as to dissect it out with facility; the patient has been kept nearly an hour in the operating room, instead of five minutes, and the surgeon censured by the spectators, as awkward and tedious. It is clear, also, that, besides the great deal more blood lost, from this error, than would otherwise happen, the vessels being commonly not tied till all the cutting is finished, the avoidance of pain, that fear, which led to the blunder, is not effected, and the patient suffers much more, and for a much longer time, in consequence of the embarrassment and obstacles in the way of the whole operation.

When the disease is of a scirrhus or malignant nature, the skin covering the tumour should, at all events, be in part removed. As I have said before, all that portion which is discoloured, puckered, tuberculated, or otherwise altered, should be taken away. Some must also be removed, in order to prevent a redundancy, in all cases in which the tumour is large. We have said too, that in cases of scirrhus

and cancer of the breast, the nipple is considered a dangerous part to be left behind. For the purpose of removing the necessary portion of skin, the surgeon must obviously pursue a different mode from that above described; and, instead of one straight incision, he is to make two semicircular ones, one immediately after the other, and which are to meet at their extremities. The size of these wounds must be determined by that of the disease to be removed, and by the quantity of skin, which it is deemed prudent to take away; for the part, which is included in the two semicircular cuts, is that which is not to be separated from the upper surface of the swelling, but taken away with it. The shape of the two cuts together may approach that either of a circle or oval, as the figure of the tumour itself may indicate, as most convenient. The direction of the incisions is to be regulated by the same consideration.

In the above ways, the first division of the integuments is to be made in removing tumours of every description, covered with skin. The same principles and practice should prevail in all these operations; and, whether the swelling is the mamma, or any other diseased mass, whether situated on the chest, the back, the head, or extremities, the same considerations should always guide the operator's hand.

The incision, or incisions, in the skin having been made, the next object is to detach every side of the tumour from its connexions, and the separation of its base will then be the last and only thing remaining to be done. When the tumour is a scirrhus, or other malignant disease, the operator must not dissect close to the swelling, but make his incisions on each side, at a prudent distance from it, so as to be sure to remove, with the diseased mass, every atom of morbid mischief in its vicinity. But, when the tumour is only a mere fatty, or other mass, perfectly free from malignancy, the cellular bands and vessels forming its connexions, may be divided close to its circumference. It is astonishing with what ease fatty tumours are removed, after the necessary division is made in the skin; they may almost be turned out with the fingers, without any cutting at all. When they have been inflamed, however, they are then more adherent to the surrounding parts.

Thus we see, that the first stage of the operation of removing a tumour, is the division of the skin; the second, the separation of the swelling from the surrounding parts on every side; the third and last stage is the division of the parts to which its under surface, or base, is attached.

The latter object should be accomplished by cutting regularly from above downward, till every part is divided.

It is a common thing to see many operators constantly embarrassed and confused, whenever they have to remove a large tumour, on account of their having no particular method in their proceedings. They first cut a few fibres on one side, then on another; and, turning the mass of disease now to this side, now to that, without any fixed design, they both prolong the operation very tediously, and present to the bystanders a complete specimen of surgical awkwardness. On the contrary, when the practitioner divides the cutting part of the operation into the three methodical stages, above recommended, in each of which there is a distinct object to be fulfilled, he proceeds with a confidence of knowing what he is about, and soon effects what is to be done, with equal expedition and adroitness.

Having taken out the tumour, the operator is immediately to tie such large vessels as may be pouring out their blood; indeed, when the removal of the swelling will necessarily occupy more than three, or four minutes, it is better to tie all the large arteries as soon as they are divided, and then proceed with their dissection. This was the celebrated Desault's plan, and it is highly deserving of imitation in this country, not only because many subjects cannot afford to lose much blood, but also because the profuse effusion of this fluid keeps the operator from seeing what parts he is dividing.

The largest arteries being tied, the surgeon should not be immediately solicitous about tying every bleeding point which may be observed. Instead of this, let him employ a little while in examining every part of the surface of the wound, in order to ascertain that no portion of the swelling, no hardened lump, nor diseased fibres remain behind. Even if any part of the surface of the pectoral muscle should present a morbid feel, or appearance, it must, on every account, be cut away. Also, if any of the axillary glands are diseased, the operator should now proceed to remove them. After the time spent in such measures, many of the small vessels, which bled just after the excision of the swelling, will now have stopped, the necessity for several ligatures will be done away, and, of course, the patient saved a great deal of pain, and more of the wound be likely to heal by the first intention.

Some information may be derived, respecting whether any of the tumour is left behind, by examining its surfaces, when taken out, and observing whether

any part of them is cut off: for, if it is, it may always be found in the corresponding part of the wound.

The axillary glands may always be taken out, without the least risk, if the plan pursued by Desault in France, and Sir Charles Blicke, and other eminent surgeons in this country, be adopted. The method alluded to, is, after dividing the skin covering the gland, and freeing the indurated part from its lateral connexions, to tie its root, or base, with which it is connected with the parts on the side towards the cavity of the axilla. Then the indurated gland itself may be safely cut off, just above the ligature. Were the gland cut off in the first instance, the artery which supplies it with blood, would be exceeding difficult to tie, on account of its deep situation; and, by reason of its shortness and vicinity to the heart, it would bleed almost like a wound of the thoracic artery itself. In this way, there is also not the least hazard of injuring the latter vessel. It would be a great improvement in the mode of operating for the removal of these glands, if surgeons were always to make the patient lie down, with the arm placed in such a position as would let the light fall into the axilla. How much the steps of the operation would be facilitated in this way, I need not attempt to explain.

The above directions will enable a surgeon to remove tumours in general. They apply also in a great measure to *encysted tumours*; but, a few particular rules how to operate in the latter cases, will be found in that article. One half of each ligature is always to be cut off before dressing the wound. The edges of the incision are to be brought together with strips of adhesive plaster; and, before this can be done with ease, the stick confining the arm back must be removed, and the os brachii brought forward, so as to relax the pectoral muscle, and integuments of the breast. No sutures should ever be employed, as they are useless, painful, and irritating. The wound being closed with sticking plaster, and a pledget of simple cerate, a compress of folded linen, or flannel, may be put over the dressings; these are to be secured with a broad piece of linen, which is to encircle the chest, be fastened with pins, or stitches, and kept from slipping down by two tapes, one of which is to go from behind forward, over each shoulder, and be stitched to the upper part of the bandage, both in front and behind. The arm on the same side as that on which the operation has been done, should be kept perfectly motionless, in a sling; every motion of the limb must evidently disturb the

wound, by putting the great pectoral muscle into action, or rendering its fibres sometimes tense, sometimes relaxed. It is scarcely necessary to say, that, after so considerable an operation as the removal of a large breast, or any other tumour of magnitude, the patient should be given about thirty drops of the tinctura opii. A smaller dose always creates restlessness, head-ach, and fever, after operations, instead of having the desired effect.

Here it becomes me to state, that as I could not find in any surgical book, with which I am acquainted, what I conceived to be a proper description of the mode of removing a diseased breast, and tumours in general, the foregoing remarks are given chiefly on my own authority. Whether they are just, or not, must be decided by the profession.

The principal writers on the removal of the mamma are, Garengot, Dionis, Le Dran, Bertrandi, Sharp, and Sabatier, in their respective treatises on the operations. B. Bell, Latta, &c. have also treated of the subject in their Systems of Surgery; and there is a memoir *Sur l'Operation du Cancer au Sein*, in *Les Œuvres Chirurgicales de Desault par Bichat. tom. 2.*

MAMMARY ABSCESS. *Milk Abscess.* Women who suckle, are particularly subject to inflammation and suppuration in the breast. The part enlarges, becomes tense, heavy, and painful. The integuments of the breast sometimes assume an uniform redness; sometimes they are only red in particular places. The inflammation may affect the mammary gland itself, or be confined to the skin and surrounding cellular substance. In the latter case, the inflamed part is equally tense; but, when the glandular structure of the breast is also affected, the enlargement is irregular, and seems to consist of one or more large tumours, situated in the substance of the part. The pain often extends to the axillary glands. The secretion of the milk is not always suppressed, when the inflammation is confined to the integuments, and suppuration is said to come on more quickly, than in affections of the mammary gland itself. When the symptoms of inflammation continue to increase for four or five days, suppuration may be expected; unless the progress of the inflammation be slow, and its degree moderate, in which circumstances, resolution may often be obtained, even as late as a fortnight after the first attack. Inflammations in the breast are almost always attended with symptoms of the sympathetic inflammatory fever. (See *Fever, Surgical.*) I think authors err, who describe the febrile disorder as generally preceding the local complaint.

Women are most liable to mammary abscesses within the first three months after parturition; but they are also very much exposed to the disorder as long as they continue to suckle.

The most common causes occasioning the mammary abscess, as enumerated by writers in general, are, repressing the secretion of milk at an early period, mental disturbance, fright, &c.; exposure to cold, moving the arms too much while the breasts are very large and distended, bruises, and other external injuries. The causes are not always assignable.

The matter is sometimes contained in one cyst, or cavity, sometimes in several; but the abscess generally breaks near the nipple.

As all inflammations of the mamma are attended with considerable induration, these cases should be carefully distinguished from other swellings of a more incurable kind. It is said, that scrophulous tumours of the mamma, which have existed a long while, often disappear after the occurrence of a milk-abscess. Women who have never been pregnant, are sometimes affected with suppurations in the breast, not essentially different from those above described. Even men are said to be liable to similar complaints.

In the early period of the affection, resolution should be attempted. The following are the principal means for this purpose:—topical blood-letting, saline purges, low diet, keeping the inflamed breast from hanging down, gentle friction of the breast, with a soft sponge, wet with some warm emollient liquor, having the milk tenderly sucked out at proper intervals; saturnine applications, or lotions containing sal ammoniac.

When matter cannot be prevented from forming, an emollient poultice is the best application, and the abscess should in general be allowed to break of itself, unless of a somewhat chronic nature, in which case, it should be opened in a depending part, with a lancet. Sinuses sometimes form, in consequence of abscesses in the breast, and will not heal till freely opened with a director and curved bistoury. When the cavity of the abscess begins to fill up with granulations, the poultice may be left off, and superficial dressings applied.

The indurations, often remaining in the breast, in consequence of acute inflammation and abscesses, generally yield to frictions with camphorated mercurial ointment, the application of a piece of soap plaster, and giving calomel, cicuta, and, as some advise, emetics.

Mr. Hey describes a very deep seated abscess of the breast, not of frequent oc-

currence, and not confined to pregnant nor suckling women. Its situation renders all superficial applications ineffectual. The inflammatory stage is tedious; and when the matter has made its way outward, the discharge continues, and there is no tendency to healing. Sometimes the matter lodges behind the mamma, as well as in the substance of the gland, and breaks out in different places, the intermediate parts of the breast feeling as if affected with a scirrhus hardness. There are numerous sinuses running in different directions, and, when opened, a soft purple fungus appears within them. The disease goes on in this state, for a long while, keeping up hectic symptoms.

Mr. Hey's practice is to trace the course of all the numerous sinuses, and lay them open, and unless this is done, with respect to every one of them, the cure cannot be accomplished. If he finds any two sinuses running in such directions, that when fully opened, they leave a small part of the mamma in a pendulous state, he removes such part entirely. As the sinuses are filled with fungus, their continuations present no visible cavity, and can only be detected by the greater softness of parts of the wound, where, on breaking down the fungus, the orifice of the collateral sinus may be found. Mr. Hey has found, that even in the most unfavourable subjects, the wounds heal quickly, and the natural shape of the breast is preserved.

Consult *Pearson's Principles of Surgery*, Chap. 3. *Hey's Practical Observations*, p. 504. *Kirkland* has also treated of several kinds of abscesses of the breast, in his *Enquiry into the present state of Medical Surgery*, Vol. 2. p. 161. The German reader may refer to *Richter's Anfangsgr. der Wundarzn.* Band. 4. Chap. 16.

MARASMUS. (from *μαραίνω*, to grow lean.) An atrophy, or wasting of the bulk and strength.

MATURANTIA. (from *maturo*, to ripen.) Medicines for promoting suppuration.

MATURATION. (Same derivation.) *Maturatio.* The old surgeons were accustomed to call the completion of the suppurative process in inflammatory tumours their *maturatio*, in which state they were deemed fit to be opened. The word is still frequently found in modern surgical works.

MELICERIS. (from *μέλι*, honey, and *κηρός*, wax.) A tumour of the encysted kind, filled with a substance resembling wax and honey in consistence. (See *Tumours, Encysted.*)

MENINGES. (from *μηνω*, to remain.) The membranes covering the brain.

MENINGOPHYLAX. (from *μηνιγξ*, a membrane, and *φυλασσω*, to guard.) An instrument used by the ancients for guarding the dura mater and brain from injury, in their mode of trepanning. It seems to have been something like the lenticular, only its blade was completely round, without an edge. It ended in a lentiform cup, like the latter. (*Encyclopédie Méthodique, Partie Chirurgicale.*) Pott gives a little engraving of a meningophylax, which resembles a common elevator. (See Vol. 1, of his Works.)

MERCURY. (*Quicksilver. Mercurius. Hydrargyrum.*) The medicinal virtues of this mineral were almost totally unknown to the ancients, who considered it as a poison. It was first employed for purposes of medicine by the Arabians, who made use of it in the form of ointments for the cure of certain diseases of the skin and the killing of vermin. In modern times, mercury is one of the most important articles of the *materia medica*. It has an advantage over all others in being a specific remedy for a disease, which tends more, than any other, to the destruction of the human species, and which, without this inestimable discovery, would probably have continued incurable to the present day.

Mercury, taken into the stomach in its metallic state, has no action on the body, except what arises from its weight, or bulk. It is not poisonous, as was vulgarly supposed, but perfectly inert. But, in its various states of combination, it produces certain sensible effects. It quickens the circulation, and increases all the secretions and excretions.

According to circumstances, the habit of the body of the patient, the temperature in which he is kept, the nature of the preparation, and the quantity in which it is exhibited, its effects are, indeed, various. Sometimes, it more particularly increases one secretion; sometimes another; but, its most characteristic effect is the increased flow of saliva, which it generally excites, if given in sufficient quantity. (*Edinb. Dispensatory.*)

FIRST ATTEMPTS TO ADMINISTER MERCURY.

It has been said, that the efficacy of mercury in curing the venereal disease was an accidental discovery; but, it seems more probable, that the good effects, which it produced in cutaneous diseases, first led physicians to make trial of it in the venereal one, which, frequently coming

on with eruptions on the skin, ulcers, &c. seemed to present an analogy to the affections, in which mercury had already been found successful.

In the times immediately following the first origin of the venereal disease, practitioners only ventured to employ this remedy with timorous caution, so that, of several of their formulæ, mercury scarcely composed a fourteenth part, and few cures were effected. On the other hand, the empirics, who noticed the little efficacy of these small doses, ran into the opposite extreme, and exhibited mercury in such large quantities, and with such little care, that most of their patients became suddenly attacked with a most violent salivation, frequently attended with very dangerous, and even fatal symptoms; or such, as after making them lose their teeth, left them pale, emaciated, exhausted, and subject, for the rest of their lives, to tremblings, or other more or less dangerous affections. From these two very opposite modes of practice, there originated such uncertainty, respecting what could be expected from mercury, and such fears of the consequences, which might result from its employment, that every plan was eagerly adopted, which offered the least chance of cure, without having recourse to this mineral.

A medicine, however, so powerful, and whose salutary effects were seen by attentive practitioners amid all its inconveniences, could not sink into oblivion. After efforts had been made to discover a substitute for it, and it was seen, how little confidence those means deserved, on which the highest praises had been lavished, the attempts to extend its utility were renewed. A medium was pursued, between the too timid methods of those physicians, who had first administered it, and the inconsiderate boldness of the empirics. Thus the causes, from which both parties failed, were avoided; the character of the medicine was revived in a more durable way, and, from this period, its reputation has always been maintained.

It was only about this epoch, that mercury began to be internally given: hitherto, it had only been externally employed, which was done in three manners. The first was in the form of an ointment or liniment: the second, as a plaster; and the third, as a fumigation.

The basis of the ointment, or liniment, was quicksilver, which was blended, by means of trituration, with hog's lard, goose's fat, &c. and composed scarcely one-sixth or one-eighth of the whole; a proportion, however, much greater, than what had been at first employed. But,

from a fear, that the mineral might prove hurtful to the nerves, by the cold property, which they fancied it possessed, and that it might occasion numbness, tremblings, or palsies, they combined with it a multitude of ingredients of a warm, aromatic nature, or supposed to possess such; for example, oil of camomile, sesame-seeds, ani-seeds, the roots of zedoary, and the florentine iris, and a thousand other substances, which were incorporated with the ointment. The members, joints, and the whole of the body, except the head, belly, and chest, were rubbed with this composition; and the frictions were repeated, at suitable intervals, until obvious signs of salivation appeared.

The ingredients of the plasters resembled those of the ointments; only they contained less fat, for which was substituted a sufficient quantity of wax, to give them a proper consistence. This composition was applied to the skin, and they covered the whole body with it, excepting the same parts, on which they feared to put the ointments. The plasters were kept on, till salivation began to make its appearance.

The fumigations were made with quicksilver, triturated with turpentine, or saliva, or else with cinnabar. These substances were mixed with fatty, or resinous ones, such as myrrh, nutmeg, &c. and, all the ingredients being reduced to powder, were made into a paste, with a sufficient quantity of turpentine, or gum tragacanth. The patient was then placed in a box made on purpose, or under a little kind of tent, out of which the head was generally allowed to protrude. A chafing-dish, containing burning coals, was placed near his feet, and, every now and then, bits of mercurial paste were thrown into the vessel. The patient was left exposed to the fumes, which arose, until he broke out into a profuse perspiration, which they took great pains to keep up and increase, by putting him in a warm bed, loading him with bedding, for about two hours, after which he was rubbed quite dry, and given some food. This plan was persisted in every day, till a salivation was produced, which was kept up as long as necessary. The method by fumigation is described in Astruc, and particular preparations, and apparatuses for the purpose, have been since recommended by Lalouette in France, and, more recently, by Abernethy in England.

Of the three methods, which we have just described, only the first is at present much in use, and even this is very much altered. Experience evinced, not only, that the employment of mercurial plas-

ters caused heat, redness, itching, and disagreeable eruptions, but, that the method was exceedingly slow and uncertain. Mercurial plasters are now only used as topical discutient applications to tumours, and indurations.

Fumigations, considered as the only means of cure, fell also into discredit, because, although they formed a method of applying mercury in a very active manner, they were, as anciently managed, liable to several objections. In this way it was next to impossible to regulate the quantity of mercury used, which will necessarily vary, according to the greater, or lesser activity of the fire employed for making the fumigation, according to the position of the patient during the operation, and other circumstances. The effect of the vapour on the organs of respiration was often very hurtful, and mercury, applied in the way of fumigation, more frequently occasioned tremblings, palsies, &c. than in any other manner. In Mr. Abernethy's mode, however, fumigation is, under certain circumstances, not only an eligible, but, the very best, way of affecting the constitution, as we shall presently notice.

Frictions with ointment have always been regarded as the most efficacious. They have undergone considerable change, and, by being rendered more simple, have been greatly perfected. All the warm aromatic substances have been retrenched from the ointment, not only as useless, but, as irritating and inflaming to the skin. In modern times, the proportion of mercury to the fat has been very much increased.

GENERAL REMARKS ON THE ADMINISTRATION OF MERCURY, ITS OCCASIONAL CONSEQUENCES, &c.

With regard to the preparations of the medicine, and the modes of applying it, we are to consider two things; first, the preparation and mode attended with the least trouble, or inconvenience, to the patient; and secondly, the preparation, and mode of administering it, that most readily conveys the necessary quality into the constitution. Mercury is carried into the constitution in the same way as other substances, either by being absorbed from the surface of the body, or that of the alimentary canal. It cannot, however, in all cases be taken into the constitution in both ways; for, sometimes the absorbents of the skin will not readily receive it, at least, no effect is produced, either on the disease, or constitution, from this mode of application. In this circumstance, mercury must be given by

the mouth, although the plan may be very improper in other respects, and often inconvenient. On the other hand, the internal absorbents sometimes will not take up the medicine, or, at least, no effect is produced on the disease, or the constitution.

In such cases, all the different preparations of the medicine should be tried; for, sometimes one succeeds, when another will not. In some cases, mercury seems to have no effect, either applied outwardly, or taken into the stomach. Many surfaces seem to absorb mercury better, than others; such are probably all internal surfaces and sores. Thirty grains of calomel, rubbed in on the skin, have not more effect, than three, or four, taken by the mouth. Dressing small ulcers with red precipitate sometimes causes a salivation. (See *Hunter on the Venereal Disease*, p. 335, 336.)

Besides the practicableness of getting the medicine into the constitution in either way, it is proper to consider the easiest for the patient, each mode having its convenience and inconvenience, depending on the nature of the parts, to which it is applied, or on certain situations of life at the time. Hence, it should be given in the way, most suitable to such circumstances.

In many, the bowels can hardly bear mercury at all, and it should then be given in the mildest form possible, conjoined with such medicines, as will lessen, or correct its violent local effects, although not its specific ones on the constitution.

When mercury can be thrown into the constitution with propriety by the external method, it is preferable to the internal plan, because the skin is not nearly so essential to life as the stomach, and, therefore, is capable in itself of bearing much more, than the stomach. The constitution is also less injured. Many courses of mercury would kill the patient, if the medicine were only given internally, because it proves hurtful to the stomach and intestines, when given in any form, or joined with the greatest correctors. Every one, however, has not opportunities of rubbing in mercury, and is therefore obliged, if possible, to take it by the mouth. (*Hunter*, p. 338.)

Mercury has two effects, one as a stimulus on the constitution and particular parts; the other as a specific on a diseased action of the whole body, or of parts. The latter action can only be computed by the disease disappearing.

In giving mercury in the venereal disease, the first attention should be to the quantity, and its visible effects in a given

time, which, when brought to a proper pitch, are only to be kept up, and the decline of the disease to be watched; for, by this we judge of the invisible, or specific effects of the medicine, and know what variation in the quantity may be necessary. The visible effects of mercury affect, either the whole constitution, or some parts capable of secretion. In the first, it produces universal irritability, making it more susceptible of all impressions. It quickens the pulse, increases its hardness, and occasions a kind of temporary fever. In some constitutions, it operates like a poison. In some it produces a kind of hectic fever, that is, a small quick pulse, loss of appetite, restlessness, want of sleep, and a sallow complexion, with a number of consequent symptoms; but, such effects commonly diminish, on the patient becoming a little accustomed to the medicine. Mercury often produces pains like those of rheumatism, and nodes of a scrophulous nature. (*Hunter, p. 339, 340.*)

The quantity of mercury to be thrown into the constitution, for the cure of any venereal complaint, must be proportioned to the violence of the disease. However, we are to be guided by two circumstances, namely, the time, in which any given quantity is to be thrown in, and the effects it has on some parts of the body, as the salivary glands, skin, or intestines. For, mercury may be thrown into the same constitution in very different quantities, so as to produce the same ultimate effect; but, the two very different quantities must also be in different times; for instance, one ounce of mercurial ointment, used in two days, will have more effect upon the constitution, than two ounces used in ten. The effects of one ounce, used in two days, on the constitution and diseased parts, are considerable. A small quantity, used quickly, will have equal effects, to those of a large one employed slowly; but, if these effects are principally local, that is, upon the glands of the mouth, the constitution at large not being equally stimulated, the effect upon the diseased parts must be less, which may be known by the local disease not giving way in proportion to the effects of mercury on some particular part. If it is given in very small quantities, and increased gradually, so as to steal insensibly on the constitution, a vast quantity at a time may at length be used, without any visible effect at all. (*Hunter, p. 341.*)

These circumstances being known, mercury becomes a much more efficacious, manageable, and safe medicine, than it was formerly thought to be; but, un-

luckily, its visible effects upon the mouth and the intestines are sometimes much more violent, than its general effect upon the constitution at large. These parts must therefore not be stimulated so quickly, as to hinder the necessary quantity of mercury from being used.

The constitution, or parts, are more susceptible of mercury at first, than afterwards. If the mouth is made sore, and allowed to recover, a much greater quantity may be thrown in, a second time, before the same soreness is produced. However, anomalous cases occur, in which, from unknown causes, mercury cannot at one time be made to produce any visible effects; but, afterwards, the mouth and intestines are all at once affected. (*Hunter, p. 342.*)

Mercury occasionally attacks the bowels, and causes violent purging, even of blood. The effect is remedied by intermitting the use of the medicine, and exhibiting opium. At other times, it is suddenly determined to the mouth, and produces inflammation, ulceration, and an excessive flow of saliva. To obtain relief in this circumstance, purgatives, nitre, sulphur, gum-arabic, limewater, camphor, bark, kali sulphuratum, blisters, &c. have been advised. Mr. Pearson, however, does not seem to place much confidence in the efficacy of such means, and, the mercury being discontinued for a time, he recommends the patient to be freely exposed to a dry cold air, with the occasional use of cathartics, Peruvian bark, and mineral acids, and the assiduous applications of astringent gargles. "The most material objection, (says Mr. Pearson,) which I foresee against the method of treatment I have recommended, is the hazard, to which the patient will be exposed, of having the saliva suddenly checked, and of suffering some other disease in consequence of it.

"That the hasty suppression of a ptyalism may be followed by serious inconveniences, has been proved by Dr. Silvester, (*Med. Obs. and Inq. Vol. 3.*) who published three cases of persons, who had been under his own care; two of whom were afflicted with violent pains; and the third scarcely retained any food in her stomach for the space of three months. I have seen not only pains, but even general convulsions produced from the same cause. But, this singular kind of metastasis of the mercurial irritation does not appear to me to owe its appearance to simple exposure to cold and dry air; because, I have known it occur in different forms, where patients continued to breathe a warm atmosphere, but used a bath, the water of which was not sufficiently heat-

ed. Cold liquids, taken in a large quantity into the stomach, or exposure of the body to cold and moisture, will also prove extremely injurious to those, who are fully under the influence of mercury; whereas breathing a cool air, while the body is properly covered with apparel, has certainly no tendency to produce any distressing, or dangerous consequences.

"If, however, a suppression of the ptyalism should be occasioned by any act of indiscretion, the remedy is easy and certain: it consists only in the quick introduction of mercury into the body, so as to produce a soreness of the gums, with the occasional use of a warm bath." (*Pearson on the Effect of Various Articles in the Cure of Lues Venerea*, Edit. 2, p. 163, 164.)

Mercury, when it falls on the mouth, produces, in many constitutions, violent inflammation, which sometimes terminates in mortification. In these habits, great caution is necessary. The ordinary operation of mercury does not permanently injure the constitution; but, occasionally, the impairment is very material; mercury may even produce local diseases, and retard the cure of chancres, buboes, and certain effects of the lues venerea, after the poison has been destroyed. (*Hunter*, p. 342.)

From mercury occasionally acting on the system, as a poison, quite unconnected with its agency as a remedy, and neither proportionate to the inflammation of the mouth, nor the actual quantity of the mineral absorbed, Mr. Pearson noticed that one, or two patients in general died suddenly every year in the Lock Hospital. The morbid state of the system, which tends to the fatal event, during a mercurial course, is named by Mr. Pearson *erethismus*, and is characterized by great depression of strength, a sense of anxiety about the præcordia, irregular action of the heart, frequent sighing, trembling, a small, quick, and sometimes an intermitting pulse, occasional vomiting, a pale contracted countenance, a sense of coldness; but the tongue is seldom furred, and neither the vital, nor natural functions are much disordered. They, who die suddenly of the mercurial erethismus, have frequently been making some little exertion just before. To prevent the dangerous consequences of this state of the system, the use of mercury must be discontinued, whatever may be the stage, extent, or violence of the venereal symptoms. The patient should be directed to expose himself freely to a dry and cool air, in such a manner, as shall be attended with the least fatigue, and he should have a generous diet. In this manner, patients often recover sufficiently in ten, or four-

teen days, to resume the use of mercury with safety. In the early stage, the mercurial erethismus may often be averted by leaving off the mercury, and giving the *mistura camphorata* with large doses of the volatile alkali. When the stomach is unaffected, sarsaparilla sometimes does good. (*Pearson*, p. 154, &c.)

Occasionally, the use of mercury brings on a peculiar eruption, which has received the several names of *hydrargyria*, *mercurial rash*, *eczema mercuriale*, *lepra mercurialis*, *mercurial disease*, and *erythema mercuriale*.

"Eruptions of various kinds are very common symptoms of syphilis, but a very unusual effect of mercury. Therefore, until the real nature of this erythema was lately discovered, whenever it occurred in patients undergoing a mercurial course for syphilitic complaints, it was naturally enough considered, as an anomalous form of lues venerea. The mercury was consequently pushed to a greater extent, in proportion to the violence of the symptoms, and, from the cause of the disease being thus unconsciously applied for its removal, it could not fail to be aggravated, and hurried on to a fatal termination. The observation of this fact, conjoined with another, of less frequent occurrence, namely, that a similar eruption did sometimes appear in patients using mercury for other complaints, and in whom no suspicion of syphilis could be entertained, at last led some judicious practitioners in Dublin to the important discovery, that the eruption was entirely an effect of mercury, and not at all connected with the original disease. This discovery was not published till 1804." (*M. Mullin*, in *Edinburgh Medical and Surgical Journal*, No. 5.) Mr. Pearson states, however, that he has been acquainted with the disease ever since 1781, and has always described its history and treatment in his lectures, since 1783.

The eruption is attended with more or less indisposition, is not confined to either sex, or any particular constitution, and seems to be equally produced by mercury applied externally, and by any of its preparations taken inwardly. Mr. Pearson has never seen it in subjects above 50; and he says, its occurrence is more common about eight, or ten days after beginning a mercurial course. (P. 166.)

Dr. M'Mullin distinguishes three distinct stages of the erythema mercuriale. "The first stage commences with languor, lassitude, and cold shiverings; these symptoms are succeeded by increased temperature of the body, quick pulse, nausea, headach, and thirst. The patient is troubled with a dry cough, and complains of difficult respiration, anxiety, and sense of

stricture about the præcordia. The tongue is usually moist, and covered with a white glutinous slime; it sometimes appears clean, and brightly red in the centre, whilst the margins appear foul. The skin feels unusually hot and itchy, with a sense of pricking, not unlike the sensation experienced from the application of nettles. The belly is generally costive; but, a diarrhœa is often produced by very slight causes.

"On the first, or second day, an eruption most commonly shews itself, the colour of which is either dark or bright red: the papulæ are at first distinct and elevated, resembling very much those in rubeola. Sometimes, but rarely, the eruption appears like urticaria, and in such instances the disease is observed to be very mild. The papulæ very speedily run together in such a manner as to form a suffused redness, which disappears on pressure. In most cases it begins first on the scrotum, inside of the thighs, forearm, or where mercurial friction had been applied, and the integuments of the parts affected become much swollen. There have also been observed instances, where an eruption of a purplish colour, and unaccompanied by papulæ, has diffused itself suddenly over the entire body. This, however, may be considered as uncommon. In every instance which came under my observation, it was confined at first to a few places, and from thence gradually extended, until the different portions of the eruption had united, and the papulæ were also rough to the feel. But in those cases, which resemble urticaria, a number of minute vesicles, which contain a serous fluid, appear, from the commencement, interspersed among the papulæ. Contrary to what happens in most diseases accompanied with cutaneous affections, the febrile symptoms are much aggravated, and continue to increase after the eruption has been completed. The pulse in general beats from 120 to 130 in a minute, the thirst continues urgent, and the patient, extremely restless, seldom enjoys quiet sleep. When the eruption has continued in this manner for a certain period, the cuticle begins to peel off in thin, whitish, scurfy exfoliations, not unlike those observed in rubeola. This desquamation has not been attended to by Dr. Moriarty or Mr. Alley, if they have not, by giving the same name to the decrustation which occurs in the last stage, confounded both together. It commences in those places where the eruption first made its appearance, and in this order spreads to other parts. About this period the fauces become sore, the tongue swells, and the eyes appear somewhat inflamed.

"The duration of this stage is very various; sometimes it continues from ten to fourteen days, and in other cases it terminates in half that time. When the disease has appeared in its mildest form, the patient recovers immediately after this desquamation, a new cuticle having formed underneath; but, if severe, he has only experienced the smallest part of his sufferings, and the skin now assumes a new appearance, which I have considered as the second stage.

"The skin at this period appears as if studded with innumerable minute vesicles, which are filled with a pellucid fluid. These vesicles may be expected, if the patient, at the close of the first stage, complains of increased itching, and sense of burning heat, in those parts from which the cuticular exfoliations have fallen. They remain sometimes for a day or two, but are most commonly burst, immediately after their formation, by the patient rubbing them, in order to relieve the troublesome itchiness with which these parts are affected. They discharge a serous, acrimonious fluid, which possesses such a very disagreeable odour as to induce nausea in the patient himself, as those who approach near his bed-side. The odour is so peculiar, that it can easily be recognised by any person who has once experienced it.

"This fluid is poured out most copiously from the scrotum, groin, inside of the thighs, or wherever the skin forms folds, and sebaceous glands are most numerous. The serous discharge from these minute vesicles form, with the cuticle, an incrustation, which may be considered as the third or last stage.

"These crusts are generally very large, and, when detached, stain the figure of the parts from which they have fallen. Their colour is yellow; but sometimes appears dark and dirt. This period of the disease might be termed, I think, with much propriety, the stage of *decrustation*, in order to distinguish it more fully from the *desquamation* which has been already noticed. From the use of the two last terms indiscriminately, those who have described the disease, have introduced into their descriptions a degree of confusion, which has caused its progress not to be well understood. When this stage appears, the face becomes more affected, the eyes insupportable of light, and the tarsi tender, inflamed, and sometimes inverted. The crusts, when on the face, as in other parts of the body, being falling off, divide asunder, so as to leave cracks and fissures, which produce an hideous expression of countenance; and the eyelids are also from the general

swelling of the face, completely closed. The back and hairy scalp are last affected, and, even in very severe cases, these parts are sometimes observed to escape entirely. The patient, whilst in this state, is compelled to desist from every kind of motion, on account of the pain which he experiences in the slightest exertion, and which he describes as if his flesh were cracking. The crusts also fall off in such abundance, that the bed appears as if strewed with the cores of hops. Whilst the eruption is only making its appearance in one place, another part may have arrived at its most advanced form; so that all the different stages of the disease may be present at one time in the same individual. It is attended with typhus through its entire course but it is very curious to observe, that the appetite for food, in most cases, remains unimpaired, and sometimes is even voracious. This circumstance was particularly remarkable in a patient who laboured under the disease, in its worst form, for the space of three months, in the Royal Infirmary of Edinburgh; for double the usual hospital allowance of food was scarcely sufficient to satisfy his hunger. When the catarrhal symptoms have continued during the progress of the complaint they are, at this advanced period, particularly aggravated the anxiety and pain of the breast are also very severe, attended with cough, and bloody expectoration, and the patient always feels languid and dejected. The pulse becomes frequent, feeble, and irregular, the tongue black and parched, and at length diarrhoea, delirium, convulsions, gangrene of the surface of the body, and death, supervene. In its milk form, it only goes through the first stage, and terminates, as we have already stated, in a few days, by a slight desquamation. But, when severe, it often protracted more than two months: every stage of the eruption continuing proportionally longer; and when, in this manner, it has run its course, it repeatedly breaks out on the new surface, and passes through the same stages." (*MM in Edinb Med. and Surg. Journal*, A 5.)

With respect to the remote cause, this is the employment of mercury. Dr. M'Mullin is inclined to think with Dr. Gregory, that the application of cold to the body, while under the action of mercury, is absolutely necessary, for its production; an opinion strengthened by there always existing catarrhal symptoms. Mr. Pearson, however, thinks cold has no concern in bringing on the complaint.

In the early stage, Mr. Pearson recommends small doses of antimonial powder,

with saline draughts, or the ammonia acetata. A gentle purgative should be given every three, or four days, and opium to procure sleep. The latter medicine sometimes does most good, when joined with camphor, or Hoffman's anodyne liquor. Sarsaparilla and bark may be given, when the discharge is no longer ichorous, and the tumefaction has subsided. Vitriolic acid has seemed to give relief. The diet may be light and nutritive, without fermented liquors, however, till the desquamation has somewhat advanced. Frequent use of the warm bath, and often changing the patient's linen and sheets, which soon become stiff and rough with the discharge, afford much benefit. If the warm bath cannot be had, Mr. Pearson advises, washing the body very tenderly with warm water-gruel; he also covers parts, from which the cuticle is detached, with a mild cerate, and renews the application twice a day. (P. 178.)

Dr. M'Mullin advises the immediate discontinuance of mercury; the removal of the patient from wards, where this mineral is in use; emetics and diaphoretics; but on account of the very irritable state of the bowels, he says antimonials are hardly admissible, and that when purgatives are indicated, only the mildest ones, such as oil of ricini, magnesia vitriolata, &c. ought to be given. He advises mucilaginous draughts with opium for relieving the soreness of the fauces. In the second stage, the cold infusion of bark with aromatics and opium, or, what are more praised, wine, porter, &c. To relieve the ophthalmia tarsi, the unguentum oxidii zinci, and to appease the painful sensation of the skin cracking, the linimentum calcis, which should be liberally applied as soon as crusts appear. See more particulars in Dr. M'Mullin's Essay.

Consult *Essay on a Peculiar Eruptive Disease, arising from the Exhibition of Mercury*, by G. Alley, Dublin, 1804. *A Description of the Mercurial Leprosy*, by Dr. Moriarty, Dublin, 1804. *Spens and M'Mullin, in Edinburgh Med. and Surgical Journal*, No. 1, and 5. *Pearson on Lues Venerea*, Edit. 2.

REMARKS ON THE PARTICULAR MODES OF GIVING MERCURY, AND ON ITS PREPARATIONS.

Frictions with Mercurial Ointment.

No metal acts in its pure metallic state; it must first be more or less combined with oxygen. The mercury, contained in the unguentum hydrargyri, becomes in

a certain degree oxydated, when triturated for the purpose of blending it with the fat. The metal, however, in mercurial ointment, is in the most simple, and least combined form, of all its preparations, and hence, it not only generally operates with more mildness on the system, but, with more specific effect on the disease. Various salts of mercury, when given internally, operate more quickly, than mercurial frictions; but, few practitioners of the present day confide solely in any internal preparations for curing the venereal disease, particularly, when the virus has produced effects in consequence of absorption. We shall only just mention in this part of the work, that rubbing in mercurial ointment is the mode of affecting the system with mercury, which is generally considered to agree best with most constitutions, and to act with most certainty on the venereal disease.

Mercurial Fumigations.

We have mentioned this method, as being one of the most ancient plans of affecting the constitution with mercury, and Lalouette and Abernethy have stated circumstances in its favour, which certainly render it sometimes a very eligible mode. The latter is of opinion, that if the peculiar advantages of mercurial fumigations were generally known to practitioners, they would be much more frequently employed. The advantages of the method consist in its affecting the constitution, when other means have failed, and in producing its effects in a much shorter time, than any other mode requires. How desirable this celerity of operation must often be, when venereal ulceration is making great ravages in the palate, throat, &c. it is needless to insist upon. In patients, who have not strength to rub in ointment, and whose bowels will not bear the internal exhibition of mercury, the mode of fumigation may prove of great service.

"In the year 1776, the Chevalier Lalouette, a physician at Paris, laid before the public an account of a new mode of mercurial fumigation, free from the inconveniences of former ones, and which, in the space of thirty-five years, he had successfully employed in more than four hundred cases, that had resisted all the ordinary methods of cure. His method consisted in inclosing the patient, previously undressed, in a kind of box resembling a sedan chair, with an opening at the top to let out the head, and another at the bottom, to which was fitted a small grate or furnace, having in it a heated iron for converting the mercurial remedy

into fume. The preparation he made use of was a kind of calomel, which, by repeated sublimation from iron-filing, was so far deprived of its muriatic acid, as to be in part reduced into running quicksilver; and, while it possessed considerable volatility, was perfectly irritating. Some of this powder being strewed upon the hot iron placed below, was immediately converted into smoke, which surrounded the patient's body, and after some time settled on his skin in the form of a white and very fine calx of quicksilver: a complete dress, having its inner surface fumigated with the same powder, was then put on.—The remedy being thus generally applied to the mouths of the cutaneous absorbents, soon got admission into the circulating fluids, and the constitution became thereby more speedily affected, than by any other process known before." (*Abernethy's Surgical and Physiological Essays, Part 3.*)

As the fumigating powder used by M. Lalouette was very operose, and consequently a very expensive preparation, and appeared to have no advantages over one made by abstracting the muriatic acid from calomel by means of volatile alkali, Mr. A. has always employed the latter, which is prepared at the hospital in the following manner: Two drachms of aqua ammoniæ are added to six ounces of distilled water, and four ounces of calomel are thrown into this liquor, and shaken up with it; the powder is afterwards separated by a filter, and dried.

The powder thus obtained is of a grey colour, and contains a good deal of quicksilver in its metallic state, which of course is extremely volatile, but becomes oxydated when raised into fume, and afterwards condensed into a white subtile powder.

Mr. A. never knew the method fail in curing the lues venerea.

In local disease of the joints, such, for instance, as frequently take place in the knee, and in sarcomatous enlargements of the breast in women, Mr. Sharp, and Sir C. Blicke have long been accustomed to direct fumigated stockings, or underwaistcoats to be worn; by which the complaints have been relieved, and the constitutions of the patients affected, without the trouble and unpleasantness arising from the use of the common mercurial ointment (*See Abernethy's Surgical and Physiological Essays, Part 3.*)

Mr. Pearson procured Lalouette's machine, and made a considerable number of experiments to determine the comparative advantages of this method, and mercurial frictions. He found, that the gums became turgid and tender very quickly

and that, the local appearances were sooner removed, than by the other modes of introducing mercury into the system; but that it soon brought on debility, a rapid and premature salivation, and, of course, the medicine could not be steadily continued. This gentleman concludes, that where checking the progress of the disease suddenly is an object of great moment, where the body is covered with venereal ulcers, or where the eruptions are large and numerous, so that there scarcely remains a surface large enough to absorb the ointment, the vapour of mercury will be advantageous. But, he thinks it extremely difficult thus to introduce a sufficient quantity of mercury into the system to secure the patient from a relapse, and therefore by no means eligible as a general practice. The vapour of mercury, he says, is singularly efficacious, when applied to venereal ulcers, fungi, and excrescences; but this plan requires an equal quantity of mercury to be given in other ways, as if the local application itself were not a mercurial one. (*Pearson on Lues Venerea, p. 145, &c.*)

For the purpose of fumigating sores, the hydrargyrus sulphuratus ruber is commonly used. Ulcers and excrescences about the pudendum and anus in women are said to be particularly benefited in this way; and in these cases the fumes are most conveniently applied by placing a red-hot heater at the bottom of a night-shool pan, and after sprinkling on it a few grains of the red sulphurated quicksilver, placing the patient on the stool. On other occasions, a small apparatus, sold at the shops, is used, which enables the surgeon to direct the fumes through a funnel against the ulcer in any situation.

Though mention has just been made of venereal excrescences, I am of opinion with Mr. Abernethy, that it is very questionable, whether any are ever really of this nature. I know, that many excrescences and verrucae about the anus, and parts of generation, diminish and are cured by a course of mercury. This is the only argument in favour of their being venereal; for, when tied, cut off, or made to fall off by stimulating them with pulv. sabinæ and erugo aris, they are as effectually cured, as if mercury had been given.

PREPARATIONS OF MERCURY FOR INTERNAL EXHIBITION.

The acetite of mercury is supposed to be a mild preparation, and was the active ingredient in the celebrated Keyser's pills. In solution it has also been recommended to be applied externally for the removal

of some cutaneous affections. It may be made into pills with crumb of bread. The dose is from one to five grains every night.

When you wish to excite a salivation quickly, when mercurial ointment alone will not produce this effect, or cannot be employed, and when fumigating is not convenient nor agreeable, the hydrargyrus calcinatus is often prescribed. The common dose is a grain, which may be increased to two, a day. It is apt, however, to disagree with the stomachs and bowels of many patients; but some can still continue to take it when conjoined with opium.

The hydrargyrus cum creta has occasionally been prescribed. The dose is ten grains; but it is a preparation, at present, not much in repute.

The hydrargyrus muriatus (corrosive sublimate) was a medicine highly praised for its antisyphilitic virtues by the celebrated Van Swieten, and, indeed, there is no doubt, that, like other preparations of mercury, it possesses such qualities. It retains great reputation even now, and, probably will always do so. However, like the hydrargyrus calcinatus, it sometimes deranges the stomach and bowels, and is never deserving of such confidence as mercurial frictions. Mr. Pearson remarks, that "when the sublimate is given to cure the primary symptoms of syphilis, it will sometimes succeed; more especially when it produces a considerable degree of soreness of the gums, and the common specific effects of mercury in the animal system. But it will often fail of removing even a recent chancre; and where that symptom has vanished during the administration of corrosive sublimate, I have known a three months course of that medicine fail of securing the patient from a constitutional affection. The result of my observations is, that simple mercury, calomel or calcined mercury, are preparations more to be confided in, for the cure of primary symptoms, than corrosive sublimate. The latter will often check the progress of secondary symptoms very conveniently; and I think it is peculiarly efficacious in relieving venereal pains, in healing ulcers of the throat, and in promoting the desquamation of eruptions. Yet, even in these cases, it never confers permanent benefit; for, new symptoms will appear during the use of it; and, on many occasions, it will fail of affording the least advantage to the patient, from first to last. I do sometimes, indeed, employ this preparation in venereal cases; but it is either at the beginning of a mercurial course, to bring the constitution under the influence of mercury at an

early period, or during a course of inunction, with the intention of increasing the action of simple mercury. I sometimes, also, prescribe it after the conclusion of a course of frictions, to support the mercurial influence in the habit, in order to guard against the danger of a relapse. But, on no occasion whatever, do I think it safe to confide in this preparation singly and uncombined, for the cure of any truly venereal symptom." (*Pearson on Lues Venerea*.)

The dose of hydrargyrus muriatus is a quarter of a grain.

The following is a common mode of ordering it: ℞. Hydrargyri Muriati gr. i. Aquæ Nucis Moschatae ℥ij. Misce. ℥ss. Omni nocte sumenda.

The hydrargyrus muriatus mitis (calomet) is not much used by modern surgeons for the cure of the venereal disease. Sometimes, indeed, it is given in cases of gonorrhœa, with a view of preventing venereal symptoms from following. But, it is extensively given as an alterative, and for the cure of such surgical diseases as require the system to be slightly under the influence of mercury. It generally proves actively purgative, when more than two or three grains are given.

The hydrargyrus phosphoratus has been successfully prescribed in the following formula: ℞. Hydrargyri phosphorati gr. iv. Corticis Cinnamomi in pulverum triti gr. xiv. Sacchari Purif. ℥ss. Misce.

The whole is to be divided into eight equal parts, one of which is to be taken every morning and evening, unless salivation takes place, when it ought to be discontinued. Some patients, however, will bear from one to two grains of the phosphat of quicksilver, without inconvenience.

"This remedy has been observed to heal inveterate venereal ulcers in a very short time, nay, in the course of a few days, particularly those about the pudenda. In venereal inflammations of the eyes, chancres, rheumatisms, and chronic eruptions, it has proved of eminent service. Upon the whole, if used with the necessary precaution, and in the hands of a judicious practitioner, it is a medicine mild and gentle in its operation. The cases, in which it deserves the preference over other mercurial preparations, are these: in an inveterate stage of syphilis, particularly in persons of torpid insensible fibres—in cases of exostosis as well as obstructions in the lymphatic system—in chronic complaints of the skin, &c." (*Journ. de Gotha*.)

In the *Pharmacopœia Chirurgica* may be seen an account of the manner of making the hydrargyrus phosphoratus, taken

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from the *Journal of Inventions of Gotha*, No. 2. As the author of the first work suggests, opium would certainly be most likely to correct the bad effects of the preparation on the stomach and bowels.

It is generally admitted by surgeons, that the most simple preparations of mercury are the most effectual in eradicating the venereal disease. The pilulæ hydrargyri are the most simple of the internal formulæ, being merely mercury triturated with mucilaginous and saccharine substances. Next to mercurial frictions, they are, perhaps, most frequently employed for the cure of the incipient form of the venereal disease, that is, while a chancre is the only complaint. They are also very commonly given in all stages of the disease, to aid mercurial frictions in bringing the system under the influence of the specific remedy. Ten grains of the mass, kept for these pills, is the usual dose. When they purge, opium will sometimes prevent this effect.

We must reserve other observations on the use of mercury in syphilis for the article *Venereal Disease*.

Mercury is employed both constitutionally and locally in numerous surgical cases; for the removal of indolent thickenings and indurations of parts; for the relief of tinea capitis, herpetic diseases, tetanus, hydrophobia, hydrops articuli, and a multitude of other affections, which we need not here specify.

MEROCELE. (from *μερος*, the thigh, and *κηλη*, a tumour.) A femoral or crural hernia. See *Hernia*.

METACINEMA. (from *μετα*, after, and *κινεω*, to remove.) A removal of the pupil of the eye from its natural situation.

METASTASIS. (from *μεθιστημι*, to transfer.) A transposition of a disease from one part to another.

MEZEREON. (said, by Blanchard, to be derived from some barbarous dialect.) This medicine was recommended by Dr. A. Russell for a particular class of venereal symptoms, in the following terms: "The disease, for which I principally recommend the decoction of the mezereon root as a cure, is the venereal node that proceeds from a thickening of the membrane of the bones. In a thickening of the periosteum, from other causes, I have seen very good effects from it: and it is frequently of service in the removal of those nocturnal pains, with which venereal patients are afflicted; though, in this last case, excepting with regard to the pain that is occasioned by the node, I own I have not found its effects so certain, as I at first thought I

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had reason to believe. I do not find it of service in the cure of any other symptom of the venereal disease." (*Med. Obs. and Inq. Vol. 3, p. 194, 195.*) Mr. Pearson, however, asserts, unequivocally, that mezereon has not the power of curing the venereal disease in any one stage, or under any one form, and if the decoction should ever reduce a venereal node, yet there will be a necessity for taking mercury in as large quantity, and for as long a time, as if no mezereon had been exhibited. Cullen found this medicine of use in some cutaneous affections, but, excepting an instance or two of lepra, Mr. Pearson has very seldom found it possessed of medicinal virtue, either in syphilis, or the sequelæ of that disease, scrofula, or cutaneous affections. (*Pearson on Lues Venerea, p. 55—59.*)

MIASMA. (from *μιασμα*, to pollute.) The matter, or effluvia producing contagion.

MODIOLUS. (dim. of *modius*, a measure.) The crown, or saw of a trepan, so called, because it was formerly contrived to enter to a certain depth.

MOLLITIES OSSIUM. A morbid softness of the bones, which become preternaturally flexible, in consequence either of the inordinate absorption of the phosphate of lime, from which their natural solidity is derived, or else of this matter not being duly secreted and deposited in their fabric. In rickets, the bones only yield and become distorted by slow degrees, and retain their natural inflexibility; but, in the present disease, they may be at once bent in any direction. The mollities ossium is rare, and its cause not understood. To give an idea of the disorder, I shall quote the case of Madame Supiot. In the year 1747 she had a fall, which occasioned her to keep her bed for some time, and left great pain and weakness in her loins, and lower extremities. In about a year and a half afterwards, she began to perceive her left leg particularly affected. Along with this weakness, she had violent pains over her whole body, which increased after a miscarriage, and still more after a natural delivery, in the year 1751. She was now seized with startings, great inquietude, and such violent heats, that she was almost continually in a sweat, and could not bear the least covering even in the coldest weather, and while her pains continually increased, she took notice that her urine precipitated a white sediment. Her pains abated on the appearance of the sediment, but she now observed that her limbs began to bend, and from this time the softness of them gradually increased till her death. In the month of

April 1752, the trunk of the body did not exceed 23 inches in length; the thorax exceedingly ill formed, and the bones of the upper part very much distorted; those of the lower part were very much bent, and the thigh-bones became so pliable, that her feet might easily be laid on each side of her head. The right side did not, till after some time, become so deformed as the left; but it was surprising to observe the alterations which daily took place, and the different figures assumed by the limbs, in consequence of the increased softness of the bones; so that when the sediment in the urine was considerable, the disease of the bones seemed to be at a stand, increasing considerably when it was suppressed. Besides this, she had violent pains, startings, difficulty of breathing, spitting of blood, and, lastly, a fever, with convulsions. She died in the beginning of November 1752, and, on dissecting her body, the following appearances were observed: 1. The muscles in general were of a very soft and pale consistence, the vastus externus, fascialis, quadriceps, biceps, and external parts of the gracilis, were much shorter than in their natural state, and more firm and tense; while those on the opposite side were much elongated, thin, and very tender: in short, the whole muscular system had suffered more or less, according to the action of the muscles in her life time. 2. The bones were entirely dissolved, the periosteum remaining unhurt, so that they exhibited only the form of a cylinder. 3. The heart and large blood-vessels, both veins and arteries, contained large black polypi, of a viscid consistence, and very unlike those usually found in dead bodies.

A case of softness of the bones is related by Mr. Gooch, but considerably different from the above, as it was attended with a remarkable fragility of the bones before they became soft. It likewise began with pains through the whole body, attended with feverish symptoms; but, after some weeks, they became confined chiefly to the legs and thighs, though they were not increased by pressure. This fragility of the bones does not appear to have been the case with Madame Supiot. In the month of June, 1742, Mr. Gooch's patient broke her leg, in walking from her bed to a chair, and heard the bone snap. No callus, however, formed, though the fracture was instantly reduced, and treated by one of the best surgeons in that part of the country; but, instead of this, the bones began to grow flexible, and, in a few months, were so from the knee to the ankle. The disease still continued to increase, so that,

In a short time, the other leg and thigh were affected in the same manner, after which both legs and thighs became oedematous, liable to excoriations, and to discharge a thin yellow ichor. Scorbutic symptoms began to appear in the winter after her leg was broken, and her gums began to bleed. Tonic medicines were exhibited without any success, only that her menstruation became more regular, and her appetite and digestion better than before; but, towards the end of her life, her breathing became difficult, the spine distorted, and a pain in the loins took place upon every motion of the vertebræ; and, as her limbs was now quite useless, she was obliged to sit upright in bed. At last, the end of the bones, on which she sat, having become also very soft, spread much, and the ends of her fingers and thumbs, by frequent endeavours to raise herself, became also very broad, and the phalanges crooked. The flexibility of the bones gradually increased, and became more general, attended with a wasting of the flesh, and excessive difficulty of breathing. The menstrual flux totally ceased four months before her death; her legs, which were very anasarcaous, and excoriated almost all over, became erysipelatous, but she retained her senses to the last. She expired suddenly, having talked in a composed manner concerning her miserable situation and approaching end only a few moments before.

On examining the body, she was found to have lost two feet two inches of her natural stature. The heart and lungs appeared sound, but had been much confined, principally by the liver, which was enlarged to an extraordinary degree; it was not, however, scirrhus, nor in any other way diseased. The spleen was very small, and the mesentery had one large scirrhus gland. All the bones, except the teeth, were softened, so that scarcely any of them could resist the knife; but those of the lower extremities were the most dissolved, being changed into a kind of parenchymatous substance, like soft dark-coloured liver, without any offensive smell. So completely, indeed, were they decomposed, that the knife met with less resistance in cutting through them, than in sound muscular flesh, though some bony lamellæ were here and there to be met with, but as thin as an egg-shell. The most compact bones, and those which contained the greatest quantity of marrow, were the most dissolved and it was observable, that the dissolution began internally, for the bony laminæ remained here and there on the outside, and no where else. The periosteum was rather thicker, than ordinary, and the

cartilages thinner; but, not in a state of dissolution. The bones were found to contain a great quantity of oily matter and little earth. No cause could be assigned for the disease; and in the case of Madame Supiot, the one assigned, viz. that of her eating too much salt, seems totally inadequate to explain the origin of the disorder. All the cases of the molities ossium on record have proved fatal, and no means of cure are yet known.—*Morand in Mem. de l'Acad. des Sciences*, 1752. See also *Chirurgical Observations and Cases*, by William Bromfield, Vol. 2, p. 30, &c. We meet with cases of this nature in the *Philosophical Transactions*; *Act. Hafniens*; *German Ephem.*; *Saviard's Obs. Chir.*; the writings of *Forestus*; *Gooche's Chirurgical Works*, Vol. 2, p. 393—399. *Edit.* 3792; &c.

MONOCULUS. (from *μονος*, single, and *oculus*, the eye.) A bandage formerly applied to the fistula lachrymalis, and diseases of the eye. It consists of a single-headed roller three ells long. To apply it to the right eye, it is to be held in the right hand, and its end in the left, *et vice versa*. This end is to be put on the back of the neck, and one turn of the roller is to be carried round, over the forehead, so as to meet the extremity of the bandage. The roller is then to descend under the ear of the side affected, and to pass obliquely over the cheek underneath the eye, and next over the root of the nose, and opposite the parietal bone, to the nape of the neck. The third turn of the roller is to overlap the second a little; the third the fourth; making what the French call *dolaires*; and the application of the bandage is completed by making turns round the head. The use of the monoculus was only to retain dressings. (*Encyclopédie Méthodique; Partie Chirurgicale.*)

MORTIFICATION. (*mortificatio*, from *mors*, death, and *fit*, to become.) The death of a part of the body.

Mortification is of two kinds, the one without inflammation, the other preceded by it. Inflammation is an increased action of that power, which a part naturally possesses; and in healthy inflammations, at least, it is probably attended with an increase of power. In cases, however, which are to terminate in mortification, there is no increase of power; but, on the contrary, a diminution of it. This, when joined to an increased action, becomes a cause of mortification, by destroying the balance, which ought to subsist between the power and action of every part. There are, besides, cases of mortification, preceded by inflammation, which do not arise wholly from that, as a cause: of this kind, are the carbuncle and the

slough formed in the small-pox pustule. (Hunter.) When any part of the body loses all motion, sensibility, and natural heat, and becomes of a brown, livid, or black colour, it is said to be affected with *sphacelus*, that is, complete mortification. As long as any sensibility, motion, and warmth continue, the state of the disorder is termed, *gangrene*. This word is here made use of to signify only a degree of *sphacelus*, or rather the process, by which any local disorder falls into the state of complete mortification. Many authors use both terms synonymously; but, it is to be observed, that *gangrene* does not invariably end in *sphacelus*; nor is the latter always preceded by the former. (*Richter's Anfangsgr. der Wundarzneykunst. Band 1. Kap. 3.*) There are some surgical writers, however, who make the distinguishing circumstance of *sphacelus* to be the extension of the disorder to the bones as well as the soft parts. (*Lassus, Pathologie Chirurgicale, Tom. 1, p. 30, Edit. 1809.*)

The causes of mortification are either internal, or external. It is commonly taught in the medical schools on the continent, that the internal causes probably operate after the manner of a deleterious substance, which being introduced into the circulation, occasions a putrefaction of the fluids. (*Lassus, op. et loc. cit.*)—This doctrine, however, is supported by no sort of proof, and may be considered as entirely hypothetical, if not decidedly erroneous.

There are, indeed, as the preceding author has noticed, some spontaneous mortifications, the primitive cause of which is not always well understood: an inflammation, apparently slight, may become gangrenous immediately it has made its appearance. In scorbutic, venereal, and small pox cases, we have daily instances of this fact. Other internal causes sometimes cut off, without any very evident pre-existing disease, persons, who are but little advanced in years. (*Saviard, Obs. 16. Haller, Disput. Chirurg. Tom. 4, p. 551.*) Certain poisonous, acrid, caustic substances taken inwardly, or introduced under the skin, may have the same effect, by annihilating the vital action, or destroying the texture of parts. (*Lassus, Pathologie Chirurgicale, Tom. 1, p. 31.*) But, though these observations may all be entirely correct, they by no means justify the conclusion, that the internal causes of mortification ever act like a deleterious matter producing a putrefaction of the fluids. The mortification of the toes and feet, so well described by Mr. Pott, proceeds from internal causes, which have not hitherto admitted of any accurate explanation.

Another very remarkable specimen of mortification from an internal cause, is that originating from eating bread made of bad black wheat, or rye. It is curious, that this case, both in man and other animals, always begins upon the extremities of the limbs. (*Mém. de l'Acad. des Sciences, ann. 1710. p. 61.*)

The external causes of mortification, which are manifest, and act mechanically, are burns; excessive cold; the application of caustics; the presence of any ichorous, urinary, or fecal matter effused in the cellular substance; violent contusions, such as are produced by gunshot wounds, or bad fractures; the strangulation of a part, as in cases of hernia, or when polypi, or other tumours are tied; a high degree of inflammation; and, lastly, every thing, that has the power of stopping the circulation and nervous energy in parts. (*Lassus, Pathologie Chirurgicale, Tom. 1, p. 34, 35.*)

Inflammation is one of the most frequent occasional causes of mortification. But, as we have already remarked, the death of a part may take place without any previous inflammatory disorder; and the latter, even when present, has frequently less share in the mischief, than other incidental circumstances, and is, in reality, only an effect of the very same cause, which produces the *sphacelus* itself. It is oftentimes a matter of doubt, whether actual inflammation precedes the occurrence, or not; for, a part, before it mortifies, is often only affected with pain, and with no degree of preternatural redness. Lastly, when mortification is, unquestionably, preceded by inflammation, there are so many varieties of the disorder, depending on incidental causes, that these latter demand more attention, than the inflammation itself. (*Richter's Anfangsgr. Band 1, Kap. 3.*)

Healthy phlegmonous inflammation seldom ends in mortification, though it occasionally does so, when very extensive and vehement.

Of all the inflammatory complaints, to which the system is liable, erysipelas is observed most frequently to terminate in *gangrene*, and whenever phlegmon is, in any degree, conjoined with an erysipelatous affection, which it not unfrequently is, it seems thereby to acquire the same tendency, being more difficult to bring to resolution, or suppuration, than the true phlegmon, and more apt to run into a mortified state. (*B. Bell.*)

The symptoms of mortification from inflammation take place variously, yet, generally, as follows. The pain and sympathetic fever suddenly diminish, the part affected becomes soft, and of a livid

colour, losing, at the same time, more or less, of its natural warmth and sensibility. In some places, the cuticle is detached; while, in other situations, vesicles arise, filled with a clear, or turbid fluid. Such is the state, to which we apply the term, *gangrene*, and, which stage of the disorder too often rapidly advances to *sphacelus*, when the part becomes a cold black, fibrous, senseless substance, called in technical language a *slough*.

The causes which produce mortification by impeding the return of blood from the part affected, for the most part operate by making pressure on the trunk, or principal branches, of a vein. In these instances, there is always an accumulation of blood in the part, which first swells, becomes of a livid colour, tense, and very painful. Soon afterwards, blisters arise, and the part becomes soft, œdematous, cold, insensible, emphysematous, black, and fœtid. Such are the circumstances, which happen in strangulated herniæ, in tied polypi, and in a limb, in which the veins have been so compressed by any hard swelling, such as the head of a dislocated bone, as to excite mortification.

Other causes operate by preventing the entrance of arterial blood. The application of a ligature to an artery, as practised in several surgical cases, and all external pressure, that closes the artery, or arteries, on which a part entirely depends for its supply of blood, have this effect. Mortification does not, however, always take place, when the trunk of an artery is rendered impervious, because nature furnishes the necessary supply of blood, through collateral ramifications. But, when the disorder does happen, the part commonly first becomes pale, flaccid, and cold, and soon afterwards shrinks, loses its sensibility, grows black, and perishes.

It is usually represented by writers, that mortification may proceed from a mere lessening of the communication of blood and nervous energy to a part. However, it is to be observed, that parts, deprived of all connexion with the sensorium, by the division, or paralytic state, of their nerves, do not frequently perish on this account. But, as their functions are carried on with less vigour, and their vitality is weakened, the same causes, which sometimes produce mortification in parts differently circumstanced, must much more readily occasion it in these. Among the causes of the present species of mortification, may be mentioned great universal debility; extreme old age; a thickening and ossification of the coats of the arteries, and a consequent dimi-

nution of their capacity, and of their muscular and elastic power.

The mortification, arising from long continuance in the same posture, is chiefly attributable to the unremitted pressure, which parts sustain, and which obstructs the circulation. Surgeons have frequent occasions to see melancholy examples of this kind of mortification, particularly, in cases of fractures, paralysis from disease of the vertebræ, &c. The mischief most readily occurs, where the bones have the least flesh upon them, and, consequently, where all external pressure has the most effect; as, for instance, about the os sacrum, os ilium, spines of the scapulæ, &c. The disordered part always first becomes soft, livid, red at the circumference, and, œdematous, afterwards losing its sensibility, and acquiring a black appearance: at length, it is converted into a foul sloughing ulcer.

Though long continuance in the same posture is the grand cause of this kind of mortification; yet, incidental circumstances are frequently combined with it, and have great influence over the disorder. These are, great debility, the same state of the system, as exists in typhus fever, impure air, unclean bedding, &c.

There are some causes, which produce death in a part at once, by the violence of their operation. A blow, struck very forcibly, on any portion of the body, may destroy the vitality of the fibres and vessels in this sudden manner. When a ball enters the substance of parts with great force and rapidity, it always kills at once many of the fibres, which are in the way of its track, and these must be thrown off in the form of sloughs, before the wound can granulate and heal.

Cold is often another cause of mortification, and, when parts, which have been frozen, or frostbitten, are suddenly warmed, they are particularly apt to slough.

I find in M. Larrey's late valuable publication, some interesting observations on the gangrene from cold. He acquaints, that after the battle of Eylau, one of the most grievous events, to which the French soldiers were exposed, was the freezing of their feet, toes, noses, and ears: few of the vanguard escaped the affliction. In some, the mortification was confined to the surface of the integuments of the toes, or heels; in some, the skin mortified more deeply, and to a greater or lesser extent; while, in others, the whole of the toes, or foot, was destroyed.

"All the writers on this species of mortification (says M. Larrey) have considered cold as the determining cause; but, if we attend to the period when the

complaint begins its progress, and the phenomena, which accompany it, we shall be convinced, that cold is merely the predisposing cause. In fact, during the three or four exceedingly cold days, which preceded the battle of Eylau, (the mercury having then fallen to 10, 11, 12, 13, 14, and 15 degrees below zero of Reaumur's thermometer) and until the second day after the battle, not a soldier had complained of any symptom depending upon the freezing of parts. Nevertheless, we had passed these days, and a great portion of the nights of the 5, 6, 7, 8, and 9th, of Feb. in the snow, and the most severe frost. The imperial guard, especially, had remained upon watch in the snow, hardly moving at all for more than four and twenty hours, yet, no soldier presented himself at the ambulance,* nor did any one complain of having the feet frozen. In the night of the 9th and 10th of February, the temperature suddenly rose, the mercury ascending to 3, 4, and 5 degrees above zero. A great quantity of sleet that fell on the morning of the 10th, was the forerunner of the thaw, which took place in the course of that day, and continued in the same degree for several days. From this moment, many soldiers of the guards and the line applied for succour, complaining of acute pain in the feet, and of numbness, heaviness, and prickings in the extremities. The parts were scarcely swollen, and of an obscure red colour. In some cases, a slight redness was perceptible about the base of the toes, and on the back of the foot. In others, the toes were destitute of motion, sensibility, and warmth, being already black, and, as it were, dried. All the patients assured me, that they had not experienced any painful sensation during the severe cold, to which they had been exposed on the night watches of the 5, 6, 7, 8, and 9th, of February, and that it was not till the

* The ambulances of the French army are caravans, furnished with an adequate number of surgeons, and every requisite for the dressing of wounds, and the immediate performance of operations, upon which last circumstance, in particular, the life of the wounded soldier often depends. These caravans follow the most rapid movements of the army, and are always capable of keeping up with the vanguard. It is to be regretted, that no surgeon-general of our army has organized any thing of this sort; it is the only means, however, by which speedy surgical assistance can be rendered to the thousands of wounded in every considerable action.

night of the 10th, when the temperature had risen from 18 to 20 degrees, that they felt the first effects of the cold." It is further noticed by M. Larrey, that such patients as had had opportunities of warming themselves in the town, or at the fires of the night watches, suffered in the greatest degree. (See *Larrey's Mémoires de Chirurgie Militaire*, Tom. 3, p. 60—62)

Sometimes mortification seems to depend on epidemic causes. Instances have been known, in which almost all the ulcers and wounds in large hospitals, have become nearly at the same time affected with gangrenous mischief.

The *hospital gangrene*, as it is commonly called, is said to be produced by the putrid effluvia in hospitals, gaols, and ships, where the sick are crowded together in great numbers. "It is (observes Lassus) a true contagion, which is communicated to the wound, or ulcer, by the mere application of linen, or lint, that has been for a certain time in some place, where the air is impregnated with these deleterious miasmata. The impression made on the skin, throat, lungs, and intestinal canal, by such pernicious emanations, occasions gangrenous diseases, which are sometimes epidemic. This affection, the progress of which is so rapid, especially in cold damp weather, and in debilitated subjects, first shows itself locally in the form of greyish ash coloured spots, like the aphthæ, which appear on the surface of the ulcer. Such spots afterwards turn blackish, the vital powers sink, and the ulcer daily enlarges, emitting a most fetid smell." (*Lassus, Pathologie Chirurgicale*, Tom. 1, p. 37, 38.)

Mortification is very frequently occasioned by the injury, which parts sustain from the application of fire, and heated substances to them. When the heat is very great, the substance of the body is ever decomposed, and of course killed at once. On other occasions, when the heat has not been so violent, nor sufficiently long applied, inflammatory symptoms precede the sloughing.

It is a curious fact, that the blood coagulates in the large arteries, which lead to a mortified part. This occurrence takes place for some distance from the slough, and is the reason, why the separation of a mortified limb is seldom followed by hemorrhage.

When gangrene and sphacelus take place, the patient is usually troubled with a kind of hiccup.

The constitution also suffers immediately a considerable dejection. The patient's countenance suddenly assumes a wild cadaverous look; the pulse becomes,

small, rapid, and sometimes irregular; cold perspirations come on, and the patient is often affected with diarrhoea and delirium.

The generality of writers have distinguished gangrene and mortification, into the *dry* and *humid* kinds, according as the disordered part is found free from much moisture, or not. It does not appear, however, that such distinctions lead to any useful objects in practice. Cases, of what has been termed dry gangrene, never occur from inflammation. They commonly happen from the flow of blood to the parts affected being stopped by some kind of compression, or another, as by tumours, ligatures, or other similar causes, obstructing the principal arteries, which used to supply the parts now in a mortified state. Such causes, when the stoppage of the circulation is complete, always occasion a very slow mortification; and, as the parts in such instances, are no longer supplied with fresh quantities of fluids, while a considerable evaporation must be going on, there must be less humidity, than in other cases of mortification (*B. Bell.*)

Authors have enumerated other varieties of mortification, as for instance, the *white gangrene*, in which the parts, supposed to be mortified, do not turn black, but retain nearly their former colour, (*Quesnay.*)

All mortifications spread in one of the following ways: either the living circumference sphacelates, without undergoing any previous perceptible changes, or the part first inflames, and then dies. The difference, in regard to the quickness, or slowness, with which sphacelus spreads, is exceedingly great, in different cases.

In cases of sphacelus, the prognosis chiefly depends on the nature of the cause of the disorder. The more easy the cause is of removal, the less room is there for alarm. It is an erroneous supposition, that mortification arising from an external local cause, is more easy to be stopped and cured, than that originating from an internal one. The local cause is sometimes exceedingly difficult, or even incapable, of removal; and a sphacelus, which is at first entirely local, may afterwards become a general disorder, by the universal debility, and derangement of the system, resulting from the absorption of putrid matter. Hence, it is obvious, that a sphacelus may easily extend beyond the bounds of its outward local cause. On the other hand, a mortification may be reduced to one of a nature entirely local, though it arose at first from constitutional causes. Sphacelus from extreme debility, or from such a

state of the system, as attends the scurvy, typhoid fevers, &c. is constantly perilous, because these causes are very difficult to remove. It is also a fact, that, when numerous causes are combined, it is an unfavourable occurrence, not merely because the surgeon is apt to overlook some of them, but, because there are in reality more obstacles to the cure.

There is a species of sphacelus, which spreads with very great rapidity, and, as the surgeon has scarcely time to employ the necessary means, the case is exceedingly dangerous. Sometimes, a mortification spreads so slowly, that it does not occupy much extent at the end of several months, or even a whole year. The case, however, is often not the less fatal on this account. The danger is never altogether over, until the dead part has completely separated. The entrance of putrid matter into the circulation is so injurious, that patients sometimes perish from this cause, long after the mortification has ceased to spread. (*Richter's Anfangsgr. der Wundarzn. Band 1, Kap. 3, p. 78, 79.*)

This last circumstance is very much insisted upon, by all the modern continental surgeons; but, I cannot pretend to determine, whether the doctrine is correct, or not. Certain it is, that few practitioners in this country entertain much apprehension of the bad effects of the absorption of putrid matter in cases of mortification.

The danger of sphacelus is also proportioned to the size and importance of the part affected. The event of the distemper likewise depends very much on the patient's age and constitution.

Parts, affected with gangrene, do not immediately lose the whole of their sensibility; the circulation is still continued in a certain degree; and when the progress of the distemper does not surpass certain bounds, the functions of such parts may be completely re-established. Gangrene, strictly speaking, is not a decided mortification; but, only the forerunner of this latter mischief, and may be regarded as the intermediate link, between the most violent stage of inflammation and sphacelus. The presence of this last implies the total loss of life in the part affected, the destruction of its organization, the abolition of all its functions, and an absolute inability to resume them again. However, even when we see a part manifestly sphacelated, we must not always conclude, that its entire destruction is certain; for, in many cases, the disorder only affects the skin and cellular substance. The integuments frequently slough away, and we have the

happiness to perceive, that the tendons, muscles, and other organs, which they cover, remain perfectly sound, and leave room to entertain hopes of a cure.

It is easily comprehensible, that it is only in external affections of the body, that the progress of inflammation to gangrene and sphacelus can be marked with any degree of precision. But, as we have indeed already observed, the approaches of the latter are not invariably announced by the distinct and manifest symptoms of gangrene, even when the disorder is quite superficial. There are cases, which justify the conclusion, that a small part of the body may be affected with sudden death, just in the same manner as the whole machine. Sphacelus is often seen making its appearance in a part, which is apparently quite healthy, without being preceded by any other symptom, than a sudden acute pain in the seat of the mischief. Sometimes, in the earliest period of the complaint, a black spot, which rapidly spreads on every side, may be observed.

In order to be able to form a just prognosis, all the above circumstances must be taken into consideration, and, in particular, we must never deliver an opinion, without having closely examined the progress of the disorder; for, should we make a favourable prognosis from such appearances, as might justify us as much as possible in so doing, there is always great risk of finding ourselves most miserably mistaken by the event of the case. In all cases of considerable mortification, even when arising from an external cause, the patient cannot be deemed exempt from danger, not only while no separation of the mortified parts has begun, but, also, not before such parts have been completely detached from the sound ones. After the progress of mortification has ceased, patients have been known to perish suddenly, without there being a possibility of suspecting any other causes of this catastrophe, than the operation of putrid matter on the animal economy and nervous system after absorption.

TREATMENT OF MORTIFICATION.

We shall arrange under two heads what we have to say on the treatment of mortification. Under the first, we shall comprehend every thing, which relates to internal remedies, and such other general means, as are indicated by the general state of the system. Under the second, we shall speak of topical remedies, and of the local treatment of the parts affected.

GENERAL MEANS.

1. *Evacuations and Antiphlogistic Remedies.*

When mortification seems to depend on the violence of inflammation, the first indication is to moderate the inordinate action of the sanguiferous system, by the prudent employment of such means as are proper for counteracting inflammation. The subject is treated of in *Inflammation*, and it is not necessary to enter here into any repetitions. When bleeding has not been sufficiently practised, during the state of the inflammation antecedent to the mortification, and when the general symptoms, which point out the existence of this state, continue violent, and, especially, when the pulse is still quick, hard, or full, it is absolutely necessary to empty the vessels a little more, even though mortification has begun, particularly, if the patient be young and plethoric. Bleeding, by diminishing the fever, and abating the general heat, is frequently the best means of all. It may then be considered better, than all antiseptics, for stopping the progress of the disorder. But, this evacuation is to be employed with a great deal of circumspection; for, should it be injudiciously resorted to, from the true state of the system not being understood, the error may be followed by the most fatal consequences. It should also be well remembered, that how strongly soever bleeding may be indicated, the moment is commonly not long in coming, when this evacuation is totally inadmissible, especially when the mortification makes much progress.

What we have observed, concerning bleeding, is equally applicable to other evacuations, particularly those which are obtained by purgative medicines; and which become dangerous when they lower the patient's strength to a certain point, or when they are accompanied with too violent an irritation of the intestinal canal, operating sympathetically on the whole system. Emetics, the effects of which are always apt to be confounded, or compared, with those of purgatives, act in a very different and much more advantageous manner in cases of mortification, especially that species of the distemper, which arises in consequence of erysipelatous inflammation. Such, for example, is the inflammation, often seen in hospitals, in consequence of compound fractures, or other kinds of wounds. When this kind of inflammation makes its appearance, and even after the symptoms of mortification have begun to appear, an emetic, given in small repeated doses, so as to excite vomiting, is one of the best means of resisting the progress

of the disorder. But, if, instead of occasioning vomiting, the medicine should only produce evacuations *per anum* as sometimes is the case, we must not persist in exhibiting it, lest it should prove, like every other cathartic, pernicious to the patient. A strict regimen, which may have been useful and even necessary, during the inflammatory stage, may also have a very bad effect, if continued too long, by diminishing the patient's strength, which, on the contrary, should be supported by the most nourishing food.

2. Tonic and Antiseptic Remedies.

This leads us to a second very essential and important indication to be fulfilled, as soon as the symptoms, announcing the existence of the inflammatory state, appear to abate, and the patient begins to be debilitated. This indication is to prevent excessive weakness by the suitable employment of cordials, and, particularly, of tonics. These same means also contribute to place the system in a proper state for freeing itself from the mortified parts, or, in other words, for detaching them. For, inflammation is the preparatory step, which nature takes to accomplish the separation of mortified parts from the living ones, and, such salutary inflammation cannot take place, if the energies of life be too much depressed in the rest of the system.

In order to fulfil the above indication, it is necessary to prescribe a nourishing diet, with a certain quantity of good wine, proportioned to the patient's strength, and the symptoms of the complaint. This diet is generally productive of more real benefit, than the whole class of cordial and stimulating medicines. However, when the patient is very much weakened, when the mortification of the part affected is complete, and the disorder is spreading to others, some of the following remedies may be ordered: volatile alkali; aromatic confection, &c. In general, however, wine is best; because more agreeable than cordials, and, for this purpose, one ought to prefer the most perfect wines, such as those of Spain and Madeira.

Of all the medicines, hitherto recommended for the cure of mortification, there is certainly not one, that has acquired such a character for efficacy, as the Peruvian bark. It is said, that this remedy often stops, in a very evident and expeditious manner, the course of the disorder. Being a very powerful tonic, it is thought to operate by strengthening the

system, and thus maintaining in every part the necessary tone for resisting the progress of mortification. But, whatever may be its mode of acting, the advocates for this medicine contend, that it is now a well-known fact, that it ought to be employed in almost all cases of mortification, as soon as the violence of the inflammatory symptoms has been appeased.

It was Mr. Rushworth, a surgeon at Northampton, who made this discovery in the year 1715. Amyand and Douglas, two surgeons in London, soon afterwards confirmed the virtue of this remedy. Mr. Shipton, another English surgeon, has also spoken, in the Philosophical Transactions, of the good effects, which he has produced by this medicine. In the Medical Essays, of Edinburgh, we find several cases, illustrative of the efficacy of bark in cases of mortification. We there are informed, that when its exhibition was interrupted, the separation of the eschars was retarded, and that, on the medicine being resorted to again, such a separation went on again more quickly. Since this period, all practitioners, both in England, and elsewhere, have had recourse to this remedy, which has every where obtained the highest praises. Unfortunately, these praises have induced surgeons to employ it indiscriminately, and with equal confidence, in all cases. Hence, the partial want of success, which occurred, led some to decry the Peruvian bark almost generally; until observations, made with the greatest care and circumspection, re-established its credit, by shewing the limits, beyond which, its efficacy is not to be depended upon.

We cannot indeed doubt, that bark has frequently had the most salutary effect, in cases of mortification, though sometimes it may probably have had imputed to it effects, which were entirely produced by nature. In many cases, however, bark is evidently hurtful, when exhibited prematurely. There are other instances, in which it is impossible to employ it in sufficient quantity, the stomach not being able to bear it in any form. In general, it should never be administered, when the pulse is high, and other inflammatory symptoms exist; but, when the tension of the part diminishes, the pulse sinks, when symptoms of weakness commence, and, particularly, when with these circumstances, we perceive a separation beginning to take place between the dead and living part, bark hardly ever fails to support the strength of the constitution, and powerfully to accelerate the separation of the morti-

fied parts. (*Encyclop. Méthod. Art. Gangrene.*)

However, as we have already remarked, it is quite wrong to prescribe bark, in every instance, as the sole remedy; for, there are many cases, in which it is unnecessary; some, in which it does harm; and others, in which it is totally inefficacious. It is a medicine obviously of no service, when the mortification arises from an external cause, and is the only complaint, in a healthy, strong constitution. It is equally unnecessary, when the sphacelus is of the dry sort, and has ceased to spread, at the same time, that the living margin appears to be in a state of inflammation, without any universal debility. But, it deserves particular notice, that the circumstances of each individual case are liable to such considerable variation, that though bark may be at first unnecessary, it may afterwards be indicated.

In some cases of sphacelus, bark is hurtful. The disorder is generally attended with fever, which may be of three kinds; inflammatory; typhoid; or one connected with a disordered state of the abdominal viscera.

In the latter case, which is far more common, than is supposed, bark is obviously pernicious. Here, the indication is to empty the stomach and bowels, as quickly as possible. When this has been done, and bark should now be indicated by any of the circumstances, already pointed out, it may be safely administered. But, there is a great necessity, for procuring evacuations, as speedily as possible, before great debility has come on.

Sometimes, mortification is accompanied with a low typhoid kind of fever, which, whether the cause, or the consequence of the local mischief, demands the exhibition of bark.

As we have above stated, the common inflammatory fever may attend a mortification, and then the living margin is generally inflamed and painful. This is particularly the case, when mortification is the consequence of genuine acute inflammation, or of an external injury, in a healthy subject. Here, bark must obviously be injurious. Still, it is wrong to regard this medicine, as invariably hurtful, whenever sphacelus is the effect of inflammation. It has already been observed, that the inflammation frequently has less share in the origin of the disorder, than some incidental cause, which oftentimes requires the exhibition of bark. It is also to be noticed, that even when mortification is the pure effect of inflammation, great prostration of strength may subsequently arise, or else constitutional symptoms in consequence of the absorp-

tion of putrid matter, and in both these instances, the voice of experience loudly demands the employment of bark, though its exhibition might have been at first useless or hurtful. While the genuine inflammatory fever, and local inflammation, attend mortification, antiphlogistic means are undoubtedly useful. However, great caution is requisite in employing them, since, in cases of humid gangrene, as it is termed, the inflammatory state very soon changes into one, resembling that of typhus fever, &c.

Sometimes, there is mere prostration of strength, without any symptom of disorder in the gastric system, or of inflammation, or typhoid fever. A nervous fever is of this kind. In this instance, bark is evidently proper, though seldom effectual alone. Volatile, diaphoretic, and nervous medicines, are commonly at the same time proper, and opium, wine, and the volatile alkali, are such as experience has selected, together with the application of blisters.

From the preceding observations, it becomes evident, that though the method of treatment in cases of sphacelus, depends on the occasional cause, yet, it must also be regulated by the kind of fever, which, as we have described, may be either inflammatory, typhoid, one connected with gastric disorder, or nervous. Consequently, there are four plans of constitutional treatment, and it is easy to determine the particular cases, in which bark is unnecessary, hurtful, or inefficacious.

We meet with one species of mortification; in which the patient experiences severe pain in the part, without the smallest appearance of inflammation. Here bark is never of any use, and opium is probably the only medicine of any efficacy. We shall consider this subject more fully presently, when we introduce Mr. Pott's remarks on a peculiar mortification of the toes and feet.

Bark sometimes occasions purging, and then it also proves inefficacious, and hurtful. This effect, however, may frequently be prevented by adding a few drops of laudanum to each dose.

Bark may disagree with the stomach; but, it very seldom does so, when given in exceedingly fine powder, which also generally proves more efficacious, than a coarse one. Administering it with wine, some aromatic water, or in the form of the cold infusion, makes the medicine likewise less likely to disorder the stomach. (*Richter. Anfangsgr. der Wundarzn. Kap. 3.*)

The vitriolic acid may frequently be advantageously given at the same time with the bark, and the best method of exhibiting it is to acidulate with it every thing.

which the patient drinks. Other acids are also sometimes used for the same purpose.

Carbonic acid gas is another remedy of the highest efficacy in all cases of mortification. It has even been known to have the most beneficial effects when bark has failed in doing good. Water impregnated with this gas should be recommended, as a most beneficial kind of drink.

Such are the remedies, which have acquired the greatest confidence of practitioners, when the indication is to support and strengthen the constitution, with a view of resisting the progress of mortification. A great many others have been recommended, but, there are none, which, in point of efficacy, can be compared with those abovementioned.

The *hospital gangrene*, is a case, for which bark is universally allowed to be a medicine of the highest efficacy. It is not only to be given internally, but employed as a lotion for the ulcers, with the addition of camphorated spirit of wine. In the hospital gangrene, however, one of the most essential measures is to purify the air, in which the patient is residing. As much fresh air as possible should be let into the ward, or room; fumigations of nitric and oxygenated muriatic acids should be used, not only for disinfecting the place, but as an application to the gangrenous disease. The nitric acid fumigations are made by putting into a glass vessel on the ground, half an ounce of concentrated sulphuric acid, to which an equal quantity of nitre is to be added *gradatim*. The mixture is to be stirred with a glass tube, when an abundance of white vapour will be produced.

The oxygenated muriatic acid fumigations are made, by mixing three ounces two drams of common salt with five drams of the black oxide of manganese in powder. These two ingredients are to be triturated together; they are then to be put into a glass vessel; one ounce two drams of water are to be added, and then, if the ward, or chamber be uninhabited, one ounce seven drams of sulphuric acid are to be poured upon the mixture all at once; or, *gradatim*, if the patients are there. This quantity will be sufficient for disinfecting a very large ward. (See *Lassus Pathologie Chirurgicale*, Tom. 1. p. 38, 39.)

3. *Anodyne Remedies.*

A third indication, which should be observed together with the second, or which, should even precede it in many instances, is to lessen the irritability and sufferings of the patient, by the use of

opium. Attention to this desideratum frequently contributes more than any thing else, to stop the progress of the disorder, and is often indispensable in order to promote the operation of other remedies. In all cases of mortification, every thing, which heats, irritates, or adds to the patient's sufferings, appears in general, to augment the disorder, and increase the rapidity of its progress. On the other hand, every thing which tends to calm, assuage, and relax, almost always retards the progress of mortification, if it produce no greater good. The pain also, which is a constant mark of too much irritation, contributes of itself to increase such irritation, and, in this double point of view, we cannot do better, in the majority of cases, than endeavour to appease it by more or less liberal use of opium. —When the inflammatory stage evidently prevails, this medicine may be conjoined with antiphlogistic remedies, such as neutral salts, and, particularly, nitre. In other instances, attended with debility, it may be given with bark and cordials.

The following observations on the efficacy of opium in a particular, and not unfrequent case, are highly entitled to the attention of every surgical practitioner. The disease is also described with that accuracy and elegance, which always distinguish the writings of Mr. Pott.

“The powers and virtues of the Peruvian bark are known to almost every practitioner in physic and surgery. Among the many cases in which its merit is particularly and justly celebrated, are the distempers called gangrene and mortification; its general power of stopping the one, and resisting the other, have made no inconsiderable addition to the success of the chirurgic art: but still there is a particular species even of these, in which this noble medicine most frequently fails: I mean that particular kind, which, beginning at the extremity of one or more of the small toes, does, in more or less time, pass on to the foot and ankle, and sometimes to a part of the leg, and, in spite of all the aid of physic and surgery, most commonly destroys the patient.

“It is very unlike to the mortification from inflammation, to that from external cold, from ligature, or bandage, or to that which proceeds from any known and visible cause, and this as well in its attack as in its process. In some few instances, it makes its appearance with little or no pain; but, in by much the majority of these cases, the patients feel great uneasiness through the whole foot and joint of the ankle, particularly in the night, even before these parts shew any mark of dis-

temper, or before there is any other, than a small discoloured spot on the end of one of the little toes.

"It generally makes its first appearance on the inside, or at the extremity, of one of the smaller toes, by a small black, or blueish spot; from this spot the cuticle is always found to be detached, and the skin under it to be of a dark red colour.

"If the patient has lately cut his nails, or corn, it is most frequently, though very unjustly, set to the account of such operation.

"Its progress in different subjects, and under different circumstances, is different; in some it is slow and long in passing from toe to toe, and from thence to the foot and ankle; in others its progress is rapid, and horridly painful: it generally begins on the inside of each small toe, before it is visible either on its under or upper part; and when it makes its attack on the foot, the upper part of it first shews its distempered state, by tumefaction, change of colour, and sometimes by vesication; but wherever it is, one of the first marks of it is a separation or detachment of the cuticle.

"Each sex is liable to it; but for one female in whom I have met with it, I think I may say, that I have seen it in at least twenty males. I think, also, that I have much more often found it in the rich and voluptuous, than in the labouring poor; more often in great eaters, than free drinkers. It frequently happens to persons advanced in life, but is by no means peculiar to old age. It is not, in general, preceded or accompanied by apparent distemperature either of the part, or of the habit. I do not know any particular kind of constitution which is more liable to it than another; but as far as my observation goes, I think that I have most frequently observed it to attack those, who have been subject to flying uncertain pains in their feet, which they have called gouty, and but seldom in those who have been accustomed to have the gout regularly and fairly. It has, by some, been supposed to arise from an ossification of vessels, but for this opinion I never could find any foundation but mere conjecture.

"The common method of treating this distemper is, by spirituous fomentations, cataplasms, actually and potentially warm, by dressings of the digestive kind, as they are called, animated with warm, pungent oils and balsams, &c. and, internally, by the Peruvian bark.

"I wish I could say that this, which, with little alteration, has been the general practice, had been most frequently, or even often successful; but I am, from long

and repeated experience, obliged to say, that it has not.

"I am sensible, that many of my readers will be surprised at my affirming, that the Peruvian bark will not stop a mortification, a distemper in which, for some years, it has been regarded as specific; but I must beg not to be misunderstood: I mean to confine my observation and my objection to this particular species of mortification, which I regard as being *sui generis*; and under this restriction I must repeat, that I have seldom, if ever, seen the bark successful: in all other cases, wherein it is used or recommended, no man has a higher opinion of it; but, in this I cannot give it a praise, which it does not deserve.

"I believe I may venture to say, that I have tried it as fairly, as fully, and as variously as any man has or can; I have given it in the largest quantity, at the shortest intervals, and for the longest possible space; that is, as long as the patient's life would permit: I have given it by itself in decoction, extract, and substance; I have combined all these together; I have joined it with nitre, sal. absynth. with snake root, with confect. cardiac. with volatile salts, and with musk, as different circumstances seemed to require, or admit; I have used it as fomentation, as poultice, as dressing; I have assisted it with every thing which has been usually thought capable of procuring or assisting digestion; still the distemper has continued its course, perhaps a little more slowly, but still it has ended in death.

"I am sorry to rob one of our great medicines of any part of its supposed merit, but as on the one hand, its claim, in this instance, is unjust, and as on the other, I hope to add as much to the character of another, the *res medica* will be no sufferer.

"Some time ago, I had a patient labouring under this complaint, who, from antipathy, obstinacy, or some other cause, could not be prevailed on to take bark in any form whatever. I made use of every argument, but to no purpose: fomentation, poultice, and the usual dressings were applied in the usual manner: the disease advanced some days more, some days less, and at the end of a fortnight, the small toes were all completely mortified, the great one became blackish, the foot much swollen, altered in colour, and the disease seeming to advance with such hasty strides, that I supposed a very few days would determine the event. The pain in the foot and ankle was so great, and so continual, as totally to deprive the

patient of sleep. On this account, and merely to procure some remission, I gave two grains of opium at night, which not having the desired effect, I repeated it in the morning. Finding, during the following day, some advantage, I repeated the same dose night and morning for three days; at the end of which time the patient became quite easy, and the appearances on the foot and ankle were visibly more favourable. Encouraged by this, I increased the quantity of the medicine, giving one grain every three or four hours, taking care to watch its narcotic effect, and to keep the belly empty by glysters. In nine days from the first administration of the opium, all the tumefaction of the foot and ankle totally subsided, the skin recovered its natural colour, and all the mortified parts plainly began to separate; in another week they were all loose, and casting off, the matter was good, and the incarnation florid. During the whole of this time, I continued the use of the opium, varying its quantity as circumstances required, but never gave less than three or four grains in twenty-four hours.

"When the sloughs were all cast off, the bones separated, and as I had only a clean sore to dress and heal, I gradually left off the medicine.

"I am very willing to acknowledge, that however well-pleased I might be with the event of this case, yet I really regarded it as accidental; so much so, that having very soon after another opportunity, I did not care to trust to opium alone, but joined the bark with it. The event was equally fortunate. But although I had joined the cortex with the extractum thebaicum, and did therefore attribute the success to their united powers, yet the effect was so very unlike to what I had ever seen from the bark without opium, that I could not avoid seriously, and often reflecting on it, and determining to use it by itself, whenever another opportunity should offer. I did so, and succeeded in the same happy manner, though under the very disagreeable circumstances of seventy years of age, a broken, distempered constitution, and the disease making a hasty progress.

"To relate cases which are nearly, or at least materially similar, is of no use. I shall therefore only say, that every opportunity, which I have had since of making the experiment, has still more and more convinced me of the great value and utility of this medicine, and of its power of rescuing from destruction, persons under this affliction.

"I cannot say that it has never failed me: it certainly has; but then it has been

under such circumstances, as I think would fairly account for the failure.

"I should be exceedingly sorry to be misunderstood; I should be still more so to mislead any body: and therefore I beg it may be noticed, that I do not propose the extractum thebaicum, in this case, as an universal infallible specific; I know, from experience, that it is not; but as I also know, from repeated experience, that it will, under proper management, and direction, do more than any, or than all other medicines; and that I have, by means of it, saved some lives, which I am very sure, would, under the common, and most approved method of treatment, without it, have been lost, I could not answer to myself the not communicating what I had observed.

"If this was an experiment, in which the life or limb, or health of the patient, was in any degree endangered, or by which the person, on whom it may be tried, could, in any degree, be injured, I should have withheld what I now publish, until a greater length of time, and more experience, had rendered it still more absolutely certain; and I should have thought myself strictly vindicable in so doing: but as this is a medicine whose general effects are well known, and which is, at the same time, so capable of direction and management, that it is almost impossible for any person who deserves to be trusted with medicine at all, to do any material harm with it, I thought it would be wrong and unjust to conceal what had occurred to me, lest I might thereby deprive the afflicted of an assistance which, I verily believe, is not to be obtained from any other quarter.

"In short, from what I have seen and done, I am perfectly convinced that by its means, and by its means solely, I have saved lives which, without it, must have been lost.

"If it preserves a few of those who are so unfortunate as to labour under this nasty, painful, lingering, and destructive disorder, to which we are all liable, and which has hitherto, most frequently, foiled all attempts of art, I shall be sincerely glad to have contributed to so good an end: if it should prove in other hands as successful as it has with me, I shall be still more so; but, on the other hand, if, after several times giving me reason to believe and hope that it would prove an instrument for the preservation of many, it should, upon more repeated trial, be found to fail, I shall be sorry for the event, but shall still think, that I did right in communicating what I had seen, and thereby endeavouring to be useful to mankind.

Hoc opus, hoc studium, parvi properemus
et ampli,
Si patriæ volumus, si nobis vivere cari.

"If I am right in my conjecture concerning this hazardous and destructive malady; and if the method which I have proposed and practised, should prove as successful in the hands of others as it has in mine, I cannot help thinking, that the external or chirurgic treatment of the disorder might be amended; that is, might be made to coincide more than it does at present with such soothing kind of plan.

"Since I have had reason to embrace this opinion, and to act in conformity to it, I have found more advantage from frequently soaking the foot and ankle in warm milk, than from any spirituous, or aromatic fomentations whatever; that is, I have found the one more capable of alleviating the pain, which such patients almost always feel, than the other; which circumstance I regard as a very material one. Pain is always an evil, but, in this particular case, I look upon it as being singularly so. Whatever heats, irritates, stimulates, or gives uneasiness, appears to me always to increase the disorder, and to add to the rapidity of its progress; and, on the contrary, I have always found, that whatever tended merely to calm, to appease, and to relax, at least retarded the mischief, if it did no more.

"The whole plan of the chirurgic treatment of this disease is founded on a general idea of warming, invigorating, stimulating, and resisting putrefaction; and the means generally made use of are very proper for such purpose: but I must own that I think the purpose, or intention, to be improper.

"Upon this principle, the old *theriaca Londinensis*, and the present *cataplasma à Cymino*, have been, and still are, so freely used on this occasion. A composition of this kind, if it does any thing, must heat, and stimulate, and it is by heating and stimulating the skin, to which it is applied, that it so frequently does that mischief which I am confident it often does, though such mischief is set to the account of the nature of the disorder. Cases exactly similar, in all circumstances, are not to be met with every day, but I am from experience convinced, that of two, as nearly similar as may be, in point of pain, if the one be treated in the usual manner, with a warm, stimulating, cataplasm, and the other only with a poultice made of the fine *farina seminis lini*, in boiling milk or water, mixed with *ung. sambuc.* or fresh butter, that the pain, and the progress of the distemper, will be much greater and quicker in the former than in the latter.

"When the black or mortified spot has fairly made its appearance on one or more of the toes, it is the general practice to scarify or cut into such altered part with the point of a knife or lancet. If this incision be made merely to learn whether the part be mortified or not, it is altogether unnecessary, the detachment of the cuticle, and the colour of the skin, render that a decided point: if it be not made quite through the eschar, it can serve no purpose at all: if it be made quite through, as there is no confined fluid to give discharge to, it can only serve to convey such medicines as may be applied for the purpose of procuring digestion to parts capable of feeling their influence, and on this account they are supposed to be beneficial, and therefore right.

"When the upper part of the foot begins to part with its cuticle and to change colour, it is a practice with many to scarify immediately; here, as in the preceding instance, if the scarifications be too superficial, they must be useless; if they be so deep, as to cause a slight hemorrhage, and to reach the parts which have not yet lost their sensibility, they must do what indeed they are generally intended to do, that is, give the medicines, which shall be applied, an opportunity of acting on such parts.

"The medicines most frequently made use of for this purpose are, like the *theriaca*, chosen for this supposed activity; and consist of the warm, pungent oils and balsams, whose action must necessarily be to stimulate and irritate: from these qualities they most frequently excite pain, which, according to my idea of the disease, is diametrically opposite to the proper curative intention; and this I am convinced of from repeated experience.

"The dressings cannot consist of materials which are too soft and lenient; nor are any scarification necessary for their application. But I would go farther and say, that scarifications are not only useless, but, in my opinion, prejudicial, by exciting pain, the great and chiefly to be dreaded evil in this complaint. The poultice should also be soft, smooth, and unirritating; its intention should be merely to soften and relax; it should comprehend the whole foot, ankle, and part of the leg; and should always be so moist or greasy as not to be likely to become at all dry or hard, between one dressing and another.

"I will trouble the reader with only one remark more.

"When the toes are, to all appearance, perfectly mortified, and seem so loose as to be capable of being easily taken away, it is, in general, thought right to remove

them. However rotten and loose they may seem to be, or really are, yet while they hold on, they hold on by something which is still endued with sensation, as may always be known, if they be bent back or twisted with any degree of violence.

"I will not enter into a dispute about the sensibility or insensibility of ligaments, nor undertake to determine whether they be ligaments or any other kind of parts which still maintain the connexion of the toes with their own respective joints, or with the metatarsal bones, it is sufficient for me to know, and to inform the young practitioner, that however loose they may seem, yet if they be violently twisted off, or the parts, by which they hang, be divided, a very considerable degree of pain will most commonly attend such operation, which therefore had much better be avoided; and that I have seen this very pain, thus produced, bring on fresh mischief, and that of the gangrenous kind.

"If the patient does well, these parts will certainly drop off; if he does not, no good can arise from removing them."—(*Pott's Works*.)

Other practitioners have confirmed, by their experience, the efficacy of opium, in cases, in which the disorder is attended with a great deal of irritation, though it may not always have had the same success in their hands, when the mortification has appeared to depend chiefly on constitutional debility. Mr. Kirkland observes, that we must be careful not to force the doses, especially at first; and that the medicine does more harm, than good, when its soporific effects go so far as to occasion delirium, take away the appetite, or cause affections of the heart.

Some authors have also recommended the use of camphor, which, by reason of its narcotic virtue, has sometimes produced good effects. M. Pouteau attributes considerable efficacy to it, especially, in the erysipelatous gangrene arising from wounds. In such cases, he recommends it to be given in the dose of five grains, with a double quantity of nitre, every four hours. (*Encyclopédie Methodique; Partie Chirurgicale*.)

LOCAL MEANS.

1. *Suppression of Irritating Causes.*

With respect to the external, or local treatment of mortification, the first indication consists in removing, if possible, such external causes, as may have occasioned, or kept up the disorder. Such are all those causes, which originate from

the compression of ligatures, tumours, &c. Of this kind, also, are all irritating, and poisonous substances, which by their presence stimulate the parts, more or less violently, according to their particular nature.

2. *Topical Applications.*

When mortification arises from inflammation, which still prevails in a considerable degree, it is evident, that the dead part itself only claims secondary consideration, and that the principal desideratum is to prevent the mortification from spreading to the living circumference, by lessening the inflammation present. Hence, under such circumstances, the application of linen, wet with the saturnine lotion, and the maintenance of a continued evaporation, from the inflamed parts surrounding the mortified ones, must be just as proper as if the mortification itself did not exist, and were quite out of all consideration.

It has been justly remarked by a most eminent man, (*Hunter*) that the local treatment of mortification, (meaning that in consequence of inflammation) has been as absurd as the constitutional; scarifications have been made down to the living parts, that stimulating and antiseptic medicines might be applied to them; such as turpentine, the warmer balsams, and sometimes the essential oils. Warm fomentations have been also applied, as being congenial to life; but, warmth always increases action, and should, therefore, be well adjusted to the case; for on the other hand, cold debilitates or lessens powers, when carried too far, though it first lessens action. Stimulants are likewise improper, as the actions are already too violent. It is proper to keep the parts cool, and all the applications should be cold. In cases of mortification from inflammation, good effects have also been seen to arise from the topical, as well as internal employment of opium.

But it must be acknowledged, that how proper soever the employment of cold applications is, in cases of mortification, attended with inflammation, fomentations and emollient poultices are most commonly preferred.

Besides common poultices, there are several others, which have acquired great celebrity, as topical applications in cases of mortification. Of this kind are the cataplasma carbonis,* cataplasma cerevi-

* Prepared by mixing about ℥ij. of finely powdered wood-charcoal with half a pound of the common linseed poultice.

sia,* and the cataplasma effervescent†. These local remedies are, perhaps, in nine cases out of ten, superior to all others.

With respect to stimulating, and spirituous applications, such as brandy, spirit of wine, balsams, resins, and aromatic substances, which have been recommended by a vast number of authors, they are at present almost entirely laid aside by practitioners. Though such things are indeed really very useful in preserving dead animal substances from becoming putrid, very little knowledge of the animal economy is requisite to make us understand, that they cannot act in this manner on parts still endued with vitality: but, on the contrary, that they must have very prejudicial effects, in the cases under consideration, by reason of the violent irritation, which they always excite, when applied to the living fibres. It may now and then, however, be justifiable to apply spirituous applications to the dead parts themselves with a view of diminishing the fetid effluvia, which by contaminating the air, have some share in injuring the patient's health; but the greatest care is requisite to keep these stimulants from coming into contact with the living surfaces around, and beneath the sloughs.

When mortification arises from cold, every sort of warm emollient application must be avoided, and cold water, or even snow and ice, made use of. For this subject, however, See *Chilblains*.

The local treatment of the mortification of toes and feet, described by Mr. Pott, has been already considered.

3. Scarifications, and Removal of the mortified Parts.

Another grand indication is to give vent to putrid matter, extravasated in the cellular substance, by making deep scarifications in the integuments. The majority of authors who have treated of mortification, have very much insisted upon this plan, which they recommend in all kinds of cases. They even advise the incisions to be made down to the sound parts, in order to facilitate the application of topical stimulants, and to favour the operation of the supposed antiseptic qualities of such applications. But, with the exception of cases, in which gangrene affects some apponeurotic membrane, and others in which the integuments, already mortified, are exceedingly distended with pu-

trid matter collected in the cellular substance, either in consequence of foregoing inflammation, or any other cause, such as the extravasation of urine in the scrotum, all scarifications, which penetrate as far as the living parts, are often productive of most serious mischief, instead of advantage. Such incisions cannot be practised, without occasioning a great deal of pain, and producing inflammation, which itself often powerfully contributes to make the mortification spread. But, as parts, which are in a complete state of sphacelus, are absolutely extraneous substances, in regard to those which still retain their vitality, they require no concern, and when their mass is considerable, it is not only proper to scarify them, but, also to remove a portion of them. By lessening the size of the putrid mass of matter, the fetor is diminished, which, in this case is always considerable; we also make way for the escape of a great deal of putrid discharge, which, being confined, might have a bad effect on the neighbouring living parts; and we enable these latter to free themselves more easily from the rest of the sloughs.

From what has been already said, it must appear, that scarifications are only to be employed with the greatest prudence, lest they should increase the disorder, which they are intended to benefit.

The same may be said of the too common practice of accelerating, with a cutting instrument, the separation of the mortified parts, which process nature tends to accomplish. It is always dangerous to irritate parts, which are affected with inflammation, in cases of sphacelus, before they are completely restored to their natural state, and in having recourse to the above-mentioned operation, while there is any adhesion remaining, between the sloughs and the living parts, it is impossible to avoid producing irritation in the latter. We have already given Mr. Pott's sentiments with respect to the danger and inutility of cutting the tendons and ligaments, in the mortification of the toes and feet.

If the surgeon prudently await the event of things, the separation of the mortified from the living parts, will in general be soon effected, when an inflammation and suppuration will also contribute to the detachment of the slough. The other mode of practice is the above one, viz. the amputation of what is mortified.

Although the certainty and expedition of the knife have the semblance of being infinitely preferable to the uncertain, and tedious, mode of procuring a detachment of a mortified part, by the occurrence of suppuration and the action of the absorbents, which remove the particles, connecting the dead and living matter, together

* Prepared by stirring into the grounds of strong beer as much oatmeal, as will make the mass of a suitable consistence.

† Prepared by stirring into an infusion of malt as much oatmeal, as will render the substance of a proper thickness, and then adding about a spoonful of yeast.

yet cutting away parts, in cases of sphacelus, is not, very frequently, proper. The incision can only be performed in the living, or dead part. In attempting the latter, we are ignorant of the precise extent of the disorder. Sometimes, the sphacelus is more extensive towards the surface, than in a deeper situation. There is also a constant risk of injuring the living parts, and thereby occasioning very unfavourable symptoms. If this should not occur, still there will remain, after the operation, a considerable portion of the mortified part, for the detachment of which as much inflammation, suppuration, and time, will be requisite, as if no operation had been undertaken. If the operation have any use, it is that of lessening the bulk of the slough, and thereby diminishing the fetid effluvia.

Amputation, performed in the living part, removes one danger by incurring a still greater one. Of this no doubt can be entertained, when we reflect, that this important operation has often a fatal event, even when performed under the most propitious circumstances, and that, in the cases now under consideration, it must commonly be undertaken on a subject, in a state of extreme debility. Besides, there is never any certainty, that we are amputating in living parts. Mortification rapidly ascends along the cellular substance, surrounding the large blood-vessels, and is frequently much more extensive internally, than external appearances would lead one to suppose. The adjacent surface, still apparently alive, is often so affected, that it must inevitably slough, though at present, it may not actually have sphacelated. The surgeon imagines, that amputation is performed on living parts; but, soon afterwards discovers, that he has been dividing those, which are dead. (*Richter's Anfangsgr. der Wundarzneykunst, Band. 1, Kap. 3.*)

The operation can do no good, while the mortification is in a spreading state, and it may do considerable mischief. The disorder enlarges its limits, because its cause still operates, and this is not removeable by amputation. If the operation be now injudiciously undertaken, the sphacelus invades the wound, and is the more certainly mortal, as the patient has now been further weakened by amputation, and its consequences.

Many mortifications, especially those, which arise from external causes, very often spontaneously stop and separate. But, the place, where this will happen, can never be foreseen. By amputating in this circumstance, we run a risk of dis-

turbing nature in her salutary work, and rendering the disorder fatal: and the operation, considered in the most favourable point of view, is a most useless one. It is rational to believe, that, whenever amputation has been successfully practised in the living part, while a sphacelus was in a spreading state, the complaint would have stopped of its own accord, and the patient been preserved without the operation. Since amputation, also, plainly renders the patient's condition unfavourable, we may infer, that many persons have died after its performance, who might have been saved without it.

As soon as a sphacelus leaves off spreading, and begins to separate, the greatest danger is over. To practise amputation now in the living part, is manifestly hurrying the patient unnecessarily into fresh peril, just after he has escaped from a most dangerous situation. However, should the operation be done, and the patient live, the cure is not in the least accelerated, as the healing of the wound will require as much time, as the detachment, and perfect cure of the mortification.

The following are cases, in which, perhaps, the use of the knife is justifiable and proper. There exists a species of sphacelus, which rapidly occasions death, before it is yet of great extent. Here indeed, amputation might be really advisable, but, the nature of the cause is unfortunately never disclosed, before the fatal catastrophe. Some external injuries are inevitably followed by mortification. In such cases, amputation is evidently proper; for, the simple incision is attended with less danger, than the sphacelus would be. The surgeon, however, seldom knows beforehand, that mortification will inevitably ensue.

When the mortification has already ceased spreading, or begun to separate; or, when the cause of the disorder is removed; one may, at all events, cut off some of the slough. By this means, we shall succeed in diminishing the nuisance and unwholesomeness arising from the putrid effluvia. It is only necessary to be careful, not to injure the living parts, so as to occasion pain and hemorrhage.

In cases, in which a whole limb has mortified, and the soft parts have already been detached, the separation of the denuded bone is the only thing remaining to be done; and this may be accomplished in the usual way with a saw. But, we are to remember, that we thus only free the patient from the fetor of the sphacelated limb, and neither accelerate the

cure nor obtain any other essential advantage. The death of the bone generally extends rather far upward, and, consequently, the saw can seldom remove the whole of the dead portion, some of which must remain for nature to detach. The same length of time will be requisite for this exfoliation to be effected as if none of the bone had been sawn off. When the sphacelus is of the dry description, and produces no inconvenience from fetor, the employment of the saw is even unadvisable.

From what has been said, it appears, that in the majority of cases, the surgeon must abandon the separation of a mortified part to nature, and confine his endeavours to checking the progress of the disorder.

Sometimes, a sphacelus spontaneously ceases to spread. This happens most frequently in cases which originate from an external cause, such as a violent contusion, burn, &c. But, the occurrence is not restricted to this kind of case, nor is it invariably attendant on it. When there are no other occasional causes present, the mortification does not readily go beyond the limits of the contusion, or violent burn; but the interference of surgery can hardly ever put a stop to its progress, before it has spread as far as the extent of the local injury. (*Richter's Anfangsgrunde der Wundarzneykunst, Band. 1, Kap. 3.*)

How different are the doctrines of M. Larrey upon this subject from those entertained by Richter, and, indeed, the generality of eminent modern surgeons. "Writers on gangrene, or sphacelus of the extremities (observes M. Larrey) indiscriminately recommend the amputation of a sphacelated limb never to be undertaken before the mortification is bounded or limited by a reddish circle, forming a true line of separation between the dead and living parts. This circumstance can only occur in a case of spontaneous gangrene from an internal cause; or if it happens, as is very unusual, in a case arising from a wound, its progress is different, and it would be exceedingly imprudent to wait for it. *The gangrene from external injuries almost always continues to spread; the infection becomes general; and the patient dies.*" (*Larrey in Mém. de Chirurgie Militaire, Tom. 3, p. 142.*) On the other hand, this author asserts, that, in the dry, or spontaneous gangrene, absorption takes place with more difficulty, and it is not uncommon to see the sphacelated parts separate from the living ones by the powers of nature alone, without the general

functions being impaired. He argues, that there is a manifest difference, between what he terms the *traumatic* and the *spontaneous*, gangrene, or, in other words, between the *humid* gangrene from an external cause, and the *dry* gangrene, which ordinarily proceeds from an internal cause. (*P. 148.*)

In cases of mortification arising from external injuries, M. Larrey maintains, that, "notwithstanding any thing that writers and practitioners may allege to the contrary, we should not hesitate about promptly performing amputation, as soon as the necessity for the operation is decidedly established. There is no reason to apprehend, that the stump will be seized with gangrene, as in the spontaneous mortification, that has not ceased to spread, because the traumatic gangrene, after having arisen from a local cause, is only propagated by absorption, and a successive affection of the texture of parts, by continuity of the vessels. Amputation, performed in a proper situation, stops the progress and fatal consequences of the disorder.

"Supposing then the lower half of the leg should be affected with sphacelus, in consequence of a gun-shot injury, attended with a violent contusion of the part, and a forcible concussion of the vessels, nerves, and ligaments, if the skin is elsewhere uninjured, the operation may be done in the place of election, without any fear of the stump becoming gangrenous, notwithstanding the cellular membrane of the upper part of the member may be already affected. But, when the skin of the whole leg is struck with mortification, the operation must be done on the thigh, and no time should be lost. The same practice is applicable to the upper extremities. We must be careful not to mistake a limb affected with stupor for one that is actually sphacelated. In the first case, warmth, motion, and sensibility are still retained, although the skin may be blackish and the parts may be swollen. Besides, if there were any doubt, it would be proper to try at first tonic repellent applications, and cordial medicines, &c. (*Larrey in Mém. de Chirurgie Militaire, Tom. 3, p. 152, 153.*)

"When amputation has been practised, this author recommends the exhibition of bark, good wine, tonics, &c. in order to promote the good effects of the operation. (*P. 154.*)

"The facts, (says M. Larrey) which I shall relate in the course of this dissertation, will prove, I think, in an incontestable manner, the truth of the principle, which I lay down, that, *when gangrene is*

the result of a mechanical cause, and puts the patient's life in danger, amputation ought to be performed, without waiting until the disorder has ceased to spread.

"I have been a witness of the death of several individuals, from too rigorous an adherence to the contrary precept; and at length grievously impressed with this loss, I had long ago determined to depart from an axiom, which was always considered by me as false. Besides, following the maxim of Celsus, I preferred employing an uncertain remedy, rather than abandon the patient to an inevitable death. *Satius est enim anceps auxilium experiri quàm nullum.*

"I made the first attempt at Toulon, in the year 1796, upon a soldier, who, in consequence of a violent contusion of the foot, was afflicted with a gangrenous ulcer, which soon threw the whole limb into a sphacelated state. While the mortification was yet spreading, I resolved to amputate the leg. The success of the operation surpassed my expectations; the stump healed; and, in less than forty-five days, the patient got quite well. This case served to encourage me.

"During the siege of Alexandria, in Egypt, in 1801, a second case, very analogous to the preceding, occurred in my practice; it happened in a dragoon of the 18th regiment, whose forearm and afterwards arm sphacelated, in consequence of a gun-shot wound in the articulation of the left arm. The mortification had extended nearly as high as the shoulder, and the patient's life was in great danger, when I determined to amputate the limb at the shoulder-joint. The disorder was manifestly spreading, and the patient's brain already affected, for he had symptoms of ataxia: the operation, however, arrested the progress of the sloughing, and saved the patient's life, who, at the conclusion of the siege of Alexandria, was quite cured.

"After the taking of Ulm, M. Ivan, surgeon to his Majesty the Emperor, performed in my presence, and at my ambulance established at Elchingen, the amputation of the thigh of a soldier belonging to the 76th regiment of the line, the leg having sphacelated in consequence of a gun-shot injury. The gangrene was not limited, and evidently continued to extend itself: notwithstanding this the effects of the infection were destroyed, and the patient was quite cured on our return to Austerlitz.

"A fourth patient, an officer in the same regiment, shot in the ankle, at the capture of the same town, was conveyed to my ambulance, in order to be dressed:

it was the third day after the accident; the foot was gangrenous, and the leg was swelled and threatened likewise with mortification. Febrile symptoms had also come on. I hastened to amputate the leg a little above the place of election. The cellular membrane of the stump, of a yellow blackish colour, was already infected with the gangrenous principle, (as M. Larrey terms it.) The operation, however, stopped the progress of the mischief; suppuration took place in the stump; some sloughs were detached; the wound assumed a cleaner appearance; and cicatrization was completed on the 52nd day. The patient could already walk with a wooden leg, when he caught the hospital fever, which was epidemic at Ulm, where he awaited his regiment, and, to my great regret, he was carried off by this disease, after having escaped the former danger.

"After the battles of Austerlitz and Jena, (continues M. Larrey) several of my colleagues, surgeons of the first class, undertook, in consequence of my advice, and the examples of success, which I had recited to them, the amputation of limbs equally sphacelated, although the mortification was not limited, rather than abandon the patients to a death, which appeared inevitable. In general, these practitioners experienced the same success, as I did myself." (*Larrey, in Mém. de Chirurgie Militaire, Tom. 3, p. 154—157.*)

In M. Larrey's memoir upon this subject, there are some additional facts and arguments in favour of what he endeavours to prove, viz. that, in cases of mortification from external injuries, if the patient's life is in danger, amputation ought to be performed, although the sloughing may yet be in a spreading state. I must be content, however, with having stated the particulars already explained; and the reader, desirous of more, must refer to M. Larrey's own publication. Certainly, the facts, which this gentleman has adduced, are highly important: they tend to subvert a doctrine, and to prove the error of a practice, which have been urged in most forcible terms by all the distinguished surgeons of modern time. The sentiments of Mr. Sharp are rendered questionable; and the truth of the positive assertions of Mr. Pott is yet a matter to be examined. The latter, it is well known tells us, that he has often seen the experiment made of amputating, while a mortification was spreading, but never knew it answer. Are we to conclude that all these cases, which Pott alludes to, were mortifications from an internal

cause? Or, are we to suppose that the operations failed from having been delayed too long? Or, must we imagine, that the nature of the human constitution has been changed between the æra of Mr. Pott and that of M. Larrey? The last gentleman's facts are too well authenticated to admit of being disbelieved.

4. *Application of Caustic Substances, and of the Actual Cautery.*

Having explained the chief indications in the treatment of mortification, we proceed to notice some particular means, which have been recommended by practitioners of eminence, as being in certain cases very efficacious. We allude to some caustic substances, and even the actual cautery, which have sometimes been successfully employed in this disease.

One of these applications is the muriatic acid, more or less diluted with water. It was Van Swieten, who particularly recommended this remedy, he mixed the acid with six times its quantity of water, and applied it as a fomentation to the mortified part, after making deep scarifications. In this manner he stopped, or seemed to stop, a mortification, arising from a violent inflammation of the scrotum and penis, and which extended all over these parts. The same author strongly recommends this same topical application to the sloughy state of the gums in cases of scurvy. In this kind of case, he mixed the muriatic acid with honey, in various proportions; sometimes, he even employed the pure acid itself for touching the parts, which were likely to slough. It is easy to comprehend, that the muriatic acid, as well as other mineral acids, and vinegar, weakened with a sufficient quantity of water, may act as an antiphlogistic, and antiseptic, but, when it is concentrated, its manner of acting is then very different, as it is a real caustic, and its salutary effects can only be explained by the change, which it produces in the nature of the inflammation, which now becomes favourable to the formation of healthy pus.

It is only in the same way, that we can account for the good effects, attributed to another, much more active caustic, than the muriatic acid, namely, a solution of mercury in the nitrous acid, with which solution the edges of the mortified part are recommended to be wet. This, it is said, stops the progress of mortification. We are not, however, possessed of a sufficient number of facts in support of such practice. An example, however, mentioned by a judicious author, Mr. Kirkland, deserves attention.

A man met with a fracture of the forearm, and the ends of the bones projected through the integuments. The fracture was very expeditiously reduced; but, at the end of five, or six days, the whole arm seemed to be completely mortified up to the shoulder. Amputation was performed as near the joint as possible, and the stump, which had mortified as far as the acromion, was cauterized. The following day the mortification had reached the inferior extremity of the scapula. A little of the solution of mercury in nitrous acid was now applied, by means of a probe, along the edges of the parts affected, and from this moment the disorder made no further progress. This cauterization was repeated every day, for seventeen, or eighteen days. The sloughs, and, especially, the scapula, were detached, and the patient got well.

With respect to the actual cautery, Celsus has recommended it to be applied to the line, which separates the dead parts from those which are still living, whenever medicines, and, particularly, topical emollient applications fail in stopping the progress of the disorder. M. Pouteau has ventured to revive this practice, which had been entirely exploded from modern surgery, and he was of opinion, that the method might have the most beneficial effects, in cases of erysipelatous gangrene, which is so often seen in hospitals, in consequence of wounds. For this purpose, he recommends cauterising chiefly the edges of such parts, as are of a dark red colour, and are on the point of perishing; and he advises this to be done with a heated iron, or boiling oil, and to repeat the cauterization of the dead parts, at every time of dressing them, until the sensation of heat is even felt with a certain degree of force in the sound parts. The whole of the affected part is afterwards to be covered with a large emollient poultice.

M. Pouteau relates a very interesting case of an anthrax, which took place on a woman's cheek, and which he cured in the above manner. The tumour, which, on the third day, was quite black, and as large as a walnut, was accompanied with an erysipelatous œdema, which extended over the whole cheek, eyelids, and front of the neck. M. Pouteau, after having opened the tumour in different directions with a lancet, introduced the red-hot cautery, and repeated the application several times, until the heat was felt by the sound flesh. The patient felt herself very much relieved immediately after this had been done; an oppressive headach, and a very afflicting sense of strangulation, which she before experienced, were got

rid of, and, in ten days more, the slough was detached by the occurrence of suppuration. (*Encyclopédie Méthodique, Partie Chirurgicale, Art. Gangrene.*)

The foregoing observations are introduced into this work, that the reader may not be left entirely ignorant of what violent measures the old surgeons adopted in cases of mortification, and the account is not given, in order that such practice may be again imitated. The employment of such terrible applications, as the actual cautery, and boiling oils, is as unscientific, and unnecessarily painful, as it is unproductive of any essential good. The grand object in almost every case of mortification, is to diminish the irritation of the parts in immediate contact with those already dead. This is indicated, lest the parts still alive, and so situated, should experience the same fate, as the contiguous ones. Some who have reprobated the application of spirituous, and resinous substances to parts affected with mortification, and who have also condemned incisions and scarifications, give their approbation to the use of the cautery. They assert, that the manner, in which the latter acts, is essentially different from that, in which spirituous and resinous applications operate, and that while these, by irritating the affected parts, tend to increase and propagate the inflammation, that leads to mortification, the lively action of the cautery changes the nature of such inflammation, and establishes that state of the vessels, which is necessary for a favourable suppuration. They state, also, that the cautery gives a tone to the vessels, in the vicinity of the parts to which it is applied, and, in proof of this remark, they refer to the effects of the application on different ill-conditioned ulcers, and particularly, on carious bones. (*Encyclopédie Méthodique, Partie Chirurgicale, Art. Gangrene.*)

Notwithstanding these assertions, I shall venture to congratulate the surgeons of this country in particular, on the total rejection of the use of the actual cautery and boiling oils, in cases of mortification.

[From repeated disappointments in the use of the various remedies which have been recited, and from having observed the efficacy of blisters in arresting the progress of erysipelas, Dr. Physick was induced some years ago to try the effect of epispastics in the treatment of gangrene.

"The first opportunity," says the Doctor, "I had of applying a blister with this intention, was in the case of

Captain Stokes, a gentleman between forty and fifty years of age, whom I was desired to visit in consultation with Dr. Rush, in January 1803. After an inflammation about the anus, which had been supposed for several days by the patient, an attack of piles, a mortification was observed to have commenced in the perinæum, and on the side of the scrotum. At my first visit I proposed a blister, to extend from the edge of the mortification in the perinæum, backwards over the buttocks; this being agreed to, was immediately applied; the following day, when the blister was dressed, we were both well satisfied with its effect, as it had prevented the mortification from spreading backwards; but so extensive was the mortification of the skin and anterior part of the scrotum, which appeared to extend upwards in the course of the spermatic chords towards the abdomen, that his recovery was not to be expected. After a few days he died."

Dr. Rush being struck with the good effect of the blister in the preceding instance, has lately employed the remedy in a case of mortification, the history of which is contained in the following letter.

Dear Sir,

I was called upon by Dr. Bleight, on the 29th of last July, to visit with him Captain R. A. who in consequence of applying a handful of the *polygonum persicaria*, instead of paper, to a common use, after going to stool, was affected with an inflammation in the extremity of the rectum, which extended around the adjoining parts, and along the perinæum, so as to affect the integuments of the scrotum. Bleeding and other depleting remedies had been used to no purpose, in order to cure it: a partial mortification had taken place. I concurred with Dr. Bleight in advising leeches to the sound parts; and recollecting the high terms in which you spoke of the efficacy of blisters in preventing the progress of mortification in our consultation, in the case of Captain Stokes, in January 1803, I advised their application to all the diseased parts which had not put on a gangrenous appearance. They had the wished-for effect; the mortified parts were afterwards cut away, or gradually sloughed off; and, under the faithful and patient subsequent attendance of Dr. Bleight, the Captain happily recovered, and now enjoys his usual health.

In the most dangerous state of his disease, we gave him bark; but its distressing effects upon his system obliged us to

lay it aside. From, dear, sir, your sincere friend,

BENJAMIN RUSH.

Dr. P. S. Physick.

Nov. 15th, 1804.

The next case in which the remedy was employed was that of a gentleman who had been attacked with "a mortification of the foot, which was advancing daily upwards, unchecked by the liberal use of the bark;" a blister in this case was applied round the leg below the knee, in the evening—next morning it was dressed, and it was observed that the mortification had not increased: the application of a second blister effected a cure.

Since the publication of these facts a variety of respectable testimonials have been forwarded to Dr. Physick, of the efficacy of blisters in arresting the progress of mortification. I have myself experienced the advantage of the practice in several cases of gangrene, and have no hesitation in recommending it, in preference to every local remedy hitherto in use.]

Consult *B. Bell's System of Surgery*. *Encyclopédie Méthodique, Partie Chirurgicale, Art. Gangrene*. *Kirkland on Gangrene, and on the Present State of Medical Surgery*. *Richter's Anfangsgr. der Wundarzneykunst, Band. 1, Kap. 3*. *Various parts of Hunter on Inflammation, &c. Sharp's Critical Enquiry into the Present State of Surgery, Chap. 8*. *Richerand's Nosographie Chirurgicale, Tom. 1, p. 131, &c. Edit. 2.* *Lassus, Pathologie Chirurgicale, Tom. 1, p. 30, &c. Edit. 1809.* *Cuvéillé, Nouvelle*

Doctrine Chirurgicale, Tom. 4, p. 321, &c. Paris 1812. *Larrey, Mémoires de Chirurgie Militaire, Tom. 3, particularly, the Mém. sur la Gangrène de Congélation, p. 60, and that sur la Gangrène Traumatique, p. 141.*

MOXA (Japanese.) A soft lanuginous substance prepared from the young leaves of a species of mugwort. It is used in the following way: A little cone of the moxa is laid upon the part, previously moistened and set on fire at the top. It burns down with a temperate glowing heat, and produces a dark-coloured spot, the exulceration of which is promoted by applying a little garlic. The ulcer is left to discharge, or is healed up according to the object in view. The moxa is famous in the East for curing several diseases; and the French are in the habit of using it; but, whenever English surgeons wish to produce a slough, they have recourse to caustics, in preference to actual fire.

MUNDIFICATIVES. (from *mundifico*, to cleanse.) Applications, which make sores put on a cleaner appearance.

MYDRIASIS. (from *μεδω*, to abound in moisture.) A preternatural dilatation of the pupil; so named, because it was thought to originate in redundant moisture, or too great an influx of humours. It is often a symptom of an amaurosis.

MYOPIA. (from *μω*, to wink, and *ωψ*, the eye.) That kind of short-sightedness, in which the eyes are half shut, and always winking.

N.

NÆVUS. A mole, or freckle on the skin. *Nævi materni* signify the little spots, excrescences, or swellings, with which many children are born. There are two kinds, viz. small red tumours, which gradually increase to a large size; or brown flat marks, not rising in the least above the surface of the skin. Mr. Latta says, he once saw in a child two years old, a tumour of this kind weighing fourteen ounces, which, at the time of birth, was only equal in size to a large bean,

and which for a year afterwards, did not enlarge much; but, then grew to the magnitude already specified. The other species of *nævi materni*, or such as rise but little above the skin, are of various forms, and have been compared with cherries, grapes, &c. and have all been supposed to arise from some impression made on the mind of the mother during pregnancy, or at the time of conception. The settlement of this disputed point, I shall leave to speculative writers.

Those *nævi materni*, which are mere spots, or marks, give no inconvenience, and of course do not require the interference of surgery. But such *nævi materni* as elevate themselves above the surface of the body, increase in size, and seem likely to become troublesome, should be entirely removed with a knife. Many of them seem to consist of a congeries of dilated vessels, and, after they have acquired a certain size, are apt to burst and bleed profusely. John Bell has named this kind of disease *aneurism by anastomosis*; the description, and proper treatment of which are to be found in the article *Aneurism*.

Mr. Abernethy cured an extensive *nævus maternus*, of a child's arm, with a bandage. (See *Latta's System of Surgery*, Vol. 2, Chap. 22. *John Bell on Aneurism by Anastomosis*, in his *Principles of Surgery*, Vol. 1. *Abernethy's Surg. Observations*.)

NATRON PRÆPARATUM, in surgery, is chiefly given in cases of bronchocele, and scrophula. The common dose is a scruple.

NEBULA. (from νεφέλη, a little cloud.) A cloudiness of the cornea of the eye. See *Cornea*, *Opacity of*.

NECROSIS. (from νεκρῶν, to destroy.) This word, the strict meaning of which is only mortification, is, by the general consent of surgeons, confined to this affection of the bones. The death of parts of bones was not distinguished from caries by the ancients. However, necrosis and caries are essentially different; for, in the first, the affected part of the bone is deprived of the vital principle; but this is not the case when it is simply carious. Caries is very analogous to ulceration, while necrosis is exactly similar to mortification, of the soft parts.

The subject of necrosis is a peculiarly interesting one; for, it introduces us to a knowledge of reparations accomplished by nature, which would excite admiration and wonder even in men whose feelings are the most thoroughly chilled with apathy. What man, unacquainted with the facts, which the rich records of surgery now present, would ever suppose, that so large a bone as that of the thigh might perish, a new one be afterwards generated, and the old dead one in time removed by absorption, so as to leave the functions and power of the limb quite unimpaired?—We shall first explain the most remarkable circumstances, relative to the nature of necrosis, next mention a few important cases, and lastly speak of the treatment.

It is a remarkable circumstance, in the history of necrosis, that, in favourable instances of the disease, the inflexibility and firmness of the limb are preserved, during

the whole of the process, by which the new bone is formed. Consequently, the new bone must have begun to grow, and must have acquired firmness before the old bone separates, or is absorbed. Were this not the case, the limb must become flexible and useless, the moment the dead bone is removed. Another consequence of the new bone being formed, before the removal of the old one, is, that the former must surround and include the latter. For, since the lifeless portion of bone completely occupies the space between the two living ends, these cannot be immediately connected by the new bony matter. The connexion can alone be completed by the new bone being deposited on the outside of the old one, from one end to the other, and attaching itself to the portions which still remain alive. The new bone must also be necessarily larger, than the old one, because externally situated, and hence the affected limb, after the cure is complete, will always continue larger, clumsier, and less shapely than the other. The length of it, however, remains unaltered, because the old bone retains its attachment, while the rudiments of the new bone are lying on its outside, and connect the living ends of the old one; by an inflexible mass, equal in length to the portion, which is destroyed.

Thus we see, that, in the process, which nature follows in the formation of the new osseous shell, the old bone serves as a mould for the new one; and the first step of the process is to surround the old bone with an effusion of coagulating lymph. (*Russell on Necrosis*, p. 2—7.)

This author adduces many arguments to prove, that the pulpy mass, which extends from one portion of the bone to the other, and is itself at last converted into bone, is formed quite independently of the original bone, or the periosteum. (P. 27.)

On the other hand, Mr. Crowther has published a letter, written by Mr. Macartney, in which the periosteum is described, as being the organ producing the new bony matter. Mr. Macartney remarks, "that the first and most important circumstance is the change, which takes place in the organization of the periosteum; this membrane acquires the highest degree of vascularity, becomes considerably thickened, soft, spongy, and loosely adherent to the bone. The cellular substance, also, which is immediately connected with the periosteum, suffers a similar alteration; it puts on the appearance of being inflamed, its vessels enlarge, lymph is shed into its interstices, and it becomes consolidated with the periosteum. These changes are preparatory to the absorption of the old bone, and the

secretion of new osseous matter, and even previous to the death of the bone, which is to be removed. In one instance, I found the periosteum vascular and pulpy, when the only affection was a small abscess of the medulla, the bone still retaining its connexion with the neighbouring parts, as it readily received injection. The newly organized periosteum, &c. separates entirely from the bone, after which it begins to remove the latter by absorption; and, while this is going on, its inner surface becomes covered with little eminences, resembling granulations. "In proportion as the old bone is removed, new osseous matter is dispersed in the substance of the granulations, whilst they continue to grow upon the old bone, until the whole, or a part of it, is completely absorbed, according to the circumstances of the case. What remains of the investment, after the absorption of the old bone, and the formation of the osseous tube, which is to replace it, degenerates, loses its vascularity, and appears like a lacerated membrane. I have never had an opportunity of examining a limb, a sufficient time after the termination of the disease, to ascertain, whether the investment be at last totally absorbed, but, in some instances, I have seen very little remaining. During the progress of the disease, the thickened cellular substance, which surrounded the original periosteum, becomes gradually thinner; its vessels diminish, and it adheres strictly to the new-formed bone, to which it ultimately serves as a periosteum." Mr. Macartney states, that the anatomical preparations, which authenticate the above observations, are preserved at St. Bartholomew's Hospital. (See *Crowther on White Swelling*, p. 183, Edit. 2.)

With respect to the symptoms of necrosis, an incipient case is characterised by a deep seated excruciating pain, not at first aggravated by pressure, and which is soon followed by a rapid enlargement of the parts along the course of the bone. Soon, however, after the commencement of the attack, an external inflammation succeeds, which quickly ends in the formation of matter. The abscess, at length, bursts by a small opening. The extent of this inflammation is not in general great. Most commonly several inflammations, of a circumscribed kind, occur about the same time, the abscesses burst by small openings, which do not close, but continue discharging matter, as fistulous sores. The apertures are generally situated over the most superficial part of the affected bone. The pus is usually of good quality, and large in quantity, issuing from extensive cavities, into which the fistulae lead. Such abscesses, being

situated within the newly formed osseous shell, cannot be discharged by pressure, nor can any fluctuation be felt. A probe can seldom be introduced far into the fistulous openings, or discover any loose piece of bone. In this stage, the dead bone, technically called the *sequestrum*, can seldom be felt, though, in a few instances, small spiculae make their way outward, together with the discharge. Fistulous openings may be regarded, as necessarily attendant on all cases of necrosis; though so mild a case may be conceived, that the new bone may be generated without any outward ulcerations. No such instance, however, is on record. (*Russell*.)

After the openings have formed, the case may take one of the following courses. The ulcerations may in time heal up, the sequestrum never be seen, and no vestige of the disease remain, except a permanent enlargement and induration along the course of the bone. This is the most favourable manner, in which a necrosis may terminate. In the other one, the sequestrum makes its appearance externally, through the new bone and the integuments, attended with different degrees of pain, inflammation, and suppuration, in different cases. The sequestrum may at first be moved by shaking it; but, is too firmly wedged in the surrounding parts to be completely taken out. In time, however, it becomes loose enough to be removed.

Sometimes, the middle portion of the sequestrum presents itself externally, while its sides are every where wedged in the substance of the new bone. The natural end of such a case would be very tedious of accomplishment, and the interference of art is essentially serviceable in accelerating the separation of the dead bone, thus circumstanced. After the sequestrum has been either absorbed, or thrown off, in one of the above ways, the cavity of the new bone becomes filled up with granulations, which are, at length, converted into bony matter. Thus the new bone differs from the original one, in being solid, instead of hollow. (*Russell*.)

When the sequestrum is thrown off slowly, the inflammation is moderate; but, when it separates quickly, while the new bone is in a soft state, the detachment is always preceded by severe inflammatory symptoms, and followed by a temporary loss of the natural firmness of the limb. This premature separation of the sequestrum often occurs in necrosis of the lower jaw, and the chin consequently falls down on the neck. In certain cases, the sequestrum separates at each end from the living portions of the old bone, before the new

osseous shell has acquired firmness, so that the limb feels as if it were broken in two places. (*Russell.*)

When the dead bone is removed by absorption, the process is tedious, and attended with a profuse discharge of matter, which gradually ceases, and at last stops altogether. In young subjects, this work is more quickly perfected, than in old ones. There are some chronic cases of necrosis, in which the sequestrum remains unabsorbed, for an indefinite length of time, producing no violent irritation, yet, always enough to tease the patient, and disturb his health.

In necrosis of the long bones, there are always round apertures in the new osseous shell, corresponding with the external fistulous openings, as long as the sequestrum remains enclosed in it. (*Russell.*)

The tibia, femur, lower jaw, clavicle, humerus, fibula, radius, and ulna, are most frequently affected with necrosis. Excepting the lower jaw and scapula, the process of regeneration has only been noticed, in the cylindrical bones. From twelve to eighteen years of age, is the time of life, most subject to necrosis. The necrosis of the lower jaw, however, seldom occurs before the age of thirty. In some persons, two bones are affected at once, owing to constitutional causes.

The process of cure is said to take place with more celerity in the lower jaw, than any other bone, and may be completed in three months. Mr. Russell has never known a necrosis of the tibia get well in less than a year; but, in general, nearly two years elapse first; sometimes, the cure is protracted to a much greater length of time.

When the constitution is predisposed to necrosis, any cause, capable of exciting inflammation, may occasion an attack of it. Often, however, the disease is purely sporadical and not referrible to outward causes. Cases, which occur from external injury, are generally those of the lower jaw, which are frequently imputed to blows, the application of acrid substances to carious teeth, effects of mercury, &c.

Necrosis of the lower jaw and clavicle never proves fatal: that of the lower extremities, which is the worst case, does so very seldom, and only, from the violence of the first inflammatory symptoms, which rapidly bring on a hectic fever, which proves incurable, without removing its local cause by a timely amputation. When the violence of the first stage, however, has abated, the irritation ceases, and the hectic symptoms, if there are any, are generally moderate. Nor is this state of tranquillity disturbed, till the sequestrum, in making its way outward, again pro-

duces irritation. At this second period of urgency, extensive inflammation may originate, ulcerations spread all over the surface of the limb, assume an unhealthy appearance, violent fever succeed, and the patient either perish, or sink into a state, in which he must consent to amputation, as the only means of saving his life. This is the last crisis of eminent danger; but, in general it is less perilous, than when the inflammation comes on in the incipient stage of necrosis. (*Russell.*)

The following case of necrosis of the thigh-bone is related by Dr. Mackenzie. —William Baxter, a boy thirteen years old, received a blow on his thigh at school, of which he at first hardly complained; but, in a few months, he began to have pain in the thigh, which inflamed, swelled, and appeared to have matter in it. The parents being poor, no surgeon was called, and the boy was allowed to linger for a great while. At length, the matter made its way through the skin, by a small opening, on the interior part of the thigh, about three inches above the knee, and a thin sanies continued to be discharged for eighteen, or twenty months. At length, the hole in the skin enlarged, and the point of a bone began to protrude, and give a good deal of pain, when the clothes rubbed against it. After suffering in this manner for two years and a half, the boy, as he lay in bed one morning, felt the bone looser, and projecting more, than ordinary. He gave it a strong pull, and brought the piece away entirely, which proved to be seven inches and a half of the thigh-bone. A good deal of bleeding followed; but, the wound soon healed, and he has never since found the least inconvenience. Dr. Mackenzie, hearing of this singular case, sent for the boy, carefully examined his thigh, and found it as firm as the other. The only difference was, that it was somewhat thicker, and a little more curved. The muscles retained their natural softness, and looseness on the bone. The detached piece of bone was a portion of its whole circumference.

In confirmation of this case, Dr. Hunter mentions a tibia, which was sent to him by a Mr. Inet, after amputation. On examination, the case at first sight seemed to be a swelling of the whole bone, with a loose internal exfoliation. However, it proved to be a remarkable instance of the separation of the greatest part of the original bone whose place was supplied by a callus. The external surface of the enclosed loose piece of bone was smooth. A small part of the surrounding bony substance being removed, the contained piece was taken out, and found to be the whole body of the tibia. It had separated from

the epiphysis at each extremity. The middle part of the bone had perished, consequently, had lost its connexion with the periosteum, and was gradually thrown off from the living parts of the bone at each end. A callus extended from end to end, united the two extremities of the original tibia, preserved the length, and gave firmness and inflexibility to the part. The exfoliation was so encompassed by the new bony case, that, though quite loose, it could not be thrown out. (*Med. Obs. and Enquiries*, vol. 2.) In the 5th vol. of the *Mém. de l'Acad. de Chirurg.* is the history of a man, the whole of whose clavicle came away, without his being deprived of any of the motions of the arm. The death of this patient, which happened shortly afterwards, afforded an opportunity of examining how nature had repaired the loss. Another clavicle was found regenerated, which neither differed from the original one in length, or solidity; but, only in shape, being flatter, and not so round. It was connected with the acromion and sternum, just like the primitive bone.

Though necrosis mostly attacks the cylindrical bones, the flat ones are not exempt from the disease. Pott makes mention of a parietal bone, the whole of which was detached, and of an os frontis, the greatest part of which came away. In a thesis on necrosis, in 1776, *aux écoles de chirurgie*, may be found the case of a young man, a very large part of whose scapula perished and came away. Chopart, who relates the case, mentions, that he saw the patient quite recovered, and felt a new triangular moveable bone, firmly supporting the clavicle, but, smaller and flatter, than natural, and without any spinous process. The same has happened to the lower jaw, as may be seen by referring to the *Ephemerides Germaniæ*, and *Mém. de l'Acad. de Chirurgie*. In the fifth vol. of the latter work, is an account of a woman, who applied to be relieved of some venereal complaints. From the beginning of the treatment, the bone was discovered to be loose just under the gums, and seemed, shortly afterwards, to move backwards and forwards with a tooth. M. Guernery took hold of the tooth with a key-instrument, and found it firmly inserted in the moveable piece of the jaw; he made with caution the necessary manœuvres for extracting the portion of bone; but was greatly surprised on finding what an extensive part yielded to his very moderate efforts. It was the whole of the lower jaw, above its right angle, from its division into the coronoid and condyloid processes to the space between the first

and second of the front grinders of the left side. On the right, there only remained the condyle in the articular cavity of the temporal bone. This destruction left a considerable empty space, from which great deformity was apprehended, in consequence of the unsupported soft parts falling down. The woman, however, got well in two months, and had the most perfect use of a new jaw. A similar fact is recorded in the *Journal de Médecine*, 1791.

In cases of necrosis, the surgical indications are few and obvious, viz. 1. When inflammation attends any stage of the disease, to have recourse to common antiphlogistic means;—2. To promote the separation, or absorption, of the dead bone, according as it tends to make its way outward, or to become completely incased with new bony matter; and, in this situation, to be invisibly and gradually removed by a natural process. 3. When the constitution seems unable to sustain any longer the effects of the local disease, to amputate, if the situation of the affection will permit.

During the first inflammatory attack, the patient's life is often endangered from the extent and violence of the inflammation, before the new shell is formed, or the sequestra loose, and ready to separate. In this state, art can do little more, than employ topical bleeding, and fomentations, and poultices. If, notwithstanding such treatment, the patient should seem likely to perish of the hectic symptoms, which rapidly follow, unless the limb be immediately removed, the operation should then not be delayed.

But, if the patient get over the first inflammatory stage, the grand object is to get rid of the sequestra. When they, however, are undergoing a gradual absorption, without ever making their appearance externally, or giving any considerable disturbance to the constitution; or, when the dead bone is making its way outward, without occasioning urgent inconveniences; the surgeon should interfere very little with the natural progress of the case. When the dead bone does not tend to make its way through the skin, but lies quietly incased in the new osseous shell, the occurrence of extensive suppurations may be prevented, by occasionally applying leeches, and keeping open a blister with the savine cerate, as recommended by Mr. Abernethy in his lectures, and Mr. Crowther, in his work on the White Swelling. The blister will, at the same time, have great effect in promoting the absorption of the sequestrum, and, of course, in accelerating the process of cure.

When the dead bone, however, creates considerable irritation, when its middle portion is very superficial, or quite exposed, while its ends, or edges, are overlapped by the surrounding new bony matter, consequently the piece so wedged in, that its separation cannot be expected in any moderate time, the operation of cutting it out, is, certainly, not only feasible, but highly proper and commendable. In this kind of case, Mr. Hey's saws would be found the most convenient instruments.

Also, were the dead bone, though quite covered and incased in the new one, to be tediously long in being absorbed, productive of great irritation and impairment of the health, and the affected bone superficial, like the tibia, no candid man could condemn making an incision, and removing a part of the osseous shell, in order to take the chance of being able at once to extract the sequestrum lodged in its cavity. Mr. Russell mentions successful attempts of this kind, which fully justify the practice. The state of the bone may be examined, without proceeding to any severe operation, by laying bare small portions of the bone in the vicinity of the fistulous openings, introducing a probe, if possible; or, if that be impracticable, drilling small holes with a perforator, for the purpose of exploring the state of the cavity. If the cavity should still seem extensive, and to contain a sequestrum of considerable size, the necessity of operating is apparent. On the contrary, if the whole cavity be filled up with osseous matter, and no dead bone be found there, the progress of the case must, of course, be left to nature. (Russell.) When the surgeon knows, that this object is to make an opening large enough to allow the dead piece to be extracted, he scarcely needs directions how to set about making it. The skin must be divided with a common scalpel, and the bone cut with small trephines, a gouge and mallet, or what are in most cases best, Mr. Hey's saws.

Consult *Russel on Necrosis*, 1794. *Mem. de l'Acad. de Chirurgie*, tom. 5. *Boyer on the Diseases of the Bones*, Vol. 1. *Encyclopédie Méthodique; Partie Chirurgicale; Art. Necrosis. Thesis de Ossium Necrosi*, 1776. *Crowther on White Swelling*, &c. Edit. 2. By far the most valuable work on necrosis is, I believe, *Weidman de Necrosi Ossium*, Francofurti, 1793. See also *M. David's Obs. sur une maladie connue sous le nom de necrose*; Paris 1782. *Bonn's Thesaurus Ossium Morbos.* *Richerand's Nosographie Chirurgicale*, Tome 3, p. 138, Edit. 2. *Levéillé, in Nouvelle Doctrine Chirur-*

gicale, Tom. 4, p. 321, &c. Paris, 1812. *Larrey, in Mém. de Chirurgie Militaire*, Tom. 3, p. 367.

NEPHELA. (dim. of νεφος, a cloud.)

A cloud-like spot on the cornea.

NEPHRITIS. (from νεφρος, a kidney.)

Inflammation of the kidneys.

NEPHROTOMY. (from νεφρος, a kidney; and τεμνω, to cut.) *Nephrotomia*.

The operation of cutting a stone out of the kidney; a proceeding which, perhaps, has never been actually put into practice. In the *Abrégé Chronologique de l'Histoire de France par Mézerai*, and in the *Philosophical Transactions* for 1696, two cases of what is called nephrotomy are mentioned; but several circumstances in the accounts led Haller and others to conclude, that the operation alluded to in the first work, was nothing more than the high operation for the stone. With respect to the example in the latter work, the particulars are not detailed enough to shew that an incision was really made into the kidney. There is no doubt that stones have often been extracted from abscesses about the region of the kidneys, after their presence has been detected with a probe. But, with regard to cutting into the kidney, the deep situation of this viscus, and the want of symptoms, by which the lodgment of a stone in it can be certainly discovered, will always be strong objections to the practice. When a stone, from its size, cannot pass from the kidney, and excites inflammation and suppuration, no doubt, the surgeon may make an incision into the tumour, and extract the calculus. In this sense, nephrotomy is certainly a practicable operation. Warner contends, that it can only be practised in such circumstances, notwithstanding whatever may have been said by Marchetti, or others, upon the subject. In such a case, the operation would not be attended with any greater difficulty, than the opening an abscess in any other part of the body. (See *Warner's Cases in Surgery*, p. 241, Edit. 4.)

NITROUS ACID. See *Acidum Nitrosum*.

NODE. *Nodus*. A swelling of a bone; a thickening of the periosteum, or a fascia; or a tumour on a tendon, from a venereal cause. See *Venereal Disease*.

NOLI ME TANGERE. By this expression, surgeons commonly imply an herpetic disease, affecting the skin and cartilages of the nose. Mr. Home says, that the ulcers, for which he has been led to employ arsenic, are named, from the virulence of their disposition, *noli me tangere*, and are very nearly allied to cancer;

differing from it in not contaminating the neighbouring parts by absorption, but, only spreading by immediate contact. Ulcers of this kind differ exceedingly from one another in their degree of virulence; but, they are all so far of the same nature, that arsenic in general agrees with them, and puts a stop to their progress, while they are aggravated by milder dressings. (*Home on ulcer, edit. 2, p. 267.*)

The disease generally commences with small, superficial, spreading ulcerations on the alæ of the nose, which become more or less concealed beneath the furfuraceous scabs. The whole nose is frequently destroyed by the progressive ravages of this peculiar disorder, which sometimes cannot be stopped or retarded by any treatment, external or internal.

The specific ulcerations do not generally extend to the parts far within the nostrils; but, at the time that I am writing this article, there is, under Mr. Harvey, in St. Bartholomew's Hospital, a curious example, in which the greatest part of the nose is destroyed, and the ulceration proceeds even through the front part of the palate into the mouth. The morbid process sometimes stops for a considerable time, and then is renewed with increased violence. The following case illustrates the nature of *noli me tangere*, and one mode of treatment, to which it yielded: Jane Chatillon, 45 years of age, was attacked, in the course of September, 1788, with an inflammation on the left alæ of the nose. Some time afterwards the part ulcerated, which occasioned a troublesome and sometimes a painful itching: different means were unsuccessfully employed, and the case remained nearly in the same situation till the month of September in the following year. At this period, the ulcer spread very fast: the septum nasi, the muscles, and cartilages of both sides, were, in a short space of time, destroyed. The ulceration extended on the left side, on the loose edge of the upper-lip. This was the state of her case on her admission into the Hospital of St. Louis, in the month of October, 1789.

A poultice, moistened with aq. veg. was applied twice a day to the ulcer; a sudorific ptisan prescribed, and a pill, composed of one grain of calomel, and one grain of sulph. aurat. antimonii, ordered to be taken every day. From the fifth day, the inflammation lessened. No other sensible alteration took place till the 21st. The suppuration, that, till this time, had been black and putrid, now became white and inodorous.

On the 37th, the discharge was trifling,

and the ulcer, being well deterged, was dressed with pledgets, dipped in a solution of verdegris and corrosive sublimate, in the proportion of six grains of each to a pint of water. On the 40th day, cicatrization began to take place, and was finished by the 60th.

Some time before it was completely cicatrized, an issue was made in the arm, which was healed up, without any inconvenience to the patient, six months after the cure. (*Parisian Chirurgical Journal, Vol. 1.*)

One of the best external applications to *noli me tangere* is the following lotion; ℞. Kali arsenicati, gr. iv. Aq. menthæ sativæ ℥iv. Spiritus vini tenuioris ℥j. Miscē et cola. I have seen several cases in St. Bartholomew's Hospital, very lately, which were either cured or seemed disposed to get well with this application. The solution of arsenic, which Mr. Home has always used, is made by boiling white arsenic in water for several hours, in a sand-heat. When given internally, the dose is from three to ten drops; when for external application, a dram is to be diluted with ℥ij. of water; and this solution is gradually made stronger, as the parts become accustomed to it, till it is of double strength. However, this mode of using arsenic is by no means a well regulated one; and Plunket's caustic (see *Arsenic*) for outward employment, is not nearly so neat an application as the above-mentioned lotion. At St. Bartholomew's Hospital, arsenic is administered internally in the following formula: ℞. Kali arsenicati gr. ij. Aquæ menthæ sativæ ℥iv. Spiritus vin. ten. ℥j. Miscē et cola. Dosis ℥j. ter quotidie. In this way, the quantity of arsenic is nicely determined. We shall only just add, with regard to this medicine, that, both as an external application and an inward remedy, in cases of *noli me tangere*, it perhaps deserves the highest rank. One scruple of the argentum nitratum, dissolved in half an ounce of distilled water, makes a very good application, which, although generally inferior, in point of efficacy, to arsenical ones, in the present disease, occasionally does good, when nothing else seems to produce any benefit. The case above, makes us acquainted with another lotion, which deserves further trial. All fluid remedies must be applied to the part, by dipping little bits of lint in them, placing these on the ulcerations, and covering the whole with a pledget.

The ointments, which seem most likely to prove useful applications to *noli me tangere*, are the unguentum hydrargyri nitratī, the unguentum picis, and unguen-

tum sulphuris. As far as my experience extends, they are generally less efficacious than lotions in the present cases; but, in particular instances, they prove superiorly useful, and it deserves particular notice, that surgeons can often make no progress against this inveterate disease, unless they apply a different sort of dressing every day; sometimes, a lotion; at other times, an ointment. The little ulcers may occasionally be touched with the argentum nitratum. The small furfureous scabs, which are continually forming on the part affected, should be softened with a little of the unguentum spermatis ceti, and removed with as much tenderness as possible.

We have already remarked, that arsenic is a good medicine to be given as an internal medicine, and the best mode of exhibiting it is already explained. Another medicine, which is often useful in these cases, is what is known by the name of Plummer's pill, or the compound calomel pill. *℞. Calomelanos, Sulphuris Antimonii præcipitati, singulorum gr. xii. Guaiaci gummi resinæ gr. xxiv. Saponis quod satis sit. Misce; fiant pilulæ duodecim. Dosis una bis quotidie.* In other instances, we may try the decoctum ulmi, or sarsaparillæ, with one of the following pills thrice a day; *℞. Calomelanos gr. vj. Succo spissati cicutæ ʒj. Misce; fiant pilulæ duodecim.* The hydrargyrus sulphuratus has occasionally been given, as an alterative medicine, for the relief of *noli me tangere*; with what good effect I cannot pretend to say.

NYCTALOPIA. (from *νύξ*, night; and *ὀψ*, the eye; or *ὀρρω*, to see.) An affection of the sight, in which the patient is blind in the day-light, but sees very well at night.

The Greek physicians are divided in their opinions concerning the now uncommon disease of nyctalopia. Hippocrates expressly says, "we call those nyctalopes who see by night." The author of *Defin. Medic.* "that they see nothing in the day time, but have their sight by night."—On the contrary, Paulus Ægineta, and Actuarius are as explicit in asserting, that they have their sight perfect in the day-time, but are blind by night. Ætius is of the same mind, though he is thought to favour the contrary opinion, when he says, "they see better by night than in the day, and if the moon shines they are blind."

The author of *Isagoge* embraces both opinions, when he says, "they, call those nyctalopes who, in the day time, see more obscurely, at the setting of the sun more clearly, but, when it is night, much better; or, on the contrary, by day they see a little, but, in the evening, or at night, they are blind. Galen explains the word by a night-blindness. Pliny, Varro, Nonius, Festus, Celsus, and other Latin writers, give equally opposite definitions of the disorder. Dr. Pye questions, whether these two descriptions of nyctalopia, so diametrically opposite to each other, may not be reconciled by considering the disorder as an intermittent one. The difference then will only consist in the different times of the approach of the disease; that of Hippocrates came on in the morning; that of Ægineta, in the evening; both were expressly periodical, and the distance of time between the paroxysms, in both, was respectively the same; a whole day, or a whole night. The various shapes, in which intermittents appear, very much favour, says Dr. Pye, such an opinion; and the apparent success of bark in the case, which he has related, notwithstanding the unfavourable circumstances of the evacuations his patient laboured under, and the consequent necessity of its disuse, seem to confirm it in this gentleman's mind. (*Med. Obs. and Inq. Vol. 1.*)

If this opinion be true, we need only refer the reader to *Amaturosis* and *Hemeralopia*, for the best mode of treatment. But, certainly there are instances of nyctalopia, every now and then met with, in which the affection seems to depend on a peculiarity in the structure and organization of the eye; by reason of which, the quantity of light, which only suffices for vision in an eye of natural formation, proves too abundant for a nyctalops, and absolutely prevents him from seeing at all. We know, that in the eye there is a black substance, named the *pigmentum nigrum*; one supposed use of which is to absorb the redundant rays of light, which enter the pupil. A deficiency of this, may certainly account for a nyctalops being blinded with the day-light, and seeing best at night. On the whole, however, there can be no doubt, that *amaturosis* is occasionally a periodical disease, like an intermittent; and a species of nyctalopia may also be thus induced.

O.

ŒDEMA. (from *οιδω*, to swell.)

The ancients understood by this term, all kinds of tumours; but, it is now restricted to a swelling arising from an extravasation of an aqueous fluid in the cellular substance of a particular part; for, when the affection is more extensive, and especially when it is also accompanied with a general dropsical tendency, it then becomes a medical case, and receives the name of *anasarca*. An œdematous part is usually cold, and of a pale colour; and, as it is little, or not at all elastic, it pits, as surgeons express themselves, or, in other words, it retains for some time, the mark of the finger, after being handled, or pressed. Œdematous swellings are often connected with constitutional causes. In many cases, however, they seem to be entirely local affections, arising from such causes as only act upon the parts, in which the swelling is situated. Thus we observe, that after violent sprains of the wrist, or ankle-joint, the hands and feet often become œdematous; and limbs are frequently affected with œdema, in consequence of the return of blood through the veins being obstructed by the pressure of tumours on them, or that of splints, bandages, &c. Pregnant women are known to be particularly subject to œdema of the legs, owing to the pressure of the gravid uterus on the iliac veins. Persons who have been confined in bed, with fractured thighs, or legs, generally have more or less œdema of their feet and ankles, on first getting up again; and the affection, in these cases, is probably quite dependent on loss of tone in the vessels of the limb.

In the treatment of œdema, great attention must always be paid to the nature of the cause, in order to determine whether the disease originates from a mere local, or a general constitutional affection. When it depends on the pressure of a tumour on the veins, as we often see happen in cases of aneurisms, the effect cannot be got rid of till the cause is removed; and the aneurismal swelling must be lessened, before the œdematous one can admit of the same beneficial change. When œdema is the effect of vascular weakness in a limb, in consequence of sprains, contusions, &c. the

best means of relief is, to support the parts affected with a laced stocking, or a flannel roller, while they are also to be rubbed with liniments, and bathed with cold spring water, till they have perfectly recovered their tone.

With regard to the œdema attendant on the advanced state of pregnancy, a complete cure cannot be expected till after delivery. The affection is generally more considerable in the afternoon, than the morning, owing to the different effects of an erect and a recumbent position. Some relief may be obtained by keeping as much as possible in a horizontal posture; and, when much inconvenience and pain are felt, the parts may be fomented with any aromatic and spirituous application.

Œdema is often one of the symptoms of suppuration; and, when the matter is very deeply situated, sometimes leads to its discovery. The truth of this remark is often seen in cases of empyema.

There is a species of œdema accompanied with a degree of heat, pain, &c. in the part, and which, in short, seems combined with phlegmon. In this case, saturnine lotions, the application of leeches, and the exhibition of saline purgatives, are proper. An erysipelatous œdema is also met with, in which the treatment should very much resemble what is explained in the article *Erysipelus*.

ŒSOPHAGOTOMY. (from *œsophagus*, and *τεμνω*, to cut.) *Œsophagotomia*. This operation consists in making an incision into the œsophagus, in order to take out of this tube foreign bodies, which lodge in it, and which can neither be extracted through the mouth, nor pushed down into the stomach, and whose continuance in the œsophagus would occasion fatal symptoms.

As the œsophagus is deeply situated, and covered by very important parts, such as the trachea, nerves, and considerable blood-vessels, every operation, the object of which is to make an opening into this tube, has always been regarded as exceedingly dangerous, and was even, for a long while, quite proscribed. However, although every rational practitioner agrees, that this proceeding should never be resorted to,

without some most urgent cause, yet, if a case were to present itself, in which the œsophagus was so obstructed, by some extraneous substance, that no food could absolutely pass into the stomach, or if, in consequence of an accident of the same nature, respiration were impeded in a manner imminently dangerous to life, doubtless the uncertain chance of the operation should be preferred to the certainty of a fatal event. Many instances of the œsophagus being accidentally wounded, have been known to end well. Mr. B. Bell saw a man, who, in attempting to kill himself, by cutting his throat, cut through a great part of the trachea into the œsophagus. Bohnius relates the case of a man, wounded in the same way, whose wound in the œsophagus was quite manifest, as every thing which the patient attempted to swallow came out of it. Both the patients, just mentioned, got well, and many similar examples are on record.

Guattani, a surgeon at Rome, published, in the third volume of the *Mem. de l'Acad. de Chirurgie*, a dissertation on the present subject. After explaining the manner of performing this operation, he relates some experiments made on dogs, which succeeded very well. He practised the plan also on the dead subject, in such a manner as to make it demonstrable, that the method was practicable on the human body. What is still more conclusive, the operation was actually done twice, on living subjects, with perfect success. The following is the account of these facts, as recorded in the *Mem. de l'Acad. de Chirurgie*.

"In the month of May, 1738, M. Goursauld, a surgeon at Coussat-Bouneval, in Limousin, was called to a man, who had swallowed a bone, an inch long, and six lines broad. M. Goursauld made various attempts to make this foreign body pass down into the stomach. Not being able to succeed, however, and the bone being felt on the left side, he determined to cut upon it, and try to extract it. An incision having been made, the bone was easily extracted, no bad symptoms followed, and the wound healed, with the aid of an uniting bandage. Care was taken to give the patient no food for six days, but to nourish him with glysters. A similar operation was performed, with equal success, by M. Rolland, surgeon-major of the regiment of Mailly." (*Memoires de l'Académie de Chirurgie*, Tome 3.)

Guattani, in this memoir, observes, with several other anatomists, that the œsophagus is always situated, not direct-

ly between the trachea and vertebræ, but rather more towards the left than the right. This fact would always lead a surgeon, when he deems œsophagotomy necessary, to undertake it on the left side of the neck. The parts, which cover the œsophagus, from the middle and external part of the neck, to the upper part of the sternum, are the skin, fat, cellular substance, muscles proceeding from the sternum to the larynx, the thyroid gland, the thyroid arteries and veins, the trachea, the recurrent nerve, &c. Things thus circumstanced, Guattani recommends the following mode of operating. "The patient is to sit on a chair, with his head inclined backward, as far as may be thought proper, and held by an assistant, so that it can neither move backward nor forward. The operator, placed before the patient, after pinching up the skin on the right side, into a transverse fold, with the fingers of his left hand, while an assistant does the same to that on the left, is to make, with a straight bistoury, a longitudinal incision in the integuments, from the upper part of the sternum. He is next to divide the cellular substance, fat, &c. which he will find between the left sterno-hyoideus, and sterno-thyroideus muscles, and the trachea. By means of two double blunt hooks, he is to keep the edges of the wound asunder, and, on dividing the cellular substance at the side of the trachea, with his finger and a few strokes of the knife, he will see the œsophagus. A longitudinal incision is then to be made into the lowest part of it, with a straight knife; and this wound must afterwards be dilated upward, with curved, blunt-pointed scissars. If any difficulty should be experienced, the surgeon may employ a director, to facilitate the last object. Small curved forceps, similar to those used for extracting polypi, are then to be introduced into the œsophagus, for the purpose of extracting the extraneous substance. This canal having been opened in the place above specified, the foreign body may be extracted with these forceps, whether it be situated above or below the aperture made for the purpose. This kind of opening will even be useful, when the extraneous substance has passed so far that it cannot be extracted with forceps; for, with a bougie, or some other instrument, it may now be easily pushed down into the stomach.

"The operation finished, the dressing of the wound is a point, which merits a great deal of attention, in regard to the method pursued to unite it. This object has always been accomplished, in the animals on which my experiments were

made. If comparative surgery have any weight, it is certainly in such cases, as the present one, in which the structure of the part seems to be almost the same. It is also proved by my experiments, that the œsophagus cicatrises very well, without contracting any adhesion to the adjacent parts. It is proper to observe, 1. That the integuments being cut, and the parts disengaged, if, by chance, the vein, which brings back the blood from the inferior part of the thyroid gland, and runs into the left subclavian, should be cut, the hemorrhage may be stopped with a dossil of lint, which is to be compressed by an assistant's finger, during the operation. The vein will afterwards be compressed by the uniting bandage, employed for healing the wound; but, otherwise, a ligature is to be used. 2. That, on separating the lips of the wound, the recurrent nerve may be seen, at a greater or lesser distance from the trachea. If, then, it should be foreseen, that it would be injured in separating the cellular substance, and making the incision into the œsophagus, it must be drawn out of the way, with the same hook which is employed for pulling aside the left lip of the wound. In the same manner, the trachea may be carefully drawn to one side with the right hook, if it should embarrass the operator in finding out the œsophagus; a thing which may be done, without fear of seriously interrupting respiration. 3. That the œsophagus is to be opened, as near as possible to the trachea, especially at its upper part, where the arterial branch, which goes from the subclavian, to be distributed to the thyroid gland, sometimes runs. 4. That, if thought proper, the thyroid gland is to be separated from the left side of the trachea, when the foreign body, lodged in the œsophagus, requires a large incision, and, particularly, when this gland is very much swollen, as it would prevent a free view of the œsophagus. 5. That the œsophagus will be known to be opened, when the internal membrane, which is whitish has been divided. 6. That the operation should be done with promptitude, when it is thought necessary, in order to avert the afflicting consequences of inflammation of the œsophagus. 7. That the operation being done, the reunion of the parts is to be promoted, by simple dressings, and the uniting bandage.

"With regard to regimen, besides all the general remedies required in such cases, and every thing which a judicious practice indicates, I am of opinion, that it would be proper (as far as possible)

only to give the patient, at intervals, a little broth, for the first three or four days after the operation, so as not to disturb the healing of the parts. And, as broth might cause some little disturbance of the wound, even nourishing glysters, which we know, would suffice for the support of the patient this short time, who, in such cases, is not much reduced." (*Guattani, in Mem. de l'Acad. de Chirurgie, Tom. 3.*)

Whenever nourishment is to be conveyed into the stomach, through a wounded œsophagus, the hollow bougie should be introduced, from one of the nostrils, down the passage, and the liquid food injected through it, with a syringe.

ŒSOPHAGUS, FOREIGN BODIES IN. There are few situations, in which foreign bodies lodge more frequently, than in the œsophagus. The function of this tube explains the reason of this occurrence, and its great sensibility is a ground for the apprehension of many bad effects, which may result from the lodgment of extraneous substances in it.

Foreign bodies, liable to stick in the œsophagus, are not only food, such as pieces of crust, or meat imperfectly chewed, but also various substances which are accidentally swallowed alone, or with the food, such as little bones, stones, pins, pieces of money, &c. These latter things, by lodging in the pharynx, or œsophagus, may occasion very bad symptoms; and, if forced down into the stomach, may produce still worse effects. Hence, we should immediately try to extract them. For this purpose, the fingers are to be used, and if they cannot reach them, forceps must be employed. Some have recommended hooks, for the accomplishment of the object in view; others, various instruments, adapted to particular circumstances. The excitement of vomiting has been tried, and, occasionally with success; but, it is not free from danger, and the most distressing symptoms have been brought on by it.

[A solution of emetic tartar is a very useful remedy in cases of foreign bodies in the œsophagus. The nausea produced before its emetic operation commences, relaxes, so completely all spasm in the part, that the substance is allowed to escape. A boy in attempting to swallow a peach stone had it to lodge in the œsophagus, the probang was tried without effect; it remained immovable; he was directed to swallow a solution of emetic tartar; whether any passed into the stomach, or whether nausea was produced by its

impression on the parts, it is difficult to decide. Nausea however came on, and immediately the peach stone was liberated and passed into the stomach.]

When such extraneous substances cannot be extracted, they must be pushed down into the stomach, with some such instruments as a large bougie, or a whalebone probing, fifteen or sixteen inches long; and, on the end of which, a piece of fine sponge is firmly fastened. Small bits of sponge, tied on the ends of some string, have also been used; the patient is to swallow them, and then drink something. The sponge, expanded with the fluid, dilates the passage, and facilitates the descent of the extraneous substances into the stomach. But, when such bodies are, from their sharp-pointed, angular shape, or hurtful nature, likely to occasion perilous consequences, by being pushed down into the stomach, the plan must not be attempted. Hard, angular substances, and such things as pins and needles, which surgeons have not chosen, or not been able, to force down into the stomach, have often, after a time, made their way to the surface of the body, where an abscess has formed, out of which they have been discharged.

When hard bodies have been pushed, or have got of themselves, down into the alimentary canal, their ill effects should be counteracted, and their passage through the bowels promoted by giving the patient frequent draughts containing the *oleum amygdalarum*.

When foreign bodies in the œsophagus, resist the different means employed for their extraction, or for propelling them into the stomach, when such method has been judged to be proper; when, at the same time, the pain which they occasion, is not considerable; when they do not too seriously interrupt respiration, and leave sufficient room for the passage of aliment and drink; it is prudent to abstain from further attempts to displace them. They should be left to nature, while the practitioner should content himself with bleeding the patient a few times, exhibiting draughts containing the *oleum amygdalarum*, and employing glysters. But, when the lodgment of such foreign bodies dangerously obstructs respiration, by the pressure made on the larynx, an opening must be quickly made in the trachea, in order to serve for a time the office of the natural passage for the air. (See *Bronchotomy*.) As soon as the swelling subsides, another attempt may be made to move the extraneous substance. (See *L'Encyclopédie Méthod. Partie Chir. Art. Corps Etrangers*.)

There may be cases, in which death

would certainly result from the continuance of a foreign body in the œsophagus, and as it could neither be extracted nor removed by common means, perhaps cutting into the œsophagus would be proper. (See *Œsophagotomy*.)

When some extraneous substances have been left to themselves, nature has sometimes succeeded in expelling them. They have excited a trivial suppuration, where they were lodged, by which they have been loosened, so as then either to be ejected by vomiting, or, after descending into the stomach, to be discharged by stool. In passing any instrument into the œsophagus, the great skill lies in putting it at once directly against the posterior part of the pharynx, so as to avoid touching the epiglottis, and keeping it closely against the vertebræ all the way down. The knowledge of this circumstance may be of infinite service in passing probangs, bougies, &c. but, hollow bougies are introduced in a different way, viz. through one of the nostrils, down the pharynx. When thus employed, they may sometimes be allowed to remain in the passage very advantageously. They are extremely useful for the conveyance of food and medicines into the stomach, when the œsophagus has been wounded; and as the elevation and depression of the larynx, in the action of swallowing produces immense disturbance of wounds of the trachea, they promise to be of infinite service in the latter cases.

ŒSOPHAGUS, STRICTURES OF.

As the œsophagus is required to be wider at one time and narrower at another, in order to be fitted for conveying the different kinds of food into the stomach, it is nearly under the same circumstance with respect to the formation of stricture, as the urethra. Strictures in the œsophagus, are, for very obvious reasons, much less frequent than in the urethra. However, they are by no means uncommon, and produce symptoms even much more distressing and dangerous, than those, which ordinarily arise from analogous obstructions in the passage for the urine.

This disease has been long noticed by surgical authors, and Mr. Warner in particular has recited an instance of it, that proved fatal, the patient having become incapable of taking nourishment. (See *Cases in Surgery*, by J. Warner, F. R. S. p. 130, Edit. 4.)

Of course, the most remarkable symptom of a stricture in the œsophagus, is the difficulty of swallowing, which must be greater or less, according as the obstruction is more or less complete. Sometimes no solid food whatever can pass

down into the stomach, and fluids can only descend with great difficulty, and in very small quantities. This is, in some instances, attended with considerable pain, which extends along the fauces to the basis of the skull, and through the eustachian tube to the ear. The pain sometimes returns at intervals, and lasts a considerable time, even when no effort is made to swallow. If a bougie of proper size be introduced down the pharynx, it will often be stopped by the stricture just behind the thyroid, or cricoid cartilage; for, from Mr. Home's remarks, it appears that the obstruction is generally as high up as this situation. However, there are other cases, in which the obstruction is only of a spasmodic nature, and in such, a bougie may be passed quite down. It is curious, that strictures high up in the œsophagus, often occasion ulceration in this tube very low down towards the stomach, just as strictures in the urethra occasion ulceration in that passage towards the bladder. This is most apt to occur, when strictures of the œsophagus have been of long continuance, and may arise from the efforts in retching, which frequently comes on, and must strain the parts already deprived of their natural actions, and of the benefit of the secretions, with which they are lubricated in a healthy state. When such ulceration takes place, the characters of the original disease are lost; and when the ulceration extends upwards, the stricture itself may be destroyed. A bougie, introduced under such circumstances, will, in general, have its point entangled in the ulcer; and when so skilfully directed as to go down into the œsophagus, it will meet with a difficulty while it is passing the commencement of the ulcerated part of the œsophagus, and another impediment where it leaves the ulcer, and enters the sound portion of the œsophagus below. These two resistances may lead to the supposition, that there are two strictures, while in fact there is not one, only ulceration as above described.

Strictures in the œsophagus are sometimes so complete, that swallowing even fluids is utterly prevented; the patient is obliged to have all nourishment injected *intra anum*, and in general soon perishes in a most emaciated condition.

Though any part of the œsophagus is liable to the kind of contractions forming strictures, the part immediately behind the cricoid cartilage, where the pharynx ends, and the œsophagus begins, is the most frequent seat of the obstruction. Those which are situated further down, do not so easily admit of being examined, and relieved by any surgical operation.

Strictures of the œsophagus occupy very little extent of the passage, consist of a transverse fold of the internal membrane, and are attended with little thickening of the adjacent parts. These latter circumstances are such as render the disease capable of receiving relief either from simple or armed bougies.

There are two other diseases of the œsophagus, which have symptoms similar to those of strictures. One is a thickening of the coats of the œsophagus, which extends to the surrounding parts, and generally ends in a cancer, or an incurable disease. The other affection is an ulcer of the lining of the passage, commonly situated a little below the seat of the stricture, on the back part of the tube. In the early state, these diseases can only be distinguished from a stricture, by an examination with a bougie; afterwards their nature becomes clear enough from other symptoms which arise. Strictures also take place more commonly in young subjects; the other two diseases in the more advanced periods of life.

Mr. Home has found, that a bougie can be more easily introduced into the œsophagus, when the tongue is brought forwards out of the mouth. This gentleman remarks, that when a bougie is passed, with a view of learning the nature of the case, and it passes down to the distance of eight inches, measuring from the cutting edge of the front teeth in the upper jaw, its extremity has gone beyond the usual seat of stricture. If it be withdrawn without any resistance, the aperture in the œsophagus must then be larger than the bougie employed. But if the bougie stops at the distance of six inches and a half, or even lower, it must be retained there with a uniform pressure for half a minute, so as to receive on its point an impression of the surface by which it was opposed. If the end of the bougie retains its natural form, or nearly so, and there is an indentation on one side of it, or all round it, the surgeon may conclude there is a stricture. On the other hand, should the bougie descend without impediment, as far as seven inches and a half, and, when withdrawn, the surface of its point appear irregular and jagged, the disease is an ulcer on the posterior part of the œsophagus.

The mode of treatment adopted by Mr. Home, consists either in occasionally passing a common bougie through the stricture, and employing one of larger size, in proportion as the dilatation of the obstruction will allow; or else in introducing an armed one at convenient intervals. Consult *Practical Observations on the Treatment of Strictures in the Urethra*

and *Œsophagus*, Vol. 1, Edit. 3, 1805. Vol. 2, 1803. by E. Home, F. R. S.

In spasmodic strictures of the *œsophagus*, blisters have been known to do good, and I have heard a most eminent surgeon express a strong expectation, that other strictures of this passage would be benefited, by feeding the patient through hollow bougies.

ŒSOPHAGUS, POLYPI OF. (See *Polypus*.)

OLEUM CAMPHORATUM. R. Olei Olivæ ℥j. Camphoræ ℥iv. Misce ut solvatur camphora.

Some practitioners employ this for promoting the suppuration of indolent, particularly scrophulous swellings, which are to be rubbed with the application once, twice, or thrice a day, according to circumstances.

OLEUM LINI. In surgery, linseed oil is often used as an application to burns, either alone or mixed with an equal quantity of the aqua calcis. It has also been applied to cancerous ulcers, as some assert, with considerable benefit.

OLEUM ORIGANI. The oil of marjoram is often used by surgeons for discussing ganglions: the tumours are to be rubbed with it two or three times a-day.

OLEUM PALMÆ CAMPHORATUM. R. Camphoræ ℥ij. Olei palmæ ℥j. The camphor is to be reduced to powder, and the palm oil, being melted, and suffered to become almost cold, is to be mixed with it in a mortar. This application is a mild topical stimulant: it has been used for promoting indolent suppurations, especially those of a scrophulous nature, which take place under the jaw, and are attended with a good deal of chronic induration at their circumference.

OLEUM RICINI. In such surgical cases as require the bowels to be opened with the slightest degree of irritation possible, the oleum ricini is the best and safest medicine that can be given. The usual dose is one large table-spoonful, which must be repeated every two or three hours, till the desired effect is produced.

OLEUM TEREBINTHINÆ. Oil of turpentine is employed externally as a stimulating liniment, and a styptic. In the article *Liniment* may be seen some formulæ, in which turpentine is the most active ingredient. It is sometimes exhibited by surgeons internally, for the cure of gleet.

OLEUM TEREBINTHINATUM. R. Olei Amygdalæ ℥ss. Olei Terebinthinæ gutt. xl. Misce.

In deafness, occasioned by defective, or

diseased actions of the glandulæ ceruminæ, Mr. Maule directs a little of the oil to be dropped into the patient's ear, or applied at the end of a small dossil of cotton.

When a thin secretion takes place, the cure is also promoted by a small blister, which he orders to be placed as near the ear as convenient, and kept open by the common means. Of course, the savine cerate would now be preferred for this purpose. The meatus auditorius externus must also be cleansed every day with a lengthened bit of soft cotton, affixed to a probe. This is to be introduced into the passage, and twisted gently round, so as to wipe away the discharge. (See *Pharmacop. Chirurgica*.)

OMPHALOCÆLE. (from *ομφαλος*, the navel, and *κηλη* a rupture.) A rupture or hernia at the navel. See *Hernia*.

ONYCHIA. (from *ονυξ*, the nail.) An abscess near the nail of the finger. See *Whitlow*.

ONYX. (from *ονυξ*, the nail.) A small collection of matter, situated under the cornea, in the anterior chamber of the aqueous humour, and so named from its being shaped like a nail. It is of the same nature as *Hypopyum*, to which word I must refer the reader. Maître-Jean, Mauchart, and several other oculists, imply, however, by the term *onyx*, a small abscess between the layers of the cornea.

OPHTHALMY. (from *οφθαλμος*, the eye.) *Ophthalmia*. Inflammation of the eye.

Ophthalmia is not only a consequence of several affections of the eye and adjacent parts, on the existence of which its continuance entirely depends; it is frequently, also, the primary complaint, and too frequently the fore-runner, of those irreparable diseases which deprive the patient of vision. Redness of the tunica conjunctiva; tumefaction of the eyelids; aversion to light; lancinating pain in the orbit; an itching, conjoined with a sensation of heat; and an uneasiness, seeming as if it arose from particles of sand in the eye; are symptoms forming the general inconveniences attendant on inflammations of the eye. No part of the eye-ball can be considered as exempt from the attack of inflammation. Hence, in ophthalmia, not only the conjunctiva, the sclerotica, and the choroides, but the retina itself, may also be inflamed, as well as the surrounding parts, the palpebræ, the muscles in the orbit, and the lachrymal gland.

The grand distinctions of ophthalmia are in two species, viz. *acute* and *chronic*; the one arising, as Scarpa says, from an excess of stimulus, and re-action of the

living solid: the other connected with debility, which is generally limited to the vessels of the parts affected, but sometimes extends to the whole system. The Arabian authors termed the one *calido*, the other *frigida*. It should be well known, however, that every acute ophthalmia, though treated in the best possible manner, is never so completely resolved, but that beyond a certain period, at which all active disturbance ceases, there yet remains in the conjunctiva, or lining of the eyelids, a degree of chronic ophthalmia, either from local weakness in the vessels, or from a morbid irritability continuing in the eye, after the cure of the acute inflammatory stage. As it occasions a diseased secretion in the organ, and a slow accumulation of blood and coagulating lymph in the part, the inexperienced are apt to suppose, that the acute ophthalmia is not yet subdued, while it is completely so. Immediately the critical moment arrives, when the acute ophthalmia changes into the chronic one, attended with local weakness, it is highly important, in the treatment, to substitute for topical emollient, relaxing applications, such as partake of an astringent, corroborant quality. Those surgeons who now continue to employ the first remedies, only protract the turgescence of the vessels, and the redness of the conjunctiva. *Quo major autem fuit inflammationis vehementia (says Richter) eo major plerumque sequitur partium affectarum atonia, eoque major opus est adstringentium, et roborantium longo usu, ut auferantur penitus, reliquæ morbi, &c. Fascicul. 1, p 109, 110.*

Mild acute ophthalmia is characterized by redness of the conjunctiva and lining of the eyelids, an unnatural sensation of heat in the eyes, uneasiness, itching and shooting pains, as if sand had got between the palpebræ and eye-ball. At the place where the pain seems most severe, some blood-vessels appear more prominent and turgid, than other vessels of the same class. The patient of his own accord keeps the eyelids closed; for, he feels a weariness and restraint in opening them, and by this means, also, he moderates the action of the light, to which he cannot expose himself, without increasing the burning sensation, lancinating pain, and effusion of tears from the eye. If the constitution is irritable, the pulse will be a little accelerated, particularly towards the evening; the skin will be dry; slight shiverings will occur, and, in some instances, nausea, and inclination to vomit. (*Scarpa.*)

This complaint is often the consequence of a cold, in which the eyes, as well as the pituitary cavities, fauces, and

trachea, are affected. It is not unfrequently occasioned by change of weather, sudden transitions from heat to cold, the prevalence of easterly winds, journeys through damp, unhealthy, sandy countries, in the hot season of the year, exposure of the eyes to the vivid rays of the sun, &c. Hence, it does not seem extraordinary, that it should often make its appearance as an epidemic, and afflict persons of every age and sex. Besides the preceding remote causes of ophthalmia, authors have enumerated the suppression of some habitual evacuation, such as bleedings from the nose, or piles, the menses, &c. affections of the primæ viæ, worms, dentition, &c. However, though persons thus circumstanced, are unquestionably subject to inflammation of the eyes, it may be doubted whether they are more so than other people, and when afflicted with ophthalmia, whether the alleged causes have any share in the origin of the latter complaint.

The mild acute ophthalmia is in general easily cured by means of low diet, gentle purging, with small repeated doses of the antimonium tartarizatum, and after making search for any extraneous body that may have insinuated itself beneath the eyelid, repeatedly washing the eye with a warm decoction of mallow leaves, and covering it with any very soft emollient poultice, included in appropriate little bags of exceedingly fine muslin. The fluid remedy may be most conveniently applied by means of an eye-glass. Scarpa orders the antimonium tartarizatum to be taken as follows: *R. Antim. tart. gr. j. Decocti Hordei Hiss. Crystall. tart. ʒj. Sacchari Purif. ʒvj. Misce.* To be taken in divided doses every day. I have substituted the barley water for the decoction of dog-grass, which is certainly not essential.

With this treatment, the inflammatory stage of the mild acute ophthalmia, commonly ceases in the course of four or five days. The patient no longer complains of that oppressive sense of heat, tension, throbbing, &c. experienced at first, and he can now bear a moderate light, without such an effusion of tears as was previously occasioned. In this state, how red soever the tunica conjunctiva may appear, it is no longer affected with acute inflammation, and the ophthalmia has relapsed, from its acute stage, into that attended with relaxation and weakness of the vessel of the conjunctiva, and membranous lining of the eyelids. Emollients are now improper; in lieu of them, astringent, corroborant collyria should be used, by means of which the relaxed vessels of the conjunctiva and eyelid will

recover their original tone, and the ophthalmia be totally removed. One of the following eye-waters, which are similar in quality to those directed by Scarpa, may be employed: *℞. Zinci Vitriolati gr. v. Aquæ Rosæ ℥iv. Misce.* Or *℞. Cerussæ Acetate gr. viij. Aquæ Fœniculi ℥vj. Spiritûs Vini Camphorati gutt. x. Misce.* The mild ophthalmia, originating from causes which render it an epidemic, so quickly passes over the first inflammatory stage, that it is scarcely observable, and is, according to Scarpa, the only case in which cold astringent applications prove in the first instance beneficial.

Surgeons in this country certainly very often employ vitriolated collyria at first, in almost all cases of ophthalmia, and with great benefit; but, it is to be observed, that in general some days have usually elapsed before they are consulted. If the continental surgeons are accurate in their remarks, astringents must be very wrong in the first instance. Richter says:—*Quotidie observo quantum damni adferant oculis inflammatis sueta illa collyria adstringentia, quantum emolumenti emollientia. Fascicul. 3, p. 101.*

The Severe Acute Ophthalmia, is attended with the same kind of symptoms as the mild, but in a more aggravated form. The sensation of heat in the eyes is burning; the constriction of the whole eye and eye-lid spasmodic; the presence of even a faint light intolerable. Sometimes the effusion of tears is continual, very copious, and blended with mucus, which is apt to make the eye-lids adhere together. Sometimes this secretion is almost suppressed, and the eyes become preternaturally dry. The sympathetic fever is considerable, with restlessness, and intolerable pain at the back part of the head. The pupil is contracted, the conjunctiva of an uniformly deep red colour. On the anterior hemisphere of the eye, among the most prominent fasciculi of vessels, may be distinguished a delicate vascular network, continued from one fasciculus to another, but, all being equally turgid with blood, and coiled as it were together, seem to form a kind of excrescence, which rises above the surface of the eye, and has a tendency to project forwards, beyond the eyelids. (Scarpa.)

From the immoderate action of the inflamed vessels, blood is occasionally extravasated into the cellular substance, connecting the tunica conjunctiva with the sclerotica; in consequence of which the first of these coats, which is naturally loose, becomes enormously distended, and elevated in front of the eye, so as to make the transparent cornea seem quite sunk, and prevent the eye from being completely

shut. *Chemosis* is the term usually applied to this sort of case.

The severe acute ophthalmia commonly affects only the outer part of the eye-ball; but, sometimes the interior of the eye is alone affected, or at all events, more so than the outer parts. There is little change in the external parts, the patient has immense aversion, even to the faintest light, the iris has a red appearance, the pupil is exceedingly contracted, and the aqueous humour is occasionally red and turbid. From these circumstances, Scarpa thinks it not irrational to suspect, that, in the highest pitch of internal ophthalmia, there may be an extravasation of blood into the chambers of the eye, especially betwixt the choroid and sclerotic coats. Hence may arise the termination of the internal ophthalmia in amaurosis, so common, when the case does not end in suppuration.

The severe acute ophthalmia requires the antiphlogistic treatment, in the most rigorous degree. Tardiness in procuring evacuations, especially of blood, too often gives the disease time to advance to the state of chemosis; or else to a condition, in which suppuration, or an extravasation of lymph within the eye, is threatened; while, in other instances, the inflammation degenerates into an obstinate chronic ophthalmia from the extreme weakness produced in the vessels of the conjunctiva. Both general and topical blood-letting should, therefore, be speedily put in execution. Leeches should be applied to the vicinity of the eyelids, especially about the inner canthus, on the vena angularis, where it joins the frontal, deep orbital, and transverse vein of the face. (Scarpa.)

Mr. Ware objects to leeches being put on, or very near the eyelids, as they have sometimes caused a considerable swelling of the lids, and increased, instead of lessening the irritation. In ordinary cases, this gentleman recommends applying three in the hollow of the temple, about an inch and a half from the outer part of the orbit. There is one mode of bleeding, in cases of ophthalmia, perhaps productive of more benefit than any other, and this probably on account of its acting at once both as a general and topical evacuation; I mean opening the temporal artery. In some instances, it is true, I have seen the surgeon fail in procuring from this source a sufficient quantity of blood; but I have never seen a continuance of bleeding from the wound any longer than the practitioner himself wished.

There is one particular mode of taking blood from the eye, which, in acute inflammations, has sometimes been very useful. The visible blood-vessels on that

part of the conjunctiva, which covers the inside of the eyelids, are much more numerous, than those which are observable on the white of the eye. Hence, in ophthalmia, the inflammation seems greatest on the inside of the eyelids, where the blood-vessels are often not only much increased in number, but also extremely full and turgid. Sometimes, also, the whole inside of the eyelids, particularly of the lower one, is so much enlarged, as to be constantly turned out. In both these cases great benefit has been derived from scarifying the inner surface of these parts with a lancet, by means of which a considerable quantity of blood has been removed. When the upper eyelid is very œdematous in ophthalmia, and its thickness prevents the application of remedies to the eye, a few punctures made on the outside of the lid, near its edge, will cause the discharge of a bloody water, and a very quick subsidence of the swelling. When the tumefaction of the everted eyelids is very considerable, great and speedy relief has been given, by cutting off a piece from the inside of each of them with a pair of curved scissors. (*Ware, p. 39, 40.*)

General bleeding, though copious, and assisted by the topical application of leeches, does not always prove adequate to remove the high degree of inflammation, attendant on chemosis. It is expedient to employ additional means, in order to give exit to the blood effused in the cellular substance, between the conjunctiva and sclerotica, by which the former is raised so much above the level of the cornea. Scarpa recommends, for this purpose, making a circular incision in the conjunctiva, near the margin of the cornea, with a pair of curved scissors. As a lancet, however, makes a cleaner cut than these instruments, it is perhaps preferable for the operation, and scarifications might suffice, both for the discharge of the extravasated blood, and of that distending the vessels of the conjunctiva itself. In chemosis, Mr. Ware says, there cannot be an easier or a more effectual remedy than æther. A few drops are to be poured into the palm of the hand, and diffused over it, which may be immediately done by pressing the other hand against it. The hand is then to be applied to the eye, and kept so close to it that the spirit, as it evaporates, may insinuate itself into the part affected, and act on the extravasated blood, so as to disperse it. In a few instances of chemosis, in which the swelling and inflammation have been considerable, this gentleman has found the following application of singular service: *R. Interiorum foliorum recentium Lactucæ Sisilis ʒiij. Coque cum aq. pur ʒss. in*

balneo mariæ pro semihora; tunc exprimatur succus, et applicetur paululum ad oculos et ad palpebras saepe in die. (Ware, p. 54.)

After general and topical bleeding, aperient medicines, of the most gentle nature, should be administered; soda phosphorata, pulp of tamarinds, cream of tartar, and magnesia vitriolata, are the most proper. When the stomach is affected, Scarpa also recommends an emetic, as being peculiarly beneficial to inflamed eyes.

When bleeding and other evacuations have been practised, the next most useful measure is the application of a blister to the nape of the neck. Scarpa observes, that the skin in this situation, and that behind the ears, sympathise more closely with the eyes than any other part of the integuments. Many practitioners, however, and among them Mr. Ware, prefer blistering the temples. The latter says: "When the leeches have fallen off, and the consequent hemorrhage has ceased, I would advise a blister of the size of half-a-crown, to be applied on the temples, directly over the orifices made by the leeches, and I have found, that the sooner the blister has followed the bleeding, the more efficacious both have proved." When the ophthalmia has been very violent, and resisted the common method, Mr. Ware adds, that the most beneficial effects have also been sometimes produced by the application of a blister large enough to cover the whole head. (*P. 43, 44.*)

At first, topical emollient applications to the eye are most beneficial; such as mallows boiled in new milk; bread and milk poultices; or the soft pulp of a baked apple; all included in fine little muslin bags. Remedies of this description should be renewed at least every two hours. The patient should be directed to observe perfect quietude, and to lie with his head in an elevated position. To keep the eyelids from adhering together, in the night-time, the sperma-ceti cerate is proper. When the ophthalmia is accompanied with a violent pain in the head, Mr. Ware recommends a strong decoction of poppy-heads to be applied as a fomentation. (*P. 51.*)

Under the preceding plan of treatment, the acute stage of severe ophthalmia commonly abates in about a week. The burning heat and darting pains in the eyes, and the febrile disturbance of the constitution subside. The patient is comparatively easy, and regains his appetite. The eyelids lose their tension and wrinkle. A discharge of thick matter takes the place of a secretion of thin serum, or of a preternaturally dry state of the eyes.

These organs can now be opened, without experiencing vast irritation from a moderate light. In this state, notwithstanding the eyes may continue red, and the conjunctiva swollen, all evacuations are to be left off, as well as the use of topical emollients, for which latter astringent, corroborant collyria are to be substituted. Scarpa recommends the following application: *℞. Zinci vitriolati gr. vj. Aquæ distillatæ ʒvj. Mucil. sem. cydon. mali ʒj. Spiritus vini camphor guttas paucas. Misce et cola.* This collyrium may be injected, with a syringe, between the eye and eyelids, once every two hours; or the eye may be bathed in it, by means of an eye-cup. Such persons as cannot bear cold applications to the eye, must have the same kind of collyrium a little warmed; but as soon as the irritability has lessened, they may be used cold.

The tinctura thebaica of the old London Dispensatory proves a most efficacious remedy for the second stage of acute ophthalmy, or that connected with weak vascular action in the part affected. Two or three drops may be insinuated, between the eyelids and globe of the eye, twice a-day, in common cases; but in others, attended with more sensibility, once will at first be sufficient. Mr. Ware, who brought this application into repute, has found, that introducing two or three drops of this medicine at the inner canthus, and making them glide gradually over the eye, by gently drawing down the lower eyelid, proves equally beneficial, and less painful than dropping them at once on the eyeball. Immediately the application is made, it commonly creates a copious flow of tears: a smarting pain, and a sense of heat in the eyes, which inconveniences, however, soon cease, and the eyes become clearer, and feel evidently improved. But notwithstanding every exaggerated assertion, unbiassed surgeons are now quite convinced, that the tinctura thebaica is only a proper application, when the inflammatory action has been previously diminished by blood-letting, aperient medicines, and blisters, and when the action of the vessels has been weakened by the continuance of the disease. Mr. Ware, in recommending it, as a most effectual application, in every species and stage of the disorder, from the most mild and recent, to the most obstinate and inveterate, (*p. 51.*) has certainly been rather too zealous. Scarpa has seen the necessity of limiting the use of the remedy in question, and he has expressly pointed out, that it is only useful, when the violence of the pain, and the aversion to light have abated. Indeed, Mr. Ware himself has acknowledged, a little before sanctioning its un-

limited employment in all cases, that, in certain instances, in which the complaint is generally recent, the eyes appear shining and glossy, and feel exquisite pain from the rays of light, no relief at all was obtained. (*P. 48, 49.*) See *Tinctura Thebaica*.

Whenever the patient can easily bear a moderate degree of light, all coverings should be removed from the eyes, except a shade of green or black silk. A brighter light should be gradually admitted every day into his chamber, so that he may become habituated, as soon as possible, to the open day-light. Nothing has a greater tendency to keep up and increase the morbid irritability of the eyes, than keeping them unnecessarily long in a dark situation, or covered with compresses and bandages. (*Scarpa.*)

There is a particular species of severe acute ophthalmy, which differs from the common, in appearing with vehement inflammation and swelling of the conjunctiva and eyelids, and being followed by an extraordinary discharge of pus from the eye. It is very common in children at the breast, and is described as attacking adults on the sudden suppression of a gonorrhœa, or on the inadvertent application of the matter of clap to the eyes. These cases must be regarded as complicated with specific morbid action, and not in the light of simple inflammation, free from any diseased principle.

The *Purulent Ophthalmy*, of children produces such tumefaction of the eyelids, as almost prevents them from being separated. Should the surgeon succeed in gaining a view of the membrane lining them, it appears wrinkled, and converted into a red villous surface, somewhat like the inner coat of the rectum, when protruded in young children. (*Warner on the Human eye, page 42.*) Sometimes in the child's fits of crying, the eyelids become everted, and continue so, until rectified by an attendant. No sooner is the first short attack of inflammation past, than there succeeds a discharge of thick yellow matter, truly surprising in quantity, partly secreted from the meibomian glands, but chiefly from that villous, fungus-like surface, into which the lining of the palpebræ seems converted. If the eyelids can be opened, the matter may be seen diffused over the whole surface of the eye, and its confinement, between the swollen eyelids and the eyeball, contributes still more to aggravate the pain, increase the inflammation, and often to induce ulcers, or specks, either over a part or the whole of the cornea. If a speedy check be not soon put to this distressing malady, it renders the cornea so opaque

and thickened, as often to form what is termed *staphyloma*. The cornea has even been known to burst, the humours to be discharged, and the eye to sink into the orbit. The febrile symptoms are at first severe; the infant is continually fretful and restless, and a diarrhoea is not unfrequently concomitant. The affection of the eyes is occasionally accompanied with eruptions on the head, and with marks of a scrophulous constitution. (See *Ware*, p. 138, &c.)

The antiphlogistic treatment should be quickly opposed to the progress of the disease. The temporal arteries should be opened, or leeches applied to the temples, or neighbourhood of the eyelids, and a blister put on the nape of the neck, or temples. The child should be kept in a cool room, and not covered with much clothes. If no diarrhoea should prevail, it is proper to purge with a little rhubarb or magnesia in syrup of violets.

A surgeon, however, is seldom called in before the first short inflammatory stage has ceased, and an immense discharge of matter from the eyes has commenced. Of course emollient applications must generally not be used. On the contrary, astringents and corroborants are immediately indicated, in order to restore to the vessels of the conjunctiva and eyelids their original tone, to rectify the villous and fungous appearance of the lining of the palpebræ, and thus finally to check the morbid secretion of matter. For this purpose Mr. Ware strongly recommends the *aqua camphorata* of Bates's Dispensatory: \mathfrak{z} . Cupri vitriolati, Bol. Armen. \mathfrak{a} \mathfrak{a} \mathfrak{z} iv. Camphoræ \mathfrak{z} j. M. & f. pulvis, de quo projice \mathfrak{z} j in aquæ bullientis \mathfrak{H} iv. amove ab igne, et subsidant fæces. Mr. Ware, in his late *Remarks on Purulent Ophthalmia*, 1808, observes, that he usually directs the *aqua camphorata*, as follows: \mathfrak{z} . Cupri vitriolati. Bol. Armen. \mathfrak{a} \mathfrak{a} gr. viij. Camphoræ gr. ij. Misce, et affunde aquæ bullientis \mathfrak{z} vij. Cum lotio sit frigida, effundatur fimpidus liquor, et sapissimè injiciatur paululum inter oculum et palpebras. This remedy possesses a very styptic quality; but it is much too strong for use before it is diluted; and the degree of its dilution must always be determined by the peculiar circumstance of each case. Mr. Ware ventures to recommend about one dram of it to be mixed with an ounce of cold clear water, as a medium or standard, to be strengthened or weakened as occasion may require. (P. 143.) The remedy must be applied by means of a small ivory or pewter syringe, the end of which is a blunt-pointed cone. The extremity of this instrument is to be placed between the

edges of the eyelids, in such a manner, that the medicated liquor may be carried over the whole surface of the eye. Thus the matter will be entirely washed away, and enough of the styptic medicine left behind to interrupt and diminish the excessive discharge. According to the quantity of matter, and the rapidity with which it is secreted, the strength of the application, and the frequency of repeating it, must be regulated. In mild recent cases, the lotion may be used once or twice a day, and rather weaker than the above proportions; but, in inveterate cases, it is necessary to apply it once or twice every hour, and to increase its styptic power in proportion; and when the complaint is somewhat relieved, the strength of the lotion may be lessened, and its application be less frequent.

"The reasons for a frequent repetition of the means just mentioned, in bad cases, are, indeed, of the most urgent nature. Until the conjunctiva is somewhat thinned, and the quantity of the discharge diminished, it is impossible to know in what state the eye is; whether it is more or less injured, totally lost, or capable of any relief. The continuance, or extinction, of the sight frequently depends on the space of a few hours: nor can we be relieved from the greatest uncertainty, in these respects, until the cornea becomes visible." (*Ware*, p. 145.)

This gentleman, with every appearance of reason, condemns the use of emollient poultices, which must have a tendency to increase the swelling and relaxation of the conjunctiva. If poultices are preferred, he particularly recommends such as possess a tonic or mild astringent property; as one made of the curds of milk, turned with alum, and an equal part of unguentum sambuci, or axungia porcini. This is to be put on cold, and frequently renewed, without omitting the use of the injection. (*Ware*, p. 147.)

When the secreted matter is glutinous, and makes the eyelids so adherent together that they cannot be opened, after being shut for any length of time, the adhesive matter must be softened with a little fresh butter mixed with warm milk, or by means of any other soft oleaginous liquor, after the poultice is taken off, and before using the lotion. (P. 147.)

If the eversion of the eyelids only occurs when the child cries, and then goes off, nothing need be done in addition to the above means. When, however, the eversion is constant, the injection must be repeated more frequently than in other cases; the eyelids put in their natural position, after its use; and an attendant directed to hold on them, with his finger,

For some length of time, a compress dipped in the diluted aqua camphorata. (*P.* 148.)

In some cases, when the inside of the eyelids has been very much inflamed, the tinctura thebaica, insinuated between the eye and eyelids, has been useful. If after the morbid secretion is checked, any part of the cornea should be opaque, the unguentum hydrargyri nitrati, melted in a spoon, and applied accurately on the speck, with a fine hair pencil; or Janin's ophthalmic ointment, lowered and used in the same manner; may produce a cure, if the opacity be not of too deep a kind. When the local disease seems to be kept up by a bad habit, alteratives should be exhibited, such as the æthiops mineralis, or small doses of calomel.

The *Purulent Ophthalmia*, arising either from suppression of gonorrhœa, or from the inadvertent conveyance of gonorrhœal matter to the eyes, is said to produce rather a swelling of the conjunctiva, than of the eyelids, which is followed by a discharge of a yellow greenish matter, similar to that of clap. The heat and pain in the eyes are considerable; an aversion to light prevails, and, in some instances, an appearance of hypopion is visible in the anterior chamber of the aqueous humour. When the complaint proceeds from the second cause, it is described as being less severe.

If it be actually true, that, in adults, a species of purulent ophthalmia does originate from the sudden suppression of a gonorrhœa, are we to consider the complaint so produced as a metastasis of the disease from the urethra to the eyes? This ophthalmia does not regularly follow the suppression of gonorrhœa; nay, it is even a rare occurrence: also, when it is decidedly known, that the purulent ophthalmia has arisen from the infection of gonorrhœa, namely, in those instances, in which the matter has been incautiously communicated to the eyes, it appears, that such an affection of these organs, so produced, is different from the one alluded to, inasmuch as it is slower in its progress, and less threatening in its aspect. Hence, there is good reason for supposing, that no metastasis takes place in this species of purulent ophthalmia, supposed to be connected with a suppressed gonorrhœa: but, we must be content with inferring that, if it really has such a cause, it originates from a sympathy, prevailing between the urethra and eyes, and, that the variation of irritability, in different people, is the reason, why it is not an invariable consequence of the sudden stoppage of a gonorrhœa.

The injection of warm oil, the intro-

duction of a bougie into the urethra, and the application of cataplasms to the perinæum, with a view of renewing the discharge from the urethra, form the outline of the practice of those, who place implicit reliance in the suppression of gonorrhœa being the cause of the complaint. The rarity of the occurrence; the frequency of the sudden cessation of the urethral discharge; the possibility of an ophthalmia arising, as well at this particular moment, as at any other, totally independently of the other complaint; cannot fail to raise in a discerning mind a degree of doubt, concerning the veracity of the assigned cause. Besides, admitting, that there is a sympathy between the urethra and eyes, how are we to ascertain, whether the suppression of gonorrhœa be the cause or the effect of the ophthalmia, supposing that the one ceases, and the other commences, about the same time? Actuated by such reflections, I am induced to dissuade surgeons from adopting any means calculated to renew a discharge of matter from the urethra. When the purulent ophthalmia, in adult subjects, is decidedly occasioned by the actual contact, and infection of gonorrhœal matter, applied accidentally to the eyes, no one has recommended this unnecessary and improper practice.

The first indication, in the treatment of the disease from either cause, is to oppose the violence of the inflammation, and thus resist the destruction of the eye and opacity of the cornea. A copious quantity of blood should be taken away both topically and generally; mild laxatives should be exhibited, and a blister applied to the nape of the neck, or temples. The eyes ought to be often fomented with a decoction of white poppy-heads, and warm milk repeatedly injected beneath the eyelids. To prevent the palpebræ from becoming agglutinated together, during sleep, the sperma-ceti cerate should be smeared on the margins of the tarsi, every night.

When the heat and pain in the eyes, and febrile symptoms have subsided; when an abundant discharge of pus has commenced: all topical emollients are to be relinquished, and a collyrium of Aq. rosæ ʒx, containing Hydrarg. mur. gr. j. used in their place. Scarpa states, that in the ophthalmia, originating from the inadvertent communication of the matter of gonorrhœa to the eyes, applications, in the form of ointment, such as the ung. hydrarg. the unguentum ophthalmicum of Janin, to which might be added the ung. hyd. nitrat. avail more than fluid remedies. (*Scarpa.*)

Epidemic, Purulent, or Egyptian, Oph-
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tholmy. The latter name has been given, in consequence of the very close resemblance, which this inflammation bears to that, which destroyed the sight of a considerable number of our soldiers in Egypt in 1801. Mr. Ware, however, objects to the appellation, because an ophthalmia, precisely similar in its symptoms and progress, has appeared long ago in this and other countries, and, in Egypt, as well as England, several varieties of ophthalmia prevail. This gentleman prefers calling the late epidemic affection of the eyes a *purulent ophthalmia*, since one of its chief symptoms, and that which distinguishes it from every other, is the profuse discharge of a purulent coloured fluid.—Some valuable practical remarks have been published in the *Edinburgh Surgical Journal* for January 1807, by my worthy friend Mr. Peach, who has enjoyed great opportunities of observation, from his having been surgeon to the 2d Battalion of the 52d Regiment, in which the disease has prevailed, perhaps, to an extent not witnessed in any other corps. The total strength of this regiment was 691 men, and, including relapses, Mr. Peach had 733 cases, without taking into the account some slight returns of the disease, which were obviated by venesection. Fifty men had lost the sight of both eyes, though Mr. Peach thought, that several of these would ultimately recover; for, he had already had some instances, in which the cornea recovered its transparency, after having been opaque for six months. Forty men had lost the sight of one eye. The perfect cures amounted to 404; and, when Mr. Peach's letter to Dr. McGrigor was written, he had 213 cases under treatment. (*Edin. Surg. Journ. for January 1807.*) The epidemic, now under consideration, is very different from an ophthalmia, which, at various times, has been epidemic in this, and other countries, without any purulent discharge from the eyes, which is seldom dangerous to sight, and, in a few days, generally yields to internal antiphlogistic means, and mildly astringent applications. (*Ware on the Epi. Purulent Ophthalmia, Note, p. 3; 1808.*)

According to Mr. Peach, the patient complains, in the first stage of the disease, of being suddenly seized with a rolling of sand in his eye; the vessels on the albuginea become suddenly turgid with blood, and the lower palpebræ very vascular. The cases treated in this recent state, generally yield. But, if very active measures do not arrest the progress of the disease, the second stage appears, when the palpebræ superiores become much enlarged; the eyelids can only be opened with extreme difficulty; and then either a

scalding fluid is discharged and excoriates the face, or a flux of thick yellow matter takes place. In this state, it is frequently in our power to stop the progress of the evil; but, if the most decided and active practice be not adopted, the disease reaches the third stage, in which every thing is seldom of any avail in relieving the most distressing symptoms. The cornea now too often becomes ulcerated, and the eye ruptured.

On the first appearance of the disease, Mr. Peach had recourse to venesection, and the antiphlogistic treatment. Being unsuccessful, he tried bark and stimulants; but, being still more unsuccessful with this mode of treatment, he reverted to the antiphlogistic plan in its fullest extent, and with the greatest success, and he found, that he did not formerly succeed, because he did not carry this mode far enough. It is in the commencement of the disease, that a very large quantity of blood should be taken away: in that stage, large venesection, even *ad deliquium animi*, is almost an infallible remedy. It is not sufficient to take away twenty or thirty ounces of blood. Mr. Peach has often taken away sixty, at the same time, enjoining perfect rest, the avoidance of all animal food, and putting in practice every other part of the antiphlogistic treatment. The complaint is naturally disposed to relapse, and, as often as the disease, or even the slightest pain, or uneasiness in the eye, returns, so often did this gentleman return to the lancet. Such practice, Mr. Peach confesses is likely to excite astonishment; but the fullest trial of it has demonstrated to him its utility. In many of the cases, which occurred to him, the progress of the inflammation was so rapid, that it probably would have totally destroyed the eye, if only the ordinary mode of treating ophthalmia had been resorted to. He advises particular attention to be paid to the first sensation of sand in the eye; he never defers venesection, when this is complained of; and the patient, in general, finds so much advantage during the operation, that he says, "the sand is removed." Mr. Peach has occasionally found advantage arise from dropping the undiluted aqua litharg. acetat. into the eye, though great pain was the immediate effect of its application. On the whole, however, he concludes, that dropping substances into the eye is not serviceable, and says, that, since this practice was relinquished, the eyelids have not been so often inverted. The bowels must be kept open. Benefit has often been derived from shaving the head, and keeping it continually wet with water, or vinegar. Blisters are also

sometimes indicated ; but, the great reliance is to be put in the strictest antiphlogistic regimen, and copious venesection. (See *Edinb. Med. and Surg. Journal*, for January, 1807.)

With regard to the causes of the epidemic purulent ophthalmia, Mr. Ware seems to think, that the complaint is commonly communicated by contact. Some of the worst cases of the purulent ophthalmia of children have happened in those, whose mothers were subject to an acrimonious discharge from the vagina at the time of parturition. Some of the worst forms of the purulent ophthalmia in adults, have occurred in those, who, either shortly before the attack of the ophthalmia, or, at that very time, laboured either under a gonorrhœa, or a gleet. Mr. Ware does not mean to impute every purulent ophthalmia to such a cause; but, in the majority of adults, whom he has seen affected, if the disorder had not been produced by the application of morbid matter, from a diseased eye, it could be traced to a connexion, between the ophthalmia, and disease of the urethra. Other causes, Mr. Ware acknowledges, may contribute to aggravate, and, perhaps, produce the disorder, and the purulent ophthalmia in Egypt, has been attributed to a great number. The combined influence of heat and light, of a burning dust continually raised by the wind, and of the heavy dews of the night, may powerfully tend to excite inflammations of the eyes. Yet something more must operate in causing the malignant ophthalmia now under consideration; for, the same causes operate with equal violence in some other countries, besides Egypt, and yet do not produce the same effect; and, in this country, (continues Mr. Ware) the disorder prevailed during the last summer, to as great a degree, and upon as great a number of persons, within a small district of less than a mile, as it ever did in Egypt; and, yet, beyond this space, on either side, scarcely a person was affected with it. The disorder was certainly brought into this country by the soldiers who returned from Egypt, and was probably communicated from them to many others. Now as the action of the atmosphere alone cannot account for the spreading of the disease, &c. Mr. Ware is led to believe, that this particular disorder is only communicable by absolute contact; that is, by the application of some part of the discharge, which issues, either from the conjunctiva of an affected eye, or from some other membrane, secreting a similar poison, to the conjunctiva of the eye of another person. In schools and nurseries, in consequence of children using the same basins and towels, as

others who had the complaint, the disease has been communicated to nearly twenty in one academy. Hence, Mr. Ware censures the indiscriminate use of those articles in schools, nurseries, hospitals, ships, and barracks. (P. 14, 15.)

The principal difference, between the purulent ophthalmia of infants, and that of adults, consists in the different states of the tunica conjunctiva. In the former, notwithstanding the quantity of matter, confined within the lids, is often profuse, the inflammation of the conjunctiva is rarely considerable, and whenever the cornea becomes impaired, it is rather owing to the lodgment of such matter on it, than to inflammation. But, in the purulent ophthalmia of adults, the discharge is always accompanied with a violent inflammation, and generally with a tumefaction of the conjunctiva, by which its membranous appearance is destroyed, and the cornea is made to seem sunk in the eye-ball. (Ware, p. 23.)

We have already detailed the successful plan of taking very large quantities of blood from the arm, as practised by Mr. Peach. Mr. Ware speaks also in favour of bleeding; but has rarely carried it to the extent, it has been in the army. In weak persons, this gentleman prefers, instead of repeating venesection, topical bleeding, either from the vein, that passes on the side of the nose, or by means of five, or six leeches put on the temple. Sometimes, he thinks it better to scarify the inside of the lower eyelid, with the point of a lancet, carried along parallel to, and very near the margin of this part. Mr. Ware objects to pricking the eyelid in an infinite number of places, as very painful, and likely to increase the irritation. The lancet never need be applied more, than twice, and rarely more, than once; and, perhaps, less pain will be occasioned by making the incision with the edge, rather than the point of the lancet. After taking away blood, Mr. Ware says, a large blister on the head, or back, is often useful. Anodynes should be given, with occasional purgatives, and an antiphlogistic regimen. (Ware on Purulent Ophthalmia, 1808, p. 26, &c.)

Dr. Vetch, on the subject of local applications in the present disease, advises keeping the eyes continually covered with linen dipt in some cooling lotion. In the first stage, he gives the preference to dropping the aqua sapphirina into the eye; afterwards, when the swelling of the eyelids has come on, he prefers the aqua litharg. acet. While the patient is subject to a recurrence of pain, he thinks, the injection of warm water the best application. For the purpose of lessening the

swelling of the eyelids, he advises compresses, dipt in the aqua litharg. acet. to be applied with a moderately firm pressure. When the swelling, and other symptoms of the second stage have subsided, Dr. Vetch recommends more astringent applications, such as the aqua lithargyri acet. Bates's camphorated water, solutions of alum, and the muriate of mercury. (See *An Account of the Ophthalmia, as it appeared in England since the return of the British Army from Egypt*, by John Vetch, M. D. 1807, p. 111.)

Mr. Ware gives the preference to the aqua camphorata, which is to be used exactly in the same way, as was described above in speaking of the purulent ophthalmia of children. I cannot help thinking, that, if army surgeons had been careful to inject their applications under the eyelids, as advised by Mr. Ware, great benefit would have been produced. In other ways, the effect of the remedies is often lost. When the inflammation has been very great, Mr. Ware has only put four, or five grains, instead of eight, of the cuprum vitriolatum to eight ounces of water; and, while the inflammation is great, he would never advise more than eight grains to this quantity of water. He usually employs the lotion cold, especially in children; but, in some adults, in whom the general fever, and local inflammation have been considerable, he has been obliged to use it warmed. In cases of great pain and swelling, it should be very weak, less often applied, and, sometimes only warm water injected. In such circumstances, Mr. Ware also sanctions fomenting the eye with a flannel, or sponge, wet with a hot decoction of poppy-heads, or mere hot water. When the cornea threatens to burst, this gentleman approves of opening it, in order to discharge the aqueous humour, by making an incision in a place, where the scar will not obstruct vision.

Having now treated of all the principal species of acute ophthalmia, I shall finish this part of the subject with noticing Mr. Wardrop's proposal to puncture the cornea, and let out the aqueous humour in particular states of inflammation of the eyes. This gentleman remarks, that if the eye of a sheep, or ox, be squeezed in the hand, the whole cornea instantly becomes cloudy, and whenever the pressure is removed, this membrane completely regains its transparency.—From this curious phenomenon in the dead eye, it was evident, that, in the living body, the transparency of the cornea might vary according to the degree of its distention; and that, in cases of opacity of the cornea, accompanied with fulness

of the eye-ball, its transparency might be restored by the evacuation of the aqueous humour. The cornea is little sensible, and, as every body knows, its wounds are free from danger. Mr. Wardrop soon met with a case, favourable for making the experiment; the cornea was milky and opaque, and the eye-ball distended and prominent, attended with acute inflammatory symptoms. The aqueous humour was discharged by a small incision, and the operation produced not only a removal of the cloudiness of the cornea, but an abatement of the pain, and a sudden check to all the inflammatory symptoms. From the success of this case, Mr. Wardrop was led to perform the operation on others, not only with a view of diminishing the opacity of the cornea, but, also, of alleviating the inflammation. Four interesting cases are related by this gentleman, very much in favour of the practice, when the eye is severely inflamed, attended with fulness of the organ, a cloudy state of the cornea, and a turbidness of the aqueous humour. Mr. Wardrop also advises the operation, whenever there is the smallest quantity of pus, in the anterior chamber, accompanied with violent symptoms of inflammation. He thinks that, the great and immediate relief which the method affords, is imputable to the sudden removal of tension; and he performs the operation with a small knife, such as is used for extracting the cataract. The instrument is to be oiled, and introduced, so as to make a wound of its own breadth, at the usual place of making the incision in the extraction of the cataract. By turning the blade a little on its axis, the aqueous humour flows out. (See *Edinb. Med. and Surg. Journ.* Jan. 1807.)

Mr. Ware seems to approve of Mr. Wardrop's operation in the *epidemic purulent, or Egyptian Ophthalmia*, when, notwithstanding, general evacuations, topical bleeding, mildly astringent lotions, and a strict antiphlogistic regimen, the symptoms still continue, and, especially, if the cornea begin to lose its transparency, and a white rim appear round its circumference. Mr. Ware does not object to using a small knife, of the kind, employed in extracting the cataract; but, thinks a lancet will safely answer the purpose, or, what is better, a sharp-pointed couching needle, having a blade somewhat wider than usual, and a groove in its middle. The instrument, he advises, to be introduced about one-tenth of an inch before the connexion of the cornea with the sclerotica, and pushed gently on, parallel to the plane of the iris, until the aqueous humour make its escape.

(Ware on the Purulent Ophthalmia, p. 41, 1808.)

CHRONIC OPHTHALMY.

Unfavourable peculiarities are met with in practice, which prevent the complete cure of the second stage of acute ophthalmia, or that connected with a weak vascular action in the part affected; whence the protracted disease becomes purely chronic, and threatens the slow destruction of the eye.

These peculiarities may be chiefly referred to three causes: 1. To an increased irritability continuing in the eye after the cessation of acute inflammation. 2. To some other existing affection of the eye, or neighbouring parts, of which the chronic ophthalmia is only an effect. 3. To constitutional disease.

1. That chronic ophthalmia may depend upon a morbid irritability of the eye is evinced, not only from its resisting topical astringents and corroborants, to which the disease from simple relaxation and weakness yields, but from its being exasperated by them, and even by cold water. The patient complains of a sense of weight in the upper eyelid, and restraint in opening it; the conjunctiva has a yellowish cast, and when exposed to the damp cold air, or a brilliant light, or when the patient studies by candle-light, its vessels become injected and turgid with blood. If, in combination with such symptoms, the habit of body be weak and irritable; subject to spasms; hypochondriasis, &c. then, it is manifest, that the chronic ophthalmia is connected with a general impairment of the nervous system.

2. Besides extraneous bodies, lodged between the palpebræ and eye-ball, the inversion of the ciliæ, and hairs, growing from the caruncula lachrymalis; ulcers of the cornea; prolapsus of the iris; herpetic ulcerations of the margins of the eyelids; a morbid secretion from the meibomian glands; a diseased enlargement of the cornea, or of the whole globe of the eye, &c. may occasion and maintain chronic ophthalmia.—It is only my part here to mention such remote causes; for, the particular treatment of them is described in other articles. (See *Cornea*, *Ulcers of*; *Iris*, *Prolapsus of*; *Lippitudo*; *Staphyloma*; *Hydrophthalmia*; *Trichiasis*, &c.)

3. The cure of the second stage of acute ophthalmia may be retarded by the prevalence of scrophula in the system; or by the small-pox affecting the eyes. Chronic ophthalmia is also sometimes a consequence of lues venerea.

When chronic ophthalmia depends upon

preternatural irritability, the internal exhibition of bark with valerian is proper; animal food of easy digestion; gelatinous and farinaceous broths; wine in moderation; gentle exercise; living in salubrious and mild situations; are all severally productive of benefit. Externally, the applications should be of the sedative and corroborant kind; such as aromatic spirituous vapours (from the *spiritus ammon. comp.*) applied to the eye through a funnel, for half an hour, three or four times a day; and the eyelids and eye-brows may also be rubbed with the linimentum camphoræ.

Patients, both during the treatment and after the cure, must refrain from straining the eye, and, immediately the least uneasiness is felt, must desist from exercising it. When they write, or read, it should constantly be in a steady, uniform light, and too little, as well as too much, aggravates the disease. Having once begun to use spectacles, they should never study, or survey minute objects, without them. (*Scarpa.*)

I shall conclude the subject with a few remarks upon the cure of ophthalmia, when connected with constitutional disease.

SCROPHULOUS OPHTHALMY.

No specific being known for scrophula, the treatment, in this instance, rather consists in preventing the aggravation, than in attempting the radical cure of the complaint. Every thing debilitating is hurtful, as all evacuation; indigestible food; intense study; a sedentary life; damp marshy habitations; uncleanness; frequent transitions from heat to cold. On the other hand, observing to regulate the action of the bowels with the mildest laxatives; and the administration of bark, either alone or conjoined with the tinct. guaiaci ammoniata, do good. Alterative medicines, and especially *Æthiops mineralis*, from gr. ss. to gr. xx. in the day, taken for a few weeks uninterruptedly; aqua calcis, in broth or gruel, at first, in the dose of ℥ij. at breakfast, and afterwards the same quantity, twice daily for a few months, uniformly adhering to a good regimen in diet; may tend much to abbreviate the duration of this obstinate species of the disease. (*Scarpa.*)

Mr. Ware has found, that the addition of xx. to xxx gr. of the sal polychrestus of the Edinburgh Dispensatory, to each dose of bark, suffices to keep the bowels in a regular state, when there is a tendency to costiveness. In some cases, in which there was little appearance of inflammation, this gentleman found the

eyelids so relaxed, and the eyes so irritable, that children would not open their eyes, even in the darkest room. In some such relaxed cases, very beneficial effects were produced by administering internally small doses of opium, night and morning, to abate the irritability. Sea-bathing is always serviceable in scrophulous ophthalmia, and, probably the mere residence on the sea-coast, and the respiration of the sea-air, may bring about some of those advantages, which have been exclusively attributed to bathing. Friction of the body with a flesh-brush, or flannel, should be employed morning and evening.

With regard to topical applications, those of a soft relaxing kind prove injurious, as also retirement into dark situations. Slightly astringent collyria; the ung. tutia, and the ung. hyd. nitrat. are proper when there are excoriations upon the eyelids, and when, from their occasional adhesion to each other, there is reason to suspect, that the sebaceous glands secrete an acrimonious fluid. Mr. Ware has also found that one drop of the thebaic tincture, dropped into the eye, once or twice in the course of the day, contributes greatly, both to abate the irritability and to increase the strength of the relaxed vessels. (*On Scrophulous Ophthalmia*, p. 26.) The same gentleman has occasionally mixed old verjuice with cold spring-water, at first, in the proportion of one part of the former to six of the latter, and increasing the quantity of verjuice, until, sometimes there has been an equal quantity of that and water. All coverings should be removed from the eyes, except a shade of green silk, and patients should be gradually habituated to a stronger light. Good air and exercise always tend to improve scrophulous constitutions, and thus, indirectly, the disease under consideration. Scrophula often disappears spontaneously, as children approach the adult state, and, if we only have it in our power to check its progress in the early stage of life, it seems to wear itself out afterwards, and whatever local effects, it may have produced, often disappear.

As the small-pox inoculation has at present almost generally been abandoned by the faculty in favour of the vaccine disease, there seems less occasion now for detailing circumstantially a very obstinate species of ophthalmia, induced by the former complaint. When the small-pox eruption is very abundant in the face, it causes a considerable swelling of this part of the body; the eyelids become tumefied, the eyes redden, and there ensues a discharge of a very thick adhesive matter, which agglutinates the palpebrae together; so

that, if no steps be taken, the eyes will continue closed for several days in succession. The matter, confined between the eyelids and globe of the eye, being perhaps of an irritating quality, and injurious from the pressure it occasions on the surrounding parts, seems capable of exciting ulceration of the cornea, and even of irremediably destroying vision. When the pustules of the small-pox in other parts of the body have suppurated, they cicatrize; but, those, which happen within the margin of the cartilage of the eyelids, are prevented from healing by the diseased secretion, which is then secreted from the meibomian glands, and such ulcers result, as will sometimes last for several years, and even during life, if unremedied by art. (*St. Yves sur les Mal. des Yeux*, p. 216, Edit. 12mo.) After the employment of the antiphlogistic treatment, should the disease, when treated with topical astringents and corroborants, yet baffle the efforts of the surgeon, setons in the nape of the neck, kept open for a long while, prove one of the most useful remedies. Scarpa has experienced much advantage from giving, every morning and evening, to a child, ten years old, a pill, containing one grain of calomel, one grain of the sulph. aur. antim. and four grains of cicuta in powder. It is obvious, that such a potent alterative, if ever serviceable in this case, will soon evince its efficacy, nor would it be justifiable to sport with the patient's constitution by continuing its use beyond a certain period, unless sanctioned by evident signs of its salutary effects on the disease of the eyes.

When great irritability prevails, a mixture, of three drams of the vinum antimoniale, and one dram of the tinctura thebaica, given in doses of five, or six drops, in any convenient vehicle, and, at the same time, applying externally the vapours of the spiritus ammon. comp. to the eye, constitute an excellent plan of treatment. In other cases, saturnine collyria, with a little camphorated spirit of wine, or white wine, in which a little sugar is dissolved; tinct. thebaica, Janin's ointment, &c. avail most. This treatment is also applicable to the chronic ophthalmia from measles.

When inveterate ulcers remain upon the edges of the palpebrae, the disease may then be regarded as the psorophthalmia, described by Mr. Ware, and will demand the same method of cure. (See *Psorophthalmia*.)

VENEREAL CHRONIC OPHTHALMY.

Mr. Hunter entertained doubts, whether any inflammations of the eyes are sy-

philitic, and he appears to build his opinion upon two circumstances; one is, that if such cases be venereal, the disease is very different from what it is when it attacks other parts, and is attended with more pain, than venereal inflammation arising from an affection of the constitution: the second is, that he never saw these cases attended with such ulceration, as occurs when the complaint invades the mouth, throat, and tongue. (*Hunter on the Venereal*, p. 324.) In regard to the first circumstances, I can accurately state, that in several cases, reputed to have been venereal ophthalmia, which I have seen in St. Bartholomew's Hospital, the pain was by no means severe, or the chief part of the malady. The disorder seemed rather to consist in an impairment of vision, with here and there little distinct plexuses of dilated blood-vessels. If the pain should be actually more severe, than that accompanying other local symptoms of lues venerea, will not the natural sensibility of the eye satisfactorily explain this semblance of a well-marked disease deviating from its determinate character? In support of this observation, may I not remark, that the progress of a venereal bubo in the groin causes greater pain, than the formation of a node on the ulna, or tibia. As to the second reason for supposing no inflammations of the eyes are truly venereal, it cannot be considered as conclusive. Syphilis does not seem invariably to produce ulceration, in every situation, where it invades the human frame, and, in the bones, indeed, it would rather seem, in general, to give rise to a process of a directly different tendency, namely, the formation of nodes; nor does it, according to Mr. Hunter's own sentiments, produce ulceration upon mucous membranes. Scarpa says, the venereal ophthalmia is peculiar in not discovering manifest signs of inflammation, stealing on clandestinely, without much uneasiness. It afterwards relaxes the vessels of the conjunctiva and lining of the palpebræ, and changes the secretion of Meibomius's glands. In time it causes ulceration of the margins of the eyelids; the ciliæ fall off, and the cornea grows opaque. In the worst stage, it excites itching in the eyes, which is exasperated at night, and abates in violence towards morning, as do almost all the effects of syphilis. It never attains the state of chemosis. (Scarpa.)

In the few cases, which have fallen under my own observation, the decoct. sarsap. and hydrarg. mur. have constantly improved the condition of the eye, and, when taken, for a sufficient time, have cured the disease. I do not mean to as-

sert, that these instances were unequivocally venereal ophthalmies, I can only say, that they were reputed to be such, and yielded to the above medicines. In some cases, mezereon, guaiacum, and mercurial frictions, might be tried; and, I believe, in all cases, the use of a collyrium, containing hydrarg. muriatus, as Scarpa recommends, would assist the operation of internal medicines, in the cure of the disease. When the eyelids are ulcerated, the ung. hydrarg. nitrati, weakened at first by the addition of twice, or thrice its quantity of hog's lard, is the best topical application.

Some interesting observations on the ophthalmia, supposed to be venereal, may be seen in Saunders' *Treatise on the Diseases of the Eye*; but, having noticed these remarks in another publication, I shall avoid repeating them in the present place.

INTERMITTENT OPHTHALMY.

There is a description of ophthalmia, the symptoms of which intermit, or at least remit, at stated periods. Mr. Ware has not found bark so useful in this, as in scrophulous ophthalmia; but, he has known the hydrarg. mur. produce the most beneficial effects, and, sometimes, he has conjoined with its internal exhibition the decoct. sars. com. (See *Ware on Intermittent Ophthalmia*.)

On the subject of Ophthalmia, the reader may consult with advantage, *Maitre-Jean, and St. Yves sur les Mal. des Yeux*. *Ware on Ophthalmia, Psorophthalmia, and Purulent Eyes of new-born Children: on Scrophulous and Intermittent Ophthalmia*; also, *Additional Remarks on Ophthalmia*; and *Remarks on the Purulent Ophthalmia lately epidemic in this country*. There is a masterly account of Ophthalmia in *Richter's Anfangsg. der Wundarzn. Band. 3. The Edinburgh Med. and Surg. Journal for January 1807*, contains Mr. Peach's and Mr. Wardrop's remarks. See, also, *An Account of Ophthalmia, as it appeared in England, since the return of the British Army from Egypt*, by John Vetch. M. D. 1807. But, in particular, the *Observations of Scarpa, in cap. 7. of his work Sulle Principali Malattie degli Occhi, Venez.* 1802, merit notice; they have been ably translated by Mr. Briggs. Consult likewise a *Treatise on Several Practical Points relative to the Diseases of the Eye*, by J. C. Saunders, Edited by Dr. Farre, 1811.

OPISTHOTONOS. (from *οπισθεν*, backward, and *τενω*, to extend.) A spasmodic disease, in which the trunk is drawn backwards, with the head towards the

shoulders : it is one of the varieties of tetanus.

ORCHOTOMIA. (from *ορχις*, a testicle, and *τεμνω*, to cut.) The operation of removing a testicle. See *Castration*.

ORIS CANCRUM. See *Cancrum Oris*.

OSCHEOCELE. (from *οσχον*, the scrotum, and *κηλη*, a tumour.) A hernia situated in the scrotum.

OSTEOSARCOMA, or OSTEOSARCOMA. (from *οστεον*, a bone, and *σαρξ*, flesh.)

This term signifies the change of a bone into a substance, of the consistence of flesh. Bones are sometimes converted into a soft, lardy, homogeneous substance, resembling a cancerous gland, and it is this affection, which has most claim to the appellation.

Authors seem to apply the term *osteosarcoma* too much at random, as may be seen by referring to *Boyer on the Diseases of the Bones*, Vol. 1, Chap. 22. The disease, called *mollities ossium* certainly renders the bones soft and flexible, and their heads become softened, in cases of white swellings.

There is not much propriety, and, certainly, no necessity for calling these diseases *osteosarcoma*. The bones are also occasionally converted into a complete gelatinous mass. Boyer relates a very remarkable example, in which the whole humerus was destroyed in this way, nearly down to the elbow. (See Vol. 1, Chap. 22.)

OTALGIA. (from *ος*, an ear, and *αλγος*, pain.) The ear-ach.

OTITIS. (from *ος*, the ear.) Inflammation of the ear.

OZÆNA. (from *οζει*, a stench.) An ulcer situated in the nose, discharging a fetid, purulent matter, and sometimes accompanied with caries of the bones. Some authors have signified, by the term,

an ill-conditioned ulcer in the antrum. The first meaning is the original one. The disease is described, as coming on with a trifling tumefaction and redness about the ala nasi, accompanied with a discharge of mucus, with which the nostril becomes obstructed. The matter gradually assumes the appearance of pus, is most copious in the morning, and is sometimes attended with sneezing, and a little bleeding. The ulceration occasionally extends round the ala nasi to the cheek, but, seldom far from the nose, the ala of which, also, it rarely destroys. The *ozæna* is often connected with scrophulous and venereal complaints. In the latter cases, portions of the *ossa spongiosa* often come away. After the complete cure of all venereal complaints, an exfoliating dead piece of bone will often keep up symptoms, similar to those of the *ozæna*, until it is detached. Mr. Pearson remarks, that the *ozæna* frequently occurs as a symptom of the *chachexia syphiloidea*. It may perforate the septum nasi, destroy the *ossa spongiosa*, and even the *ossa nasi*. Such mischief is now more frequently the effect of the *chachexia syphiloidea*, than of *lues venerea*. The *ozæna* must not be confounded with abscesses in the upper jaw bone. (See *Antrum*.)

The constitutional disease, on which the *ozæna* generally depends, and which acts as the remote cause, must be relieved, before a cure of the local effect can be expected. The internal medicines, which may be necessary, are preparations of mercury, and antimony; sarsaparilla, elm bark, Peruvian bark, muriated barytes, and muriate of lime. Sea-bathing may also do good, by improving the health. The best external applications are said to be, preparations of copper, zinc, arsenic, mercury, the *pulvis sternutatorius*, and diluted sulphuric acid. (*Pearson's Principles of Surgery*, Chap. 12.)

P.

PANA'RIS. (from *παρὰ*, near, and *ονυξ*, the nail.) See *Whitlow*.

PANNUS. (from *πενω*, to labour.) When two, or three pterygia, of different sizes, occurred on the same eye, with their points directed towards the centre of the cornea, where they met, and covered all the surface of this transparent membrane with a dense pellicle, the ancients named

the disease, *pannus*. (*Scarpa*, Chap. 14.)

PA'PULA. (dim. of *pappa*, a nipple.) A pimple, or ulcerous tubercle.

PARACENTE'SIS. (from *παράκεντεω*, to perforate.) Surgeons, at present, restrict the meaning of this word to two operations, viz. tapping the abdomen, and making an opening into the chest. The first is called *paracentesis abdominis*, and is

often necessary in cases of dropsy. The second is named *paracentesis thoracis*, and is sometimes proper in cases of emphysema, empyema, hydrops pectoris, and extravasations of blood in the chest.

TAPPING, OR PARACENTESIS ABDOMINIS.

When the swelling extends equally over the whole abdomen, the fluid is usually diffused among all the viscera, and is only circumscribed by the boundaries of the peritonæum. The water is occasionally included in different cysts, which are generally formed in one of the ovaries; and, in this case, the tumour, which is produced, is not so uniform, the fluctuation is not so distinct, as in the former instance; at least, this is the case while the disease has not made very great progress. The difference, also, in the consistence of the fluid, may render the fluctuation more, or less difficult of detection. When the water is contained in different cysts, it is frequently thick and gelatinous; but, when it is uniformly diffused all over the cavity of the peritonæum, it is generally thinner, and even quite limpid. Sometimes a considerable number of hydatids are found floating in the fluid, discharged in cases of ascites.

Whatever may be the efficacy of digitalis, mercury, diuretics, and other evacuants, in ascites, they are rarely of any service in cases of local and encysted dropsies. When such swellings continue to enlarge, notwithstanding the adoption of a few measures, which will presently be suggested, the sooner the fluid is evacuated, the better. It is also well known, that all efforts to produce a radical cure even of dropsies, which are not encysted, too frequently fail. I am decidedly of opinion, however, with Dr. Fothergill, that physicians would meet with much more success, in the treatment of ascites, if they would recommend paracentesis to be done sooner, than they generally do. This operation is, for the most part, much too long delayed; and during a long space, the bowels are continually suffering, more and more, from the effect of the large quantity of fluid, which oppresses them. What ought to render the practice of early tapping more entitled to approbation, is, that the operation, when done in the situation, we shall presently advise, is perfectly free from danger, attended with very little pain, and need not interrupt the further trial of such medicines, as the physician may place confidence in. Paracentesis only becomes a serious measure, when the disease has existed for a great length of time, and the patient has been much weakened by it. Indeed, there

seems much reason to suspect, that the operation should be done, as soon as the tension of the abdomen, and the fluctuation, leave no doubt, concerning the nature of the malady; especially, when the first trials, which have been made of internal remedies, seem to promise no success. Dr. Fothergill has demonstrated by facts, the advantages of this method. On the commencement of an ascites, this celebrated practitioner advised the trial of diuretics and other evacuants. He then adds, that, "if by a reasonable perseverance in this course, no considerable benefit accrues; if the viscera do not evidently appear to be obstructed, and unfit for the purposes of life; if the complaints have not been brought on by a long habitual train of intemperance, and from which there seems little hope of reclaiming the patient; if the strength and time of life are not altogether against us; I desist from medicine, except of the cordial kind; and let the disease proceed, till the operation becomes safely practicable. When this is done, by the moderate use of the warmer diuretics, chalybeates and bitters, also the preparations of squills, in doses below that point, at which the stomach would be affected, I endeavour to prevent the abdomen from filling again." (*Med. Obs. and Inq. Vol. 4, p. 112.*) The same author remarks, with regard to encysted dropsies, that tapping sometimes effects a radical cure.

Whenever a considerable quantity of fluid is suddenly let out of the abdomen by tapping, the quick removal of the pressure of the water off the large blood-vessels, and viscera, may produce swooning, convulsions, and even sudden death. These consequences led the ancients to consider paracentesis, as a very dangerous operation, and, when they ventured to perform it, they only let out the water gradually, and at intervals.

Dr. Mead, after considering what might occasion the bad symptoms resulting from too sudden an evacuation of a large quantity of fluid from the abdomen, was led to try what effect external pressure would have in preventing such consequences. This practitioner thought, that, in this way, he might keep up the same degree of pressure, which the fluid made on the viscera. The success, attending some trials of this plan, fully justified the opinion Dr. Mead had conceived; for, when the compression is carefully made, the whole of the water, contained in the abdomen of a dropsical patient, may be safely discharged, as quickly as the surgeon chooses. For this purpose, however, the whole abdomen must be equally compressed, the pressure increased in

proportion as the evacuation takes place, and kept up, in the same degree, for several days afterwards. In St. Bartholomew's Hospital, while the water is flowing out, the necessary degree of pressure is usually made with a sheet, which is put round the abdomen. Two assistants, who hold the ends of the sheet, gradually tighten it, in proportion, as the fluid is discharged. Immediately, after the operation, some folded flannel, sprinkled with spirit of wine, is laid over the whole anterior part of the belly, and covered with a broad linen roller, applied with due tightness round the body. Dr. Monro invented a particular kind of belt, for the purpose; but, though it may be well adapted to the object in view, it is, perhaps, unnecessary, as the above method seems to answer every end.

The instrument used for tapping the abdomen, is called a trocar. (See *Trocar*.)

The most convenient position for the operation, is certainly when the patient is sitting in an arm-chair. However, weakness and other circumstances, frequently make it necessary to operate on the patient, as he lies in bed.

Until of late, the place, in which surgeons used to puncture the abdomen, in cases of ascites, was the centre of a line, drawn from the navel to the anterior superior spinous process of the ilium, and, on the left side, which was preferred, in consequence of the liver not being there. The place, for the puncture, was usually marked with ink, and was supposed to be always situated just over a part of the linea semilunaris, where there is no fleshy substance, nor any large blood-vessel, exposed to injury. This calculation, however, was made, without considering, that in dropsy, the parietes of the abdomen do not yield equally in every situation. On the contrary, it is known, that the front part is always more distended, than the lateral ones, and, that the recti muscles, in particular, are sometimes very much widened. In consequence of these alterations, induced by the disease, no dependence can be put on any measurement, made with a view of ascertaining the precise situation of the linea semilunaris. The surgeon, who trusts to his being able to introduce the trocar exactly in this place, from any calculation of the above kind, will frequently wound a great thickness of muscle, instead of a part, where the abdominal parietes are thinnest. But, a still stronger objection is to be urged against the practice of attempting to tap in the linea semilunaris. Men, well acquainted with anatomy, have frequently been deceived in their reckoning,

and, instead of hitting the intended line with their trocars, they have introduced these instruments through the rectus muscle, and wounded the epigastric artery. Patients have died from this error, with large extravasations of blood in the cavity of the peritonæum. In a dropsical person, who has been tapped, it is to be observed also, that, an effusion of blood in the abdomen will of course more readily take place, in consequence of the parts not being in the same close, compact state, in which they are in the healthy condition.

Let every prudent practitioner, therefore, henceforth abandon the plan of tapping in the linea semilunaris, and, he may the more easily make up his mind to do so, as there is another place, where the operation may be done with the utmost facility and safety. The linea alba is now commonly preferred by the best surgeons; because, here no muscular fibres need be wounded, the place can be hit with certainty, and no large blood-vessel can be injured. About the middle point, between the navel and pubes, is as good a situation for making the puncture, as can possibly be chosen. The surgeon should introduce the trocar in a steady, firm manner, never in an incautious, sudden way, lest parts contained in the peritonæum should be rashly wounded. For the same reason, immediately the point of the trocar has entered the abdomen, a thing always known at once, by the sudden cessation of resistance to its passing inward, it should be introduced no further, and its office of making a passage for the cannula is already accomplished. The surgeon, consequently, is now to take hold of the cannula with the thumb and index finger of his left hand, and gently insinuate it further into the cavity of the peritonæum, while, with his right hand, he is to withdraw the stilette. The fluid now gushes out, and regularly as it escapes, the sheet, which is round the patient's body, is to be tightened. All the water having been evacuated, a piece of flannel and a roller are to be immediately applied, as above explained, after putting a piece of lint and soap-plaster on the wound.

It is not uncommon for the water suddenly to stop, long before the full quantity is discharged. Sometimes, this happens from a piece of intestine, or omentum, obstructing the cannula. This kind of stoppage may be removed by just introducing a probe or director, and holding the portion of viscus back. When the water is very viscid, the only thing we can do is to introduce a larger trocar, if doing so should promise to facilitate the

evacuation. Also, when hydatids obstruct the cannula, a larger instrument might allow them to escape. In encysted dropsies, the practitioner, of course, can only let the fluid out of such cavities, as he can safely puncture.

When a dropsy of the ovary is very large, it also admits of being tapped in the linea alba; but, in this particular case, it is generally best to make the puncture where the swelling is most prominent. In this disease, the ovary is, either converted into one large cavity, filled with fluid, or else it contains several distinct cells. The contents are sometimes exceedingly viscid. In early stages of the case, the tumour is situated towards one side of the abdomen, and seems to ascend out of the pelvis. This kind of progress at once distinguishes the disease from a common ascites, which is attended, from the first, with an equal, gradual, universal swelling of the abdomen. The cyst of the ovary, when it has attained a large size, generally adheres, in different places, to the inner surface of the peritonæum, and, in this state, the whole abdomen often seems uniformly swollen, in consequence of the immense magnitude of the disease. The impairment of the health, arising from the pressure of the viscera, and interruption of their functions, and the great difficulty of breathing, produced by the pressure on the diaphragm, make it necessary to let out the fluid, and paracentesis must be done, in the way already related. The disease is often attended with an almost total stoppage of the secretion of urine. Sometimes, the urine is duly secreted, but a retention occurs, so that the use of the catheter becomes indispensable. Tapping, however, can only be regarded as a palliative measure; the water collects again, the same grievances recur, and the operation must be repeated. While an ovarian dropsy is recent, and even after it has been tapped, some attempts may be made to effect a radical cure. Blistering the surface of the abdomen, keeping up a discharge with the savine cerate, and applying a tight roller, have been known to do good. In France, the celebrated Le Dran laid open the cysts of ovarian dropsies. His patients did not die of the consequent inflammation, and the dropsy, indeed, was cured; but, there remained either a sarcomatous enlargement of the ovary, which continued to increase till death, or else incurable fistulæ, leading into the cyst, were the consequences. The large size of a wound, necessary for this purpose, the danger of inducing inflammation in so extensive a surface, as the cyst of a large ovarian dropsy, and the events of Le

Dran's cases, are circumstances, on the whole, quite enough to keep the practice from ever being revived.

A still more absurd plan has been attempted, viz. to cure the disease, by injections, just as hydroceles. I have seen two cases, in which red wine and water have been injected: one patient died very soon afterwards of the inflammation, and the other perished more lingeringly from the same cause. Setons have been tried, without success.

Sometimes, though very seldom, the operation of paracentesis is necessary for giving vent to collections of air in the abdomen. Air, when confined in this manner, is generally contained in the bowels, which it inflates to an enormous size. Instances, however, are related of quantities of air being confined between the peritonæum and intestines; but, in some of these cases, it is said, that the air was known to have escaped through a small hole in some part of the intestinal canal, and, it is probable, that all the other examples were of the same kind. This disease is named *tympanites*, and may render making an opening into the abdomen necessary. Notwithstanding authors generally recommend a small trocar for the purpose, there can be no doubt, that dividing the skin, and making a cautious puncture with a lancet through the linea alba, and peritonæum, would be a preferable mode of proceeding. The abdomen must also be compressed with a sheet, while the air is escaping, and, afterwards, with a roller, just as if the case were an ascites. Even when the air is contained in the bowels, if it should be enormous in quantity, occasion urgent symptoms, and cannot be got rid of in other ways, authors recommend paracentesis.

PARACENTESIS OF THE THORAX.

The necessity for this operation is indicated, when the heart, or lungs, are oppressed by any kind of fluid confined in the cavity of the chest. Every body knows, that the free and uninterrupted performance of the functions of these organs is essential to the support of life. When the action of these viscera is disturbed by the lodgment of a collection of any kind of fluid in the thorax, no internal medicines can be much depended upon for procuring relief. The only means, from which benefit can be rationally expected, is letting out the fluid, by making an opening in the parietes of the chest.

The nature of the effused fluid can make no difference, in regard to the propriety of discharging it in this manner; and, though some authors have only treat-

ed of this operation, as applicable to cases of hydrops pectoris, and empyema, it may also be of the greatest service when air is confined in the chest, (see *Empysema*), or blood extravasated there (see *Thorax, Wounds of*), so as to make dangerous pressure on the lungs and diaphragm.

In this place, I shall content myself with describing the best method of performing paracentesis thoracis, referring the reader to the articles just mentioned for information, concerning the particular symptoms and circumstances, which may render the operation proper, and the rest of the surgical treatment peculiar to each affection.

The safest, and most convenient situation, for making an opening into the chest, is between the sixth and seventh true ribs, on either side, as circumstances may render necessary. The surgeon should only recollect, that the two cavities of the pleura are completely distinct from each other, and have no communication whatsoever, so that, if fluid were contained on the left side of the thorax, making an opening into the right cavity would not serve for discharging the accumulated matter. The practitioner should also remember, that, when there is a fluid on both sides of the chest, paracentesis must never be done for the relief of the two collections at the same time; because, there is great reason to believe, that, as the lungs on one side usually collapse, when there is a free communication between the air and inside of the thorax, they would do so on both sides, were an opening made at the same time into each bag of the pleura. It is hardly necessary to remark, that, in this condition, the patient could not breathe, and would die suffocated. The operation consists, in making an incision, about two inches long, through the integuments, which cover the space between the sixth and seventh true ribs, just where the indigitations of the serratus major anticus muscle meet those of the externus obliquus. Here it is unnecessary to divide any muscular fibres, except those of the intercostal muscles, and, by putting the patient in a proper posture, the opening that is to be made, will be depending enough for any purpose whatsoever. The surgeon, avoiding the lower edge of the upper rib, where the intercostal artery lies, is then cautiously to divide the layers of the intercostal muscles, till he brings the pleura into view; when the membrane is to be very carefully divided with a lancet. The instrument should never be introduced in the least deeply, lest the lungs should be injured. The size of the opening in the

pleura should never be larger than necessary. The discharge of blood and matter will of course require a freer aperture than that of air, or water. If requisite, a cannula may be introduced into the wound, for the purpose of facilitating the evacuation of the fluid, and it may even in some cases, be proper to let this instrument remain in the part, in order to let the water, or pus escape, as often as another accumulation takes place. It is obvious, however, that a cannula, for this object, should only be just long enough to enter the cavity of the pleura, and should have a broad rim to keep it from slipping into the chest. A piece of sticking plaster would easily fix the cannula, which might be stopped up with a cork, or any other convenient thing, or left open, according as the circumstances of the case, and the judgment of the surgeon, should direct.

The paracentesis of the abdomen, and that of the thorax, are described in all treatises on the operations, and systems of surgery. The works of Sharp, Le Dran, Bertrandi, and Sabatier, are particularly deserving of attention.

PARA'LYSIS. (from *παραλυω*, to weaken.) A palsy. It is a symptom of several surgical disorders; as, for instance, of pressure on the brain, from blood, matter, or a depressed portion of bone; of injuries of the vertebræ and spinal marrow: of disease of these latter bones, &c. (See *Head, Injuries of; Dislocations; Fractures; and Vertebræ, Disease of.*)

PARAPHYMOSIS, or **PARAPHIMOSIS.** (from *παρα*, back, and *φίμω*, to bridle.) This signifies the case in which the prepuce is drawn quite behind the glans penis and cannot be brought forward again. See *Phymosis*, with which it will be considered.

PARONY'CHIA. (from *παρα*, near, and *ονυξ*, the nail.) An abscess at the end of the finger, near the nail. See *Whitlow*.

PAROTID DUCT. Every one acquainted with anatomy, is aware, that, behind the jaw, on each side, there is situated a large conglomerate gland, being the principal one of such as are destined to secrete the saliva, with which the cavity of the mouth, and the food, which we swallow, are continually moistened. The parotid duct crosses the cheek, being situated about one-third from the zygoma, and two-thirds from the basis of the jaw. After passing over the masseter muscle, it pierces the buccinator, and terminates in the mouth by a considerable orifice, opposite the space, between the second and third bicuspid, grinders of the upper jaw. As soon as it has passed the mas-

seter, it dives deeply into the fat of the cheek, and, as M. Louis observes, makes an angle before it opens into the mouth. (*Mem. de l'Acad. de Chir. tom. 3. p. 457.*)

From the situation of the parotid duct, it is liable to be wounded, and this has even been done, by the surgeon's lancet, through ignorance. (See *Monro's Works, p. 520.*) In cases of this kind, the continual escape of the saliva is apt to keep the wound from healing, and, what is called a *salivary fistula* would be the perpetual consequence, if no steps were taken to afford relief. The parotid duct has sometimes been ruptured by blows.—(*Œuvres Chir. de Desault, tom. 2, p. 221.*) Cases also occur, in which the face becomes considerably swollen, in consequence, of the saliva insinuating itself into the cellular substance, just as the air does in emphysema. On the last circumstance, I shall only just mention, that mischief of this kind must always be prevented from becoming very extensive, by making a depending opening for the ready escape of the fluid.

With regard to the treatment of salivary fistulæ, if the division of the parotid duct is recent, the sides of the wound should be brought into contact, and a steady pressure maintained on that part of the cheek, by means of suitable compresses, and a roller. In this manner, a salivary fistula may often be prevented altogether: either the divided ends of the duct reunite, and the spittle resumes its original course into the mouth; or, what is more probable, the wound in the face heals at every part, with the exception of a small fistulous track, which serves as a continuation of the duct into the inside of the mouth. The latter kind of cure, however, can only take place when the wound extends quite through the cheek; but, the chance of the two portions of the duct uniting, and becoming continuous again, should always be taken in recent cases.

When a salivary fistula is actually formed, a seton, introduced from the external fistulous orifice into the mouth, is a method which seems to have, with justice, the greatest share of approbation. The celebrated Monro adopted this plan with success: he kept in the seton till the channel, which it had formed, had become fistulous, after which it was withdrawn, the external orifice being touched with the *argentum nitratum*, healed up, and the saliva in future flowed through the artificial fistulous channel into the mouth.

Desault used to practise the seton as follows:—He introduced two fingers of his left hand into the patient's mouth,

and placing them between the teeth and the cheek, opposite the fistula, thus kept the integuments tense, and the gums from being injured. He then introduced a small hydrocele trocar, with its cannula, just before the opening of the posterior part of the duct, and pushed through the cheek, in a direction a little inclined forward. An assistant now took hold of the cannula, while Desault withdrew the perforator, and passed through the tube a bit of thread, into the cavity of the mouth. The cannula was next taken out, and a seton, which was then fastened to the end of the thread in the mouth, was drawn from within outward; but not so far as to come between the edges of the external opening, where the thread alone lodged, and this was fastened with sticking-plaster to the outside of the cheek. The outer wound was dressed with lint and compresses. Desault used to change the seton daily, introducing regularly rather a larger one, and taking especial care not to bring it between the edges of the wound, which was afterwards covered with sticking-plaster. He enjoined the patient not to move the jaw much, and only allowed him, for some time, liquid food. In about six weeks he used to leave off the seton, leaving in the thread, however, for a little while longer. This being taken away, he used to finish the cure, by touching the little aperture remaining, with caustic.

The making of an artificial passage is one of the most ancient plans of curing salivary fistulæ. Every author has had his particular method of doing it, and numerous variations are to be met with, either in the instrument employed for piercing the cheek, or in the substance intended for maintaining the opening. For the first step of the operation, surgeons sometimes used the actual cautery, as Saviard furnishes us an instance of; sometimes an awl, as Monro did; sometimes a common knife, or lancet; sometimes a straight needle, which drew in the thread after it; but, Desault's trocar generally merits the preference, because the cannula, by remaining in the wound, after the perforator is withdrawn, allows the thread to be introduced, which in every other way, is either difficult to accomplish, or requires the use of several instruments.

For the second step of the operation, viz. keeping the opening distended, cannulæ were employed by Duphénix, who used to make a suture over them; a plan objectionable, inasmuch as it was attended with the inconvenience of a solid body left in the parts, and also that of the instrument being apt to slip into the mouth.

The seton, therefore, ought to be preferred, and there can be no doubt that Desault's method is better, than the one followed by Monro. See on this subject, *Monro's Works; Œuvres Chir. de Desault, par Bichat, tom. 2, p. 221. Also, Mém. de l'Acad. de Chir. tom. 3.*

PARULIS. (from *παρα*, near, and *αλον*, the gum.) An inflammation, boil, or abscess in the gums.

PEDILUVIUM. (from *pes*, the foot, and *lavo*, to wash.) A bath for the feet.

PENIS, AMPUTATION OF. No part of the penis should ever be amputated, on account of a mortification; because the dead portion will be naturally thrown off, and the ulcer heal, without the least occasion for putting the patient to any pain from the employment of the knife. Some cancerous, and fungus diseases, are the cases, in which it is often really proper and necessary to amputate more or less of this part of the body.

The old surgeons, fearful of hemorrhage, used sometimes to extirpate a part of the penis, by tying ligatures round it with sufficient tightness to make it mortify and slough off. Thus, Ruysch removed the penis in one instance (See *Observ. 30.*) The plan, however, is exceedingly painful, and quite unnecessary, notwithstanding what Heister states in its favour.

The amputation may be done in the following manner:—A circular incision is to be made through the skin, about a finger-breadth from the cancerous part. The integuments are then to be drawn back, so as to expose the corpora cavernosa, which are to be divided with one stroke of the knife, on a level with the cut edge of the skin, in such a manner, that the extremity both of the skin and corpora cavernosa, is to form one wound, or surface. The bleeding arteries, are now to be immediately tied: the chief are, one on the dorsum of the penis, and one in each corpus cavernosum. When a general oozing from the wound still continues, some recommend (*White, Hey, &c.*) applying sponge to its surface; others (*Latta*) finely scraped agaric, with a small proportion of pounded white sugar, or gum arabic. Perhaps, however, finely scraped lint, supported with compresses, would be quite as effectual as any styptics, and, certainly, the latter applications should be avoided, if possible, because stimulating, and productive of pain and inflammation. A surer and preferable method of stopping the oozing of blood, and at the same time of healing the wound, might be to bring the skin forward, over the end of the stump, with two strips of sticking-plaster, after intro-

ducing a flexible gum catheter into the continuation of the urethra, so as to keep its orifice unobstructed, and the urine from coming into contact with the wound, whenever the evacuation is made. There can be little doubt, that the gum catheter would be better than a silver one, or any metallic cannula, commonly advised for the above purposes, because it lies in the passage with less irritation. In one case, in which Mr. Hey operated, he made a longitudinal division of the integuments, at the inferior part of the penis, so as to make them cover its extremity, without puckering, or laying over the orifice of the urethra. The corpora cavernosa, however, do not readily granulate and unite to the skin by the first intention. (*Hey, p. 452.*) After the first dressings are removed, the part should be dressed with the unguentum spermatis-ceti, or any mild unirritating salve.

In consequence of the introduction of a cannula being neglected, Le Dran mentions his having seen the orifice of the urethra become closed a few hours after the operation, so that the patient could not make water. The orifice of the passage could not be discovered without great difficulty. A lancet being introduced at the point, against which the urine seemed to be forced, a quantity of it gushed out, and, as a cannula was not at hand, a sound was introduced, till one could be procured. (*Traité des Oper. de Chirurgie.*)

Pearson, in his *Practical Observations on Cancerous Complaints*, has treated of this operation: he particularly advises the skin not to be drawn back, because, when saved in this manner, it impedes the free exit of the urine. He likewise disapproves of introducing cannulae, as creative of pain, and spasms of the urethra, and being moreover unnecessary, since the stream of urine will always preserve the urethra in a permeable state. (*P. 103.*)

Sharp, Le Dran, Betrandi, and Sabatier's books on the operations, may be consulted. Also, l'Encyclopédie Méthodique; Partie Chir. Art. Verge. Hey's Practical Observations in Surgery, p. 445. Pearson on Cancerous Complaints, p. 103, &c. Warner's Cases in Surgery, p. 278, Edit. 4.

PENIS, CANCER OF. A wart, or a tubercle, on the prepuce, the frænum, or the glans penis, is generally the first symptom, and it often remains in a quiet state for many years. When irritated, however, it becomes painful, and enlarges, sometimes enormously, in a very short time. At the same time, ulceration, and a discharge of sanious fetid matter, take place. The disease sometimes also oc-

easions in the urethra fistulous openings, out of which the urine escapes, and the lymphatic glands in the groin may become affected as the disease advances. Mr. Pearson says, that "cancerous excrescences have a broad base, often more extensive, than their superficies; they seem to germinate deeply from within, or rather to be a continuation of the substance of the part; and, in their progressive state, the contiguous surface has a morbid appearance." What Mr. P. considers as a venereal wart, has a basis smaller than its surface; its roots have rather a superficial attachment, and the contiguous parts have a natural appearance, p. 97. Such are this gentleman's marks of discrimination. We might question, however, whether Mr. Pearson, notwithstanding his great opportunities, ever saw a real venereal wart. For many years past I have never seen any excrescences of this kind, in St. Bartholomew's hospital, which truly required mercury for their cure, or which, when cured without it, were followed by any inconvenience. If my memory does not fail me, Mr. Abernethy also disbelieves in the doctrine of venereal warts.

Foul, spreading, sloughy ulcers of the penis, should be discriminated from cancer. It is worthy of attention, that almost all the cases of cancer of the penis recorded by Mr. Hey, were attended with a congenital phymosis. (See *Pearson on Cancerous Complaints, and Hey's Practical Observations in Surgery.*)

PERINÆUM, FISTULÆ OF. See *Fistula in Perinæo.*

PERITONITIS. An inflammation of the peritonæum. Surgeons have chiefly to combat this dangerous affection, in cases of hernia, lithotomy, wounds of the abdomen, fractures of the pelvis, &c. but as the necessary treatment is detailed in the particular articles of this dictionary, we need not here enlarge upon the subject.

PE'RNIO. (from *πτερνα*, or *πτερινα*, the heel.) A chilblain, especially one on the heel. See *Chilblain*.

PESSARY. (from *πесσω*, to soften.) The intention of pessaries, among the old practitioners, was to hold such medicinal substances, as they wished to apply within the pudenda. *Est autum pessulus* (says Paulus) *lana pectita, et quodcumque aliud teres digiti humani speciem præferens in quo medicamenta sustinentur.* The ancients not only used wool for making pessaries, they employed also silk, lint, and linen, rolled up, and tied round with a thread, by means of which these substances were withdrawn. Instead of these materials, gums, resins, and wax, were afterwards

employed, and, being softened, were moulded into the most convenient shape.

Pessaries are now never made use of except for preventing a prolapsus of the uterus, or vagina, or for keeping up a very uncommon kind of rupture, explained in the article *Hernia*. The moderns also make their pessaries of much firmer materials, than those employed by their predecessors. Metals, wood, box-wood, sponge, elastic gum, and cork, covered with a layer of wax, have been used by different practitioners.

Linen pessaries, covered with wax, are, perhaps, as unobjectionable as any. Being softer, than metallic ones, they are not so likely to injure the parts, on which they press. They are not liable to rust, nor can they, like ivory ones, lose their proper shape. When properly covered with wax, they do not absorb, like those made of sponge, nor can they occasion any inconvenience by remaining long applied. For a particular detail of the manner of making them, see *Journal de Médecine, Tom. 34.*

Dr. Denman's pessaries are globular, formed of sound, well-seasoned, box-wood, perfectly spherical without, and excavated within, by which they acquire great lightness. They have four small holes, which, admitting the air, diminish the chance of their cracking. Dr. Clarke's pessary is an oval flat one, made of box-wood, about a quarter of an inch thick, at its external surface, but thinner towards its centre, where there is a small hole. (See *Savigny's Engravings of Instruments.*)

PETE'CHIA. (from *petechio*, a flea-bite. Ital.) A spot on the skin, which does not raise the surface, and which resembles a flea-bite.

PHAGEDÆ'NA. (from *φαγω*, to eat.) An ulcer, which spreads, and as it were eats away the flesh. Hence, the epithet, *phagedenic*, so common among surgeons.

PHALANGO'SIS. (from *φαλαγγξ*, a row of soldiers.) A disease, in which there are two rows of hairs on the eyelids, or in which the eye-lashes turn inward. See *Trichiasis*.

PHARYNGOTOMY. (from *φαρυγγξ*, the pharynx, and *τεμνω*, to cut.) See *Æso-phagotomy*.

PHARINGO'TOMUS. (from *φαρυγγξ*, the throat, and *τομη*, an incision.) An instrument for scarifying the tonsils, when inflamed, or for opening abscesses about the fauces. It was invented by M. Petit, and is nothing more, than a sort of lancet, which is inclosed in a sheath. By means of a spring the point is capable of darting out to a determinate extent, so as

to make the necessary wound, without risk of injuring other parts.

PHLEBOTOMY. (from $\phi\lambda\epsilon\psi$, a vein, and $\tau\epsilon\mu\omega$, to cut.) The operation of opening a vein, for the purpose of taking away blood. (See *Bleeding*.)

PHLEGMON, PHLEGMONE. (from $\phi\lambda\epsilon\gamma\omega$, to burn.) Healthy inflammation. (See *Inflammation*.)

PHLOGOSIS. (from $\phi\lambda\omicron\gamma\omicron\omega$, to inflame.) An inflammation. A flushing.

PHLYCTÆNA. (from $\phi\lambda\upsilon\zeta\omega$, to be hot.) A small vesicle, containing a limpid fluid.

PHRENITIS. (from $\phi\rho\epsilon\upsilon\epsilon\varsigma$, the diaphragm, supposed by the ancients to be the seat of the mind.) An inflammation of the brain. Phrenzy.

Inflammation of the brain is a frequent consequence of injuries of the head. There is an increased and disordered state of the sensibility of the whole nervous system; the retina cannot bear the usual stimulus of light; the pupils are contracted; the pulse is frequent and small; the eyes are red and turgid, perhaps in consequence of the ophthalmic artery arising from the internal carotid; the countenance is flushed, and the patient is restless, mutters incoherently, and grows wild and delirious.

Phrenitis is treated on the antiphlogistic plan. Copious bleedings, and other evacuations, are highly proper. The blood should be taken from the temporal arteries. The skin ought to be kept moist with antimonials, and a counter-irritation should be excited on the scalp by blisters.

PHYMA. (from $\phi\upsilon\omega$, to grow.) A tumour.) According to Pott, this term was formerly applied to an inflammation near the anus. (See *Anus, Abscesses of*.)

PHYMO'SIS, or rather PHIMO'SIS. (from $\phi\mu\omicron\omega$, to bind up.) A disease of the penis, in which the prepuce cannot be drawn back, so as to uncover the glans. Both the phymosis, and paraphymosis, according to Mr. Hunter, arise from a thickening of the cellular membrane of the prepuce, in consequence of an irritation, capable of producing considerable and diffused inflammation. A chancre is the most frequent cause; but a mere inflammation and discharge from the glans and prepuce, and also a gonorrhœa, may bring on tense affections. The inflammation often runs high, and is frequently of the erysipelatous kind. The cellular membrane being loose, the tumefaction becomes considerable, and the end of the prepuce being a depending part, the serum often lodges in it, and

makes it œdematous. A natural contraction of the aperture of the prepuce is very common, and persons so affected, have a natural and constant phymosis. Such a state of parts (says Mr. Hunter) is often attended with chancres, and it produces very great inconveniences during the treatment. When there is considerable diffused inflammation, a diseased phymosis, similar to the natural one, unavoidably follows; and whether diseased or natural, it may produce the paraphymosis, simply by the prepuce being brought back up on the penis. This tight part, then acting as a ligature round the body of the penis, behind the glans, retards the circulation beyond the constriction, so as to produce an œdematous inflammation on the inverted part of the prepuce.

The natural phymosis is so considerable, in some children, that the urine cannot pass with ease; but, the aperture of the prepuce generally becomes larger and larger as they grow older, and the bad consequences, which the phymosis might have occasioned in disease, are thus avoided.

In some persons, especially old men, the prepuce sometimes contracts without any visible cause whatever, and becomes so narrow as to hinder the water from getting out, even after it has got free of the urethra, and, consequently, the whole cavity of the prepuce becomes filled with urine, attended with great pain.

In the phymosis, when the prepuce swells and thickens, more and more of the skin of the penis is drawn forwards over the glans, and the latter part becomes at the same time pushed backward by the swelling against its end. Mr. Hunter says, he has seen the prepuce projecting, from such a cause, more than three inches beyond the glans, and its aperture much diminished.

Mr. Hunter also notices, that the prepuce often becomes, in some degree, inverted, by the inner skin yielding more, than the outer, and the part seems to have a kind of neck, where the outer skin naturally terminates. From the tightness and distention of the parts, the prepuce now cannot be drawn more back, so as to expose any sores, which may be situated under it. This state is frequently productive of bad consequences, especially, when there are chancres behind the glans; for, the glans being between the orifice of the prepuce and the sores, the matter sometimes cannot get a passage forward, between the glans and prepuce, and, consequently, it accumulates behind the corona glandis, so as to form a kind of abscess, which produces ulceration on the

inside of the prepuce. This abscess bursts externally, and, the glans often protruding through the opening, the whole prepuce becomes thrown towards the opposite side, and the penis seems to have two terminations. On the other hand (says Mr. Hunter) if the prepuce is loose and wide, and is either accustomed to be kept back in its sound state, or is pulled back to admit of the chancres being dressed, and is allowed to remain in this situation, till the above tumefaction takes place, the case is then named a *paraphymosis*. Also, when the prepuce is pulled forcibly back, after it is swelled, it is then brought from the state of a *phymosis* to that of a *paraphymosis*. The latter case is often attended with worse symptoms, than the former, especially, when it has first been a *phymosis*. The reason of this is, (continues Mr. Hunter) that the aperture of the prepuce is naturally less elastic, than any other part of it: therefore, when the prepuce is pulled back upon the body of the penis, that part grasps it more tightly, than any other portion of the skin of the penis, and more so, according to the inflammation. Hence, there are two swellings of the prepuce, one close to the glans; the other behind the stricture. The constriction is often so great, as to interrupt the circulation beyond it. This increases the swelling, adds to the stricture, and often produces a mortification of the prepuce itself, by which means the whole diseased part, together with the stricture, is, sometimes removed, forming, as Hunter ably expresses himself, a natural cure. In many cases, the skin and prepuce are not the only parts affected, adhesions, and even mortification may also take place in the glans, corpora cavernosa, &c. (See *Hunter on the Venereal*, 221, &c.)

TREATMENT OF PHYMOSIS.

A *phymosis* should be prevented if possible; therefore, says Mr. Hunter, upon the least signs of a thickening of the prepuce, which is known by its being retracted with difficulty and pain, the patient should be kept quiet; if in bed, so much the better, as in an horizontal position the end of the penis will not be so depending. If confinement in bed cannot be complied with, the end of the penis should be kept up, though this can hardly be done, when the patient is walking about. The object of this is to keep the extravasated fluids from gravitating to the prepuce, which they would hinder from being drawn back even more, than the inflammation itself.

As when there are sores, they cannot be

dressed in the common way, injections must frequently be thrown under the prepuce, or the operation for *phymosis* performed. Mr. Hunter advises mercurial injections; either crude mercury rubbed down with a thick solution of gum-arabic; or calomel with the same, and a proportion of opium; or else a solution of one grain of the hydrarg. mur. in one ounce of water. Mr. Hunter also recommends the application of emollient poultices, with laudanum in them, and, before putting them on the part, to let it hang over the steam of hot water, with a little vinegar and spirits of wine in it.

When, with a *phymosis* chancres bleed, Mr. Hunter says, the oil of turpentine is the best stimulus for making the vessels contract; but, when the hemorrhage proceeds from irritation, he recommends sedatives. Whatever is used, must be injected under the prepuce. When the inflammation has abated, he advises moving the prepuce occasionally to prevent its becoming adherent to the glans. He says, he has seen the opening of the prepuce, so much contracted from the internal ulcers healing and uniting, that there was hardly any passage for the water. If the passage in the prepuce, so contracted, be in a direct line with the orifice of the urethra, a bougie must be used. If otherwise, the operation of slitting up, or removing part of the prepuce, becomes necessary.

When matter is confined under the prepuce, in the manner above described, Mr. Hunter recommends laying the prepuce open, from the external orifice to the bottom, where the matter lies, as in a sinus, or fistula. However, Mr. Hunter thinks laying open the prepuce for the mere purpose of applying dressings unnecessary, as the sores may be washed with injections by means of a syringe.

The common operation for the *phymosis* consists in slitting open the prepuce, nearly its whole length in the direction of the penis. This plan is certainly the most eligible, when the matter of a chancre cannot escape from under the prepuce; because circumcision, which many surgeons, since Mr. Hunter's time, have preferred, would not suffice for giving vent to the accumulated pus. In many cases of *phymosis*, says Mr. Hunter, an operation is improper; for, while the inflammation is very considerable, such a measure might bring on mortification. He acknowledges, however, there are cases, in which a freedom given to the parts would prevent the latter event. When matter is confined under the prepuce, an opening is indispensable, and, if the patient should object to the common

operation, an opening should be made with a lancet directly through the prepuce, or else with caustic. (See *Hunter on the Venereal Disease*, p. 232. et seq.)

When the prepuce is to be slit open, a director is first to be introduced under it, and the division is then to be made with a curved pointed bistoury, from within upward.

Many surgeons object to this operation, because the prepuce continues afterwards in a very deformed state; and they perform circumcision, or amputation of the prepuce, in the following manner. The prepuce is first taken hold of with a pair of forceps, as much of the part being left out, as is judged necessary to be removed. The removal is then accomplished by one sweep of the knife, which, directed by the blades of the forceps, is sure of making the incision in a straight and regular manner. A fine suture is next passed through the edges of the inner and outer portions of the skin of the prepuce, so as to keep them together. The only necessary dressings are lint, and, over it, an emollient poultice.

TREATMENT OF PARAPHIMOSIS.

The removal of the stricture in this case should always be effected, because its continuation is apt to produce a mortification in the parts, between the stricture and the glans. It may be done in two ways; either by compressing with the fingers all the blood out of the swollen glans so as to render this part sufficiently small to allow the constricting prepuce to be brought forward over it, with the aid of the other fingers; or by dividing the stricture with a knife. From the great success, which I have seen attend the first mode, I should not conceive the latter one so frequently necessary, as Mr. Hunter seems to lay down. This operation is always troublesome to accomplish, because the swelling, on each side of the stricture, covers or closes the tight part, so as to make it difficult to get at it. Mr. Hunter says, the best way is to separate the two swellings, as much as possible, where you mean to cut, so as to expose the constricted part; then take a crooked pointed bistoury, pass it under the constriction, and divide it. None of the swollen skin, on each side, should be cut. The prepuce may now be brought forward, unless it should be thought more convenient, for the purpose of dressing the chancre, to let it remain in its present situation. (See *Hunter on the Venereal Disease*, p. 238, 239.)

The original disease, producing phimosis and paraphimosis, must always be

attended to, and the employment of mercury must be necessary, or unnecessary, according to the nature of the affection, of which these are only effects.

PILES. (See *Hemorrhoids*.)

PILULÆ AMMONIARETI CUPRI.

℞. Cupri Ammoniaci gr. xvj. Micæ Panis ℥iv. Aquæ Ammon. q. s. M. fiant pilulæ xxxii. (*Edinb. Disp.*) This is said to be the best form of exhibiting copper internally, which mineral some think worthy of trial in cases of gleet.

PILULÆ ARGENTI NITRATI.

℞. Argenti Nitrati gr. iij. Aquæ Distillatæ gutt. aliquot. Micæ Panis q. s. ut fiant pil. xx. The author of the *Pharmacopæia Chirurgica* suggests the trial of these pills in obstinate leprosy, and other cutaneous affections, and phagedenic, anomalous ulcers, connected with constitutional causes. Two, or three may be given twice a day. Dr. Powell gave the argentum nitratum internally, in a case of hydrophobia, but, without any sensible effect. These pills are among the *formula selectæ* of Dr. Saunders.

PILULÆ CALOMELANOS.

℞. Calomelanos gr. xij. Conservæ Cynosbatii quod satissit. M. fiant pil. xii. These are the calomel pills in common use. Surgeons give one, or two of them daily, as alteratives, in numerous cases. At Guy's Hospital, they add three grains of the pulvis opiatu to each pill, using syrup, instead of the conserve.

PILULÆ CALOMELANOS CUM CUCUTA. ℞. Calomelanos gr. vj. Succispissati Cicutæ ℥j. M. fiant, pil. xii. One may be given thrice a day, in scirrhus, cancerous, scrophulous, and some anomalous diseases, resembling venereal ones.

PILULÆ CALOMELANOS CUM ANTIMONIO TARTARISATO. ℞. Calomelanos ℥j. Antimon. Tart. gr. xv. Opii Pur. ℥ss. Syrupi simpl. q. s. fiant pil. lx. One of these is given twice a day, in St. Thomas's Hospital, in cases of diseased joints. As the author of the *Pharm. Chirurg.* adds, they are also of use in herpetic affections, and obstinate ulcers. The union of antimony with quicksilver, according to Dr. G. Fordyce, quickens the specific operation of the latter.

PILULÆ CALOMELANOS CUM OPIO. ℞. Calomelanos ℥j. Opii Purif. gr. xii. Conserv. Cynob. q. s. M. fiant pil. xii. When the object is to exhibit strong doses of calomel, one of these pills may be administered every night.

PILULÆ CALOMELANOS COMPOSITÆ. ℞. Calomelanos. Sulph. Antim. Præcip. sing. gr. xii. Guaiaci Gummi Resinæ gr. xxiv. Saponis q. s. M. fiant pil. xii. Similar to Plummer's pills. These are most excellent alteratives, in

the dose of one twice a day. In *tinea capitis*, herpetic affections, and many anomalous diseases, they are exceedingly useful. Some diseased enlargements of the breast, and testicle, seem also to be benefited by them.

PILULÆ CICUTÆ. ℞. Succī Cicutæ ʒss. Pulv. Herb. Cicutæ q. s. fiant pil. lx. These are the hemlock pills in use at Guy's Hospital. *Cicuta* is occasionally given in scrophulous, cancerous, and venereal cases. The surgeon should begin with small doses, and increase them gradually, till nausea and headach arise. From one, to a great number of these pills may be given, in this manner, every day.

PILULÆ CERUSSÆ ACETATÆ. ℞. Cerussæ Acetatæ gr. xii. Opii Purif. gr. vj. Conserv. Cynosbati q. s. M. fiant pil. xii. One may be given thrice a day. Gleets are, perhaps, the only cases, in which surgeons can employ these pills.

PILULÆ COLOCYNTHIDIS CUM CALOMELANE. ℞. Extracti Colocynth. comp. ʒij. Calom. gr. xii. Saponis ʒj. Two of these operate as a purgative. They are the pills most frequently employed in the practice of surgery, for the purpose just specified.

PILULÆ CUPRI VITRIOLATI. ℞. Cupri Vitriolati gr. xv. Olibani Extracti Cinchonæ, sing. ʒij. Syrup. simpl. q. s. fiant pil. lx. From one to four of these pills may be given in a day, for gleets. (*Pharm. Chirurg.*)

PILULÆ HYDRARGYRI. Of these, I need only observe here, that the usual dose is ten grains. (See *Mercury*.)

PILULÆ HYDRARGYRI CALCINATI. One grain of this preparation is the dose, which is commonly taken at bedtime. (See *Mercury*.)

PILULÆ HYDRARGYRI CUM CICUTA. ℞. Hydrargyri purificati drach. j. Arabici gummi pulverisati drach. ij. Succī cicutæ spissati drach. j. Herbæ Cicutæ foliorum, in pulverem tritorum, q. s.

The quicksilver is to be first reduced by triture with the gum-arabic, moistened with a little rain-water. The inspissated juice of hemlock is afterwards to be added, and lastly the powdered leaves in sufficient quantity to make a suitable mass for pills.

These, with a slight variation in the proportion of the hemlock, are the *pilule mercuriales* of Plenck, who directs three or four pills, each of three grains, to be given every night and morning.

There are, no doubt, many cases to which this formula must be very suitable; such, for instance, as the enlarged prostate gland, &c.

Dr. Saunders in his *Formule Selectæ* directs equal parts of pil. hydrarg. and succ. cicut. spissat. for these, or such like, purposes. (*Pharm. Chir.*)

PILULÆ NATRI CUM SAPONE. ℞. Natri ʒj. Saponis ʒj. M. fiant pil. xii. Four may be given thrice a day, in cases of bronchocele, and indurations of the absorbent glands from scrophula.

PILULÆ OPII. These need only be mentioned among such as are of eminent utility in surgery.

PILULÆ OPII COMPOSITÆ. ℞. Opii Purif. Camphoræ, sing. ʒi. Antim. Tart. gr. xv. Syrup. Simpl. q. s. fiant pil. lx. Used for alleviating pain, and keeping up a gentle perspiration; are particularly useful in preventing painful erections, in cases of gonorrhœa, chordee, &c. (See *Pharm. Chir.*)

PILULÆ ZINCI VITRIOLATI. ℞. Zinci Vitriol. ʒj. Terebinthinæ q. s. fiant pil. lx. One, or two, are occasionally given, in cases of gleets, thrice a day.

PLANTARIS MUSCLE. This long slender muscle of the leg is said to be sometimes ruptured, particularly in dancing. The surgeon can do little more, than advise rest, and the same posture of the limb, as in the rupture of the tendo Achillis. (See *Achilles, Tendon of*.)

PLEURITIS. (from *πλευρα*, the membrane lining the chest.) A pleurisy, or inflammation of the pleura.

PLEUROSTHOTONOS. (from *πλευρον*, the side, and *τεινω* to stretch.) A spasmodic disease, in which the body is drawn to one side; a species of tetanus. (See *Tetanus*.)

PLICA POLONICA. (from *plico*, to entangle.) A peculiar disease, to which the inhabitants of Poland and Lithuania are subject: in this singular affection, the hairs of the head become adherent together, probably, in consequence of some morbid secretion from the scalp. It may be cured by the same means, which cure the scaldhead. (See *Tinea Capitis*.)

PNEUMATOCELE. (from *πνευμα*, wind, and *κηλη*, a tumour.) The wind-rupture; a case, which only existed in the imaginations of the old surgeons.

POLYPUS. (from *πολυς*, many, and *πους*, a foot.) A kind of tumour, which is generally narrow where it originates, and then becomes wider, somewhat like a pear; which most commonly is met with in the nose, uterus, vagina, and antrum; and which received its name from an erroneous idea, that it usually had several roots, or feet, like polypi, or zoophytes.

POLYPUS OF THE NOSE.

Polypi more frequently grow in the cavity of the nose, from the Schneiderian membrane, than any other situation. Nasal polypi are visibly of different kinds; some being red, soft, and sensible; but, free from pain, and exactly like a piece of healthy flesh. This, which has been termed the *fleshy polypus*, is the most common, and fortunately the most easy of cure. Other polypi are called *malignant*, being hard, scirrhus, and painful: some are said to be even capable of conversion into carcinoma. Richter describes another kind of nasal polypus, which is pale, very tough, and secretes a viscid discharge; which undergoes an alteration of its size with every change of the weather; and which is rather a relaxation, or elongation, of a part of the Schneiderian membrane, than a polypous excrescence. The whole membranous lining of the nostrils is sometimes relaxed, and thickened in this manner, so as nearly to fill up the whole cavity of the nose. (*Anfangr. der Wundarzn. Band. 1. Cap. 21*)

Mr. Pott has taken great pains to shew, that there is one kind of polypus, originally *benign*; another originally *malignant*. He states, that those, which begin with, or are preceded by considerable, or frequent pain in the forehead and upper part of the nose, and which, as soon as they can be seen, are either highly red, or of a dark purple colour; those which, from the time of their being first noticed, have never been observed to be sometimes bigger, sometimes less, but have constantly rather increased; those, in which coughing, sneezing, or blowing the nose, gives pain, or produces a very disagreeable sensation in the nostril, or forehead; those which, when within reach, are painful to the touch, or which, upon being slightly touched, are apt to bleed; those which seem to be fixed, and not moveable by the action of blowing the nose, or of driving the air through the affected nostril only (when the polypus is only on one side; those which are incompressibly hard, and which, when pressed, occasion pain in the corner of the eye, and forehead, and which, if they shed any thing, shed blood; those which, by adhesion, occupy a very considerable space, and seem to consist of a thickening, or of an enlargement of all the membrane covering the septum narium; those which sometimes shed an ichorous, offensive, discoloured discharge; and those, round whose lower part, within the nose, a probe cannot easily and freely be passed, and that, to some height, ought not to

be attempted, at least by the forceps, nor indeed by any other means; and this for reasons obviously deducible from the nature and circumstances of the polypus. On the one hand, the very large extent and quantity of adhesion will render extirpation impracticable, even if the disease could be comprehended within the forceps, which it very frequently cannot; and on the other, the malignant nature of the distemper may render all partial removal, all unsuccessful attacks on it, and indeed any degree of irritation, productive of the most disagreeable consequences.

But, the polypi, which are of a palish or greyish light-brown colour, or look like a membrane just going to be sloughy; which are seldom or never painful, nor become so upon being pressed; which have appeared to be at one time larger, at another less, as the air has happened to be moist or dry; which ascend and descend freely by the action of respiration through the nose; which the patient can make to descend by stopping the nostril which is free, or even most free, and then driving the air through that which the polypus possesses; which when pressed give no pain, easily yield to such pressure, become flat thereby, and distil a clear lymph; and round whose lower and visible part a probe can easily, and that to some height, be passed, are fair and fit for extraction; the polypus, in these circumstances, frequently coming away entire; or if it does not, yet it is removable without pain, hemorrhage, or hazard, of any kind; the second of which circumstances Mr. Pott can with strict truth affirm, he never yet met with when the disease was at all fit for the operation.

Of the benign kind of polypus, fit for extraction, there are (says Mr. Pott) two sorts, whose principal difference from each other consists in their different origin or attachment. That which is most freely moveable within the nostril, upon forcible respiration; which has been found to be most liable to change of size, at different times and seasons; which has increased the most in the same space of time; which seems most limpid, and most freely yields lymph upon pressure, has its origin most commonly by a stalk, or kind of peduncle, which is very small, compared with the size of the polypus. The other which, although plainly moveable, is much less so, than the one just mentioned, which has been less liable to alteration from air and seasons; and which has been rather slow in arriving at a very troublesome size, is most frequently an elongation of the membrane covering one of the ossa spongiosa.

These latter may be extracted with no kind of hazard, and, with very little pain, and hemorrhage: but the former require the least force, and mostly come away entire; while the others often break, come away piecemeal, and stand in need of the repeated use of the forceps. (*Pott on the Polypus of the Nose.*)

Mr. John Bell criticises the distinctions drawn by the preceding writer, and he says, that a polypus is never mild, nor ever malignant; time, and the natural growth of the tumour, and the pressure it occasions within the soft and bony cells of the nostrils and jaws, must bring every polypus to one invariable form, in its last and fatal stage. Polypus, says Mr. John Bell, is indeed a dreadful disease; but, it becomes so by a slow progression, and advances by gradations easily characterized. Every polypus in its early stage is, according to this writer, a small moveable tumour, attended with a sneezing and watering of the eyes; swelling in moist weather; descending with the breath; but, easily suppressed with the point of the finger. It is void of pain, and not at all alarming; it may also be easily extracted, so as to clear for a time the passage for the breath. Yet this little tumour, simple as it may appear, is the germ of a very fatal and loathsome disease, and this easy extraction often the very cause of its appearing in its most malignant form. The more easily it is extracted (says Mr. J. Bell) the more easily does it return; and whether carelessly extracted, or altogether neglected, it soon returns. But, when it does return, it has not really changed its nature; it has not ceased to be in itself mild, it is then to be feared, not from its malignity, but from its pressure, among the delicate cells and membranes of the nose. It soon fills the nostrils, obstructs the breathing, and causes indescribable anxieties. The tears are obstructed, and the eyes become watery from the pressure on the lachrymal sac; the hearing is in like manner injured, by the pressure of the tumour against the mouth of the eustachian tube; the voice is changed, and its resonance and tone entirely lost, by the sound no longer passing through the cells of the nose and face. The swallowing is in some degree affected by the soft palate being depressed by the tumour. The pains, arising from such slow and irresistible pressure, are unceasing. From the same pressure, the bones become carious, and the cells of the face and nose are destroyed by its slow growth. It is not long, before the tumour begins to project from the nostril in front, and over the arch of the palate behind. One nostril becomes widened and thickened; the nose is

turned towards the opposite side of the face, and the whole countenance seems distorted. The root of the nose swells, and becomes puffy, the features tumid and flabby, the face yellow, and the parts round the eye livid. The patient is affected with head-achs, which seem to rend the bones asunder, and with perpetual stupor, and dozing. The bones are now absorbed, and the membranes ulcerate; a foul and fetid matter, blackened with blood, is discharged from the nostrils, and excoriates them. The blood vessels next give way, and sudden impetuous hemorrhages weaken the patient: the teeth fall from the sockets, and, through the empty sockets, a foul and fetid matter issues from the antrum.

Now the disease verges to its conclusion. The patient has terrible nights, and experiences a sense of suffocation. The repeated loss of blood renders him so weak, that he cannot quit his bed, for several days together; and when he does get up, he is (to use Mr. J. Bell's words) pale as a spectre, his lips colourless, and his face like wax, yellow and transparent. He now suffers intolerable pain, while his saliva is continually dribbling from his mouth, and the fetid discharge from his nose. In this state, he survives a few weeks: during the last days of his illness, lying in a state of perpetual stupor, and dying lethargic. Mr. J. Bell afterwards, observes, that "if horrid symptoms could establish the fact of malignity, there is not to be found in all nosology a more malignant disease, than this; but, aneurism, though it destroys the thigh-bone, the sternum, or the cranium, is not accounted malignant; neither is polypus malignant, though it destroys the cells of the face, and penetrates even through the ethmoid bone to the brain. These consequences result merely from pressure." (*John Bell's Principles of Surgery, Vol. 3. part 1. p. 90—92.*)

The celebrated professor Richter has also denied the validity of the objections, urged by Pott against attempting to relieve the patient; neither the malignant nature of a polypus, its adhesions, immovableness, ulcerations, nor disposition to hemorrhage, &c. are according to Richter, any apology for leaving the disease to itself. (*See Anfangsgr. der Wundarzn. Band. 1. Cap. 21.*)

Mr. J. Bell refutes the common notions, that polypi may be caused by picking the nose, blowing it too forcibly, colds, and local injuries. He asserts, that a polypus is not in general a local, solitary tumour: he has only found it so in three or four instances. Both nostrils are usually affected. He states, that no

finger can reach that part of the nostril, where the root of the swelling is situated, as it is deep and high in the nostrils, towards the throat, and near the opening of the eustachian tube. The finger cannot be introduced further, than the cartilaginous wing of the nose extends, and can hardly touch the anterior point of the lower spongy bone. The anterior and posterior chambers of the nostril are separated from each other by a narrow slit, which the finger can never pass, and which is divided, in consequence of the projection of the lower spongy bone, into two openings, one above, the other below. Through these the heads of the polypus project. These tangible parts of the tumour, however, are very distant from its root, which is in the highest and narrowest part of the nostril. (See p. 103, 104.) Mr. J. Bell also says, that three, or four polypi are often crowded together in one nostril, while more are formed, or forming, in the other.

He dwells upon the difficulty, and impracticableness of tying the root of a polypus; and explains, that in all attempts to extirpate such tumours, the surgeon's aim should be to reach a point, nearly under the socket of the eye, in the deepest and highest part of the nostrils, and that instruments can only do good when introduced beyond the narrow cleft, formed by the projection of the spongy bone. (P. 108)

Though Mr. John Bell is probably right in his opinion, that polypi do not proceed from several circumstances, which we have above noticed, yet they are, in most instances, diseases of an entirely local nature. Certainly, in general, it is very difficult to decide what is the cause of the polypus nasi. Frequently the patient is, in other respects, perfectly well; and, after the removal of the tumour, no new one makes its appearance. In this circumstance, it must originate from a local cause, though it is generally difficult to define what the nature of this is. Sometimes several catarrhal symptoms precede the polypus, and, perhaps, constitute its cause. It is possible, they may only be an effect of the same cause which gives birth to the tumour: but, no doubt, they are sometimes the effect of the polypus itself. It is often certain, that a faulty state of the constitution contributes to the disease; for, several polypi frequently grow in both nostrils, and even in other situations at the same time; are reproduced immediately after their removal; and the patient often has an unhealthy appearance. Notwithstanding it has been asserted, that a solution of sal ammoniac, frequently injected into the nose, some-

times disperses polypi, the efficacy of the remedy remains unestablished by experience; as, indeed, the very nature of the disease might lead one to anticipate. Some kind of operation affords the only rational chance of a cure.

There are four modes of extirpating a nasal polypus: viz. extracting it with forceps; tying it with a ligature; cutting it out; and destroying it with caustic.

EXTRACTION.

I suspect there must be some inaccuracy in Mr. John Bell's account of the little space there is in the nostril, for the introduction of instruments; for, were his description correct, how could such large forceps be introduced deeply into the nostrils, as we see done every day? This gentleman seems to have forgotten, for a moment, how much the parts are expanded, and widened by the tumour.

Extraction is the most common and proper method. It is performed with the ordinary polypus forceps, the blades of which have holes in them, and are internally rather rough, in order that they may take hold of the tumour more firmly, and not easily slip off it. The front edge of each blade must not be too thin and sharp, lest, with its fellow, it should pinch off a portion of the polypus. The forceps must necessarily have a certain breadth: for, when they are too small, they cannot properly take hold of and twist the tumour. When the handles are rather long, the instrument may be more firmly closed, and more conveniently twisted.

However, the forceps are not applicable to all cases. The anterior part of the polypus, lying in the nostril, distending, and, totally obstructing it, is sometimes quite hard; and, when the forceps are introduced, it presses their blades in such a manner, from each other, as it lies between them, that the instrument cannot be introduced sufficiently far, to take hold of the tumour at a proper depth. If introduced to a proper distance, it cannot be closed. In such a case, says Richter, one might, perhaps, advantageously make use of a pair of forceps which may be separated, and put together again at the joint, and the blades of which diverge from each other behind the joint, and touch again at their extremities. After separating the two pieces, their blades are to be separately introduced, and then joined together again at the joint. The anterior indurated portion of the polypus lies in the interspace, and does not prevent the closure of the instrument.

It is generally deemed of importance to take hold of the polypus with the forceps close to its root; and, indeed, when this rule is observed, the whole of the polypus, together with its root, is commonly extracted, and there is less reason to apprehend hemorrhage, which is naturally more profuse when the polypus is broken at the thick, middle portion of its body. It is also a rule, frequently easy of observance, especially when the polypus is not too large. But, in many instances, the tumour is so large, and the nostril so completely occupied by it, that it is impracticable to get hold of its root. In this circumstance, it is often altogether impossible to discover even where the root lies. Here we must be content to take hold of the polypus as high as possible. The consequences are of two kinds. The tumour sometimes gives way at its root, though it be only taken hold of at its anterior part; and, in other cases, breaks where it is grasped, a portion being left behind, and a profuse hemorrhage ensuing. This is, however, void of danger, if the surgeon loses no time in endeavouring to suppress the effusion of blood; but immediately introduces the forceps again, grasps the remnant piece, and extracts it. The most infallible method of diminishing the bleeding, is to extract what remains behind at its root. In this way, a large polypus is frequently extracted, piecemeal, without any particular loss of blood.

After the polypus has been propelled as far forward, into the nostril, as it can be by blowing strongly through the nose, its anterior part is to be taken hold of by a small pair of common forceps, held in the left hand; and is to be drawn gradually and slowly out, to make room for the introduction of the polypus forceps into the nostril. The more slowly we proceed in this manœuvre, the more the polypus is elongated, the narrower it becomes, the greater is the space in the nostril for the introduction of the polypus forceps, and the higher can this instrument grasp the tumour. After it has taken hold of the polypus as high as possible, it is to be twisted slowly round, and, at the same time, pulled outward, till the tumour breaks. It is a very important maxim, rather to twist the instrument than to pull it, and thus, rather to writhen the polypus off, than to drag it out. The longer and more slowly the polypus forceps are twisted, the more the part where the excrescence separates, is bruised, the less is the danger of hemorrhage, and the more certainly does the tumour break at its thinnest part, or root. When the extraction is done with violence, and celerity,

only a piece is usually brought away, and we run hazard of occasioning a copious bleeding.

As soon as the polypus has given way, the surgeon is to examine whether any part remains behind. When the polypus is very narrow at the place where it has been broken, and the patient can breathe through the nose freely, there is reason to presume, that the polypus has given way at its root, and that none continues behind. The finger, if it can be introduced, procures the most certain information; or the probe, when this, for want of room, cannot be employed. The ancients proposed several means for the extirpation of the remaining piece of polypus: but they are, for the most part, objectionable. It is best to introduce the forceps again, under the guidance of the finger, or probe, and thus pinch and twist off, the part continuing behind.

Hemorrhage invariably succeeds the operation; and it has, by many, been represented as exceedingly perilous and alarming. But, it is not constantly so, and, in many cases, is quite insignificant. Frequently, however, it is really serious; and, as the surgeon can never know beforehand to what extent it will happen, he is always to furnish himself, before the operation, with the most effectual means for its suppression. The danger of hemorrhage may always be lessened, as was before mentioned, by slowly twisting the polypus at its root, in preference to pulling it directly out. When only a portion of the tumour has been extracted, the surest mode of stopping the effusion of blood, is to extract the remaining part without delay. When the polypus has given way at its root, if there should be profuse bleeding, we may first try, ice-cold water, and strong brandy, which may either be sucked or injected into the nose. This single remedy proves effectual in numerous instances. If the hemorrhage should still prevail, it may always be checked with certainty, how copious soever it may be, in the following manner. Roll a considerable piece of lint, as fast as possible, round the extremity of a probe; wet it completely through, with a strong solution of zincum vitriolatum; introduce it into the nostril, and press it as strongly as possible against the part whence the blood issues. When the nostril is very much dilated, the fingers may be used, for this purpose, with more advantage than the probe. The point, from which the blood is effused, may easily be ascertained, by asking the patient at what part of the nostril he experienced the most pain in the operation; and then pressing the finger on various points in this situation.

As soon as the blood ceases to flow, we may conclude, that the finger is on the situation of the hemorrhage. This method is so efficacious, that there is seldom occasion for any other. When the bleeding point lies deeply in the nostril, it might be difficult to reach it with the finger. At all events, we may then employ the plan, which some so strongly praise in urgent cases.

A piece of cat-gut may be introduced into the nostril, and, by means of a pair of forceps, be brought out of the mouth. A roll of lint is then to be attached to it, and drawn through the mouth into the nose; thus the posterior aperture of the nostril may be stopped up. Then the nostril in front, is to be filled with a sufficient quantity of lint, moistened in the solution of *zincum vitriolatum*.

The objections to extracting some polypi, says Richter, have been much exaggerated. When the polypus is so large, that its root cannot be got at, its anterior part is to be taken hold of, and the tumour extracted piecemeal. It has already been noticed, that this practice is free from danger. Experience does not prove, that the polypus, which often bleeds profusely, is apt to occasion a violent hemorrhage in the operation; and, even if it should do so, powerful measures may be adopted for the stoppage of the bleeding. The malignity, and ulcerations, attending a polypus, are no objections to the operation; but, are rather motives for its being promptly performed, as delay must occasion more manifest and urgent danger. If the polypus should be here and there adherent to the membrane investing the nostrils, it is proper to separate it, before the operation. This object cannot be accomplished by straight inflexible instruments, such as have been invented by various surgeons. It may be very conveniently done, according to Richter, with thin, long, flat pieces of tortoise-shell, introduced as deeply as possible into the nostril, on every side of the polypus. As it can seldom be known with certainty, *a priori*, that adhesions are not present, it is proper, whenever the tumour is large, to introduce these instruments before the operation.

Sometimes, the greatest part of the polypus extends backward, hanging down behind the palatum molle, towards the pharynx. If there should be but little of the polypus visible in the nostril, its extraction must be performed backward, in the throat. This is usually done with a pair of curved polypus forceps, which are to be introduced through the mouth, in order, to seize and tear off the tumour as high as possible above the soft palate. Care must be taken not to irritate the root of the

tongue, or else a vomiting is produced, which disturbs the operation. When the polypus cannot be properly taken hold of, we may, according to the advice of some surgeons, divide the soft palate. But this is very rarely necessary. As, by this mode, the polypus is not twisted, but pulled away, the hemorrhage is, in general, rather copious. If a fragment of the tumour should remain behind, it may commonly be extracted through the nose.

Some recommend, for the extraction of polypi in the throat, a ring, consisting of two semicircular portions, with a kind of groove externally, which are capable of being opened and shut, by being fixed on the ends of an instrument constructed like forceps. A ligature is to be placed round the ring, and its end is to be brought to the handle of the instrument, and held with it in the hand. The instrument is to be introduced into the mouth, under the polypus, and expanded as much as the size of the tumour requires. Its ring is then to be carried upward, over the polypus, so as to embrace it; and afterwards is to be shut, whereby the noose after being carried upward, is disengaged from the ring. The noose is to be pushed as high as possible over the tumour, by means of forceps, and the extremity of the packthread is then to be drawn, so as to apply the noose tightly round the polypus. When this is done, the ring of the instrument is to be turned round, firmly closed, and placed in front of the polypus, on the noose, in such a way, that the packthread is to lie between two little pegs, made for the purpose, at the ends of the ring. On drawing the packthread firmly, and pressing the instrument, at the same time, downward, so as to make it act like a lever, the polypus, in general, easily breaks. Another peg projects in the direction of the ring, so as to prevent the ligature from insinuating itself within the circle. (See *Theden's Bemerk. Part 2. and Plate 6. fig. 1. in Richter's Anfangsgr.*)

The employment of this instrument, however, is attended, says Richter, with many difficulties, and little advantage. Polypi in the throat are most conveniently extracted by the ordinary straight polypus forceps, with which they may be seized, and gradually drawn out through the mouth. The tumour generally allows itself to be drawn out without trouble, and the inclination to vomit, which at this moment occurs, also contributes to propel it outward. When it is so stretched, that it cannot be drawn out further, without considerable force, a spatula is to be introduced into the mouth, and to be carried as high as possible behind the polypus, in order to press it downward, toward the

root of the tongue. When the tumour is, at the same time, forcibly pulled outward by the forceps, it usually gives way.

When the polypus is situated partly in the throat and partly in the nostril, though it admits of being extracted, in the same way, through the mouth, yet its anterior part often continues attached, and must afterwards be separately removed through the nostril. It is also frequently advisable to twist off the anterior portion of the polypus first, by which, the mass in the throat is often rendered so loose, that it can be easily extracted. Whenever it is conjectured, that the polypus will come away in two pieces, it is always preferable first, to extract the part in the nostril, and afterwards that in the throat: because, the separation of the last is constantly productive of more bleeding, than the removal of the first. Sometimes, the following plan succeeds in detaching the whole polypus at once. Both the part in the nostril, and that in the throat, are to be firmly taken hold of with the forceps, and drawn at first gently, and then more forcibly, backward and forward. By such repeated movements, the root is not unfrequently broken, and the whole polypus brought away from the mouth.

Frequently the polypus grows again. Policy requires that the patient should be apprised of this before-hand. Some of the root remaining behind, may often be a cause of the relapse. Hence, the surgeon should examine carefully, after the operation, the part at which the root of the polypus was situated, and separate, and twist off, most diligently, with the forceps, any fragments that may still continue attached. The recurrence of the disease, however, may arise from other causes. The tumour is occasionally reproduced, after it has been extracted in the most complete manner; and, doubtless, this circumstance is sometimes owing to the continued agency of constitutional causes, which so often remain undiscovered and unremoved. Sometimes, also, the recurrence of the disease is owing to a local morbid affection of the Schnederian membrane, or of the bones situated beneath the root of the polypus. Richter, in this case, approves of the cautery; but few English surgeons will coincide with him. The polypus, occasionally observed subsequently to the operation, is frequently not, in fact, a new substance, but only a part of the original tumour, not previously noticed by the surgeon. Sometimes it occurs, that a smaller and a larger polypus are found in the nose at the same time. The larger one is extracted, while the other remains undiscovered; and, when it has increased in magnitude, it is apt to be

mistaken for a reproduction of the one previously extirpated. (See *Richter's Anfangsgr. der Wundarzn. Band. 1. Cap. 21.*)

LIGATURE.

As the extraction of the polypus is invariably attended with hemorrhage, which is sometimes profuse, another more modern method of cure has, with some, gained the preference, as being far more convenient and secure. This is, tying the root of the tumour with a ligature, by which the polypus is thrown into the state of inflammation, suppuration, and sphacelus; and, at length, becomes detached. Many instruments have been invented for applying the ligature; but Levret's double cannula seems to be the best. Through this, a silver wire is to be introduced, so as to form a noose at the upper end of the instrument, proportioned in size to the anterior part of the tumour, situated in the nostril. The two ends of the wire are to hang out of the two lower apertures of the double cannula; and one of them is to be fastened to a small ring on its own side of the instrument. The other is to remain loose. The wire must be made of the purest silver, and ought to be as flexible as possible, that it may not readily break. It must, also, not be too thin, lest it should cut through the root of the polypus. The cannula is to be somewhat less than five inches long. By the assistance of this cannula, the noose is to be introduced into the nose, and put round the polypus. But, as the cannula, which is usually constructed of silver, is straight and inflexible, while the inner surface of the nostril is preternaturally arched, especially when much distended by the polypus, it is easy to discern that its introduction must be attended with considerable difficulty. In fact, it can seldom be introduced as deep as the root of the polypus. There are two ways of avoiding this obstacle. The cannula may either be passed under the polypus, over the ossa palati, which present a tolerably straight surface, or it must be curved a little. Perhaps, a tortoise-shell cannula, says Richter, might be convenient.

The noose is to be applied in the following manner. The polypus is to be taken hold of with the forceps, and drawn a little out of the nose. The noose is then to be carried over the forceps and polypus, into the nostril. In order to carry it as high as possible, it is necessary not to push the cannula straight forwards into the nose, but to move it from one side of the polypus to the other. The more deeply the instrument has entered the nose, the more of the loose end of the wire must be drawn

out of the lower aperture of the cannula, so as to contract the noose, which otherwise, might stop in the nostril, and not be carried sufficiently high. The elasticity of the silver wire tends to assist in raising it over the polypus, and, hence, it is more easy of application than a more flaccid kind of ligature. When there is cause to conclude, that the polypus is complicated with adhesions, they must be previously broken, in the way already mentioned.

As soon as the noose has been introduced as deeply as possible, the loose extremity of the wire is to be drawn out of the lower aperture of the cannula, and rolled round the ring on that side of the instrument. Thus the root of the polypus suffers constriction. The wire must not be pulled too forcibly, nor yet too feebly. In the first circumstance, it readily cuts through the root of the polypus; in the second, great tumefaction of the excrescence, and many inconveniences arise, which a tenser state of the wire prevents. As the noose gradually makes a furrow, where it surrounds the polypus, it grows slack, after a short time, and no longer constricts the tumour. One end of the wire, therefore, is to be daily unfastened, and drawn more tightly. The more tense it is kept, the sooner the separation of the polypus is brought about. Hence, when it is particularly indicated to produce a speedy detachment of the polypus, the wire should be tightened, at least, once a day.

In this manner the cannula is to remain in the nose, until the noose is detached, together with the polypus. There is another method of tying the tumour, without leaving the cannula in the nose. After the noose has been introduced as far as possible into the nostril, the two ends of the wire are to be twisted round the two rings, and the cannula is to be turned round a couple of times. The wire is then to be unfastened from the rings, and the cannula withdrawn. In this way, the noose is made to embrace the polypus, round which it remains fastly applied. Whenever it is wished to produce a greater constriction, the cannula may be again introduced into the nose, the ends of the wire fastened to the rings, and the instrument turned round again: after which, it is to be taken away, as before. As the cannula, when it continues long in the nose, may occasion pain, and other inconveniences, the last method seems preferable to the former. However, introducing and withdrawing the cannula every day, as Richter adds, may, perhaps, be equally troublesome and painful. The cannula, for this purpose, being necessarily straight, is by no means handy. One might, at all events,

make use of a single cannula, the upper opening of which is divided by a bridge; this could be much more conveniently twisted than a double one.

Although the ligature has been very much praised by some of the moderns, it is attended with so many difficulties, that the forceps are infinitely preferable in the majority of cases. Hemorrhage is the only inconvenience, for which extraction is abandoned for the employment of the ligature. But this, as was before stated, is far less dangerous, than is represented. The inconveniences of the ligature are far more serious, and numerous. The cure by the ligature is always accomplished with much less expedition than by extraction. When the polypus is of such a size as to occupy the whole of the nostril, it is generally impracticable to introduce the noose to a sufficient depth. The figure of the polypus renders it almost impossible to tie its root; for, commonly, the tumour expands very much before and behind, and the wire must be brought over the posterior part of the polypus, ere it can be applied to its root. In general, also, the noose only includes the front part of the polypus, while the root, and back portion remain untied, and, consequently, do not become detached.—It is, indeed, asserted, that the ligature, when only applied to the front part of the polypus, is capable of bringing about inflammation, suppuration, and a detachment of the whole of the tumour. This may sometimes be the case; but, analogous instances prove, that it is undoubtedly not constantly so. The ligature seldom accomplishes an entire destruction of the disease; and there is usually reason to apprehend its recurrence. If the polypus be very large, and the whole nostril occupied, it is frequently utterly impossible to introduce the wire; and, when this is done, the front of the tumour alone can be tied.

The polypus nasi is commonly very sensible, and, consequently, tying it proves very painful. As soon as the noose is drawn tight, not only the polypus inflames, but, the whole extent of the Schneiderian membrane. The pain, and inflammation, often extend even to parts at some distance, such as the throat, eyes, &c. occasioning acute fever, which requires the strict observance of low diet, the exhibition of cooling physic, and the evacuation of blood. Hence, it is advisable in many cases, to prepare patients for this treatment, by diet and medicines.

When the polypus is tied, it swells very much, and all the complaints it previously caused are exasperated. But, in particular, the part situated in the throat, sometimes obstructs deglutition, and respira-

tion, in such a degree, that prompt relief becomes necessary. The patient soon derives comfort, when a few punctures are made into the tumour. These excite a bleeding, that very speedily lessens the swelling, but is, sometimes, difficult to check. Hemorrhage from a part of the polypus that is tied, is most effectually stopped, by twisting the wire so tight, that it closes the arteries distributed to it.

The wire sometimes breaks off close to the lower aperture of the cannula, in consequence of being twisted so much, and thus the progress of the cure is interrupted. A new wire may be introduced; but it is difficult to apply it exactly in the situation of the other. A fresh place is commonly tied, which is almost the same thing as commencing the cure anew. It is better to prevent this interruption of the treatment, by employing very flexible wire, made of the purest silver; and by not twisting and untwisting regularly the same extremity of it, but sometimes one and sometimes the other. A strong piece of cat-gut might be a very good substitute for silver wire.

Immediately the polypus is tied, it swells, inflames, and becomes painful; in a few days, it becomes shrunk, free from pain, and sphacelated. The fetid discharge now occasions considerable inconvenience to the patient, and ought to be washed away by repeated injections. Towards the termination of the case, the surgeon ought to take hold of the polypus with the forceps, to try whether any of it is loose. When the polypus is extracted, one may inject a solution of alum, for a day or two afterwards, in order to diminish the effect of the irritating discharge on the Schneiderian membrane, and the suppuration in the situation of the ligature, as it is sometimes profuse, and of long duration.

Though one might also tie polypus tumours in the throat; and, indeed, the introduction of the cannula through the mouth, and the application of the noose, would be attended with no great difficulty; and, though the treatment might be rendered more tolerable to the patient, by withdrawing the cannula after twisting the wire; yet, the swelling of the tied portion of the tumour, would, probably, create immense inconvenience. In this case, therefore, extraction usually merits the preference, and the ligature is only fit to be practised in the throat when the polypus is very small, or there is some especial cause forbidding extraction. When deglutition and respiration are impeded by the swelling of the tied portion of the polypus in the throat, the swollen part must be scarified by means of the pharyngoto-

mus, so as to excite a bleeding, and, thereby, produce a diminution of the swelling. The noose is to be frequently and strongly tightened, in order to accelerate the detachment of the polypus, and shorten the inconveniences. When the excrescence has not only descended towards the pharynx, but also into the nostril, its front portion is to be tied first. The result of this may be, such an inflammation and suppuration of the whole polypus, that, after the separation of its anterior portion, the posterior one may also become detached, or at least, easy of removal.

CAUSTICS.

The cautery, formerly recommended for the cure of the polypus nasi, is now almost entirely rejected, and, indeed, in the manner it was customary to use it, little good could be done. It was applied to the anterior surface of the tumour in the nostril, and its employment was repeated every time the slough separated. Its operation could naturally be but of small extent, as it only came into contact with a trivial portion of polypus. Its irritation augmented the determination of blood to the excrescence, and accelerated its growth; while as much of the tumour was reproduced, ere the slough separated, as was thus destroyed; and the design of completely extirpating the disease, in this way, seldom or never proved successful. However, says Richter, there is one particular example, where the cautery is the only means from which relief can be derived; and, used in a certain way, it always speedily produces the desired effect.

There are polypi of the nose, which readily bleed profusely. Touching them in the gentlest manner, and every trivial concussion of the body, give rise to hemorrhage. The patient is exceedingly debilitated by repeated loss of blood; his countenance is pallid; his feet swollen; he is affected with hectic fever; and faints whenever there is any considerable bleeding. Doubtless, extraction, in this case, is a very precarious method, as the patient is so circumstanced, that any copious effusion of blood must be highly perilous. Sometimes the polypus is, at the same time, so large, and the nostril so completely occupied and distended, that it is impossible to apply a ligature. Such is the case, to which alone the cautery promises assistance. (*Richter.*)

In employing the cautery, (says the latter author,) the object is not to effect, by its direct agency, a gradual destruction of the polypus; but to excite such an inflam-

mation, and suppuration, of the whole of it, as shall lead to this event. To fulfil this purpose, a common trocar, three inches long, may be used. The cannula ought to be two inches shorter than the trocar, whereby the latter may protrude from it so far; and it should be constructed with a handle. The cannula should be made wider than it is in common, to allow the trocar to be introduced, and withdrawn with facility. It is to be wrapt round with a piece of wet linen, and applied to the polypus. The red-hot trocar is then to be pushed into the tumour, as far as the cannula will allow it, which is, of course, two inches.

According to Richter, this method of treatment is far less painful than it has the semblance of being. It is only necessary to dry the front part of the nostril, and fill it with lint all round the cannula, in order that any moisture, heated during the operation, may not touch, and injure the inner surface of the nose. If care be taken to introduce the trocar in a proper direction, there is no reason to fear damaging the septum nasi, especially as it is preternaturally distended by the polypus. The immediate effect of the operation is to bring on an inflammation and swelling of the whole polypus, frequently accompanied with head-ach, sore throat, fever, and other complaints, which require the antiphlogistic treatment; but, on the whole, are not dangerous.

When the patient entertains a dread of the actual cautery, one might, at all events, employ the potential one, in various forms. One might introduce into the puncture of the unheated trocar, a tent of the emplastrum cantharidum, or a tent smeared with butter of antimony, which may be allowed to continue in for some time. But, these applications operate slowly, and are hardly capable of exciting inflammation of the whole polypus.

As soon as suppuration has taken place, emollient and detergent lotions should be injected into the nose; cleanliness, and the promotion of the suppurative process, demand them. It is only requisite to maintain suppuration, until the polypus is so small, that it can be conveniently extracted, or tied. To effect its entire destruction by suppuration, is a tedious undertaking. (*Richter's Anfangsgr.*)

EXCISION.

In the treatment of the polypus, the use of cutting instruments has always been reprobated, because they usually occasion a profuse hemorrhage, and can hardly ever be passed, without mischief,

to a sufficient depth into the nose to divide the root of the tumour. Yet, there are instances, in which their use might be productive of advantage. The anterior part of the polypus, situated in the nostril, is sometimes so thick and hard, that it is utterly impracticable to introduce the forceps for the performance of extraction, or the cannula for the application of the ligature. In such a case, it might be a judicious step to cut off the front of the polypus, by a sharp instrument, of a suitable shape, in order to make room for the use of the ligature, or forceps. The polypus is sometimes of a ligamentous structure, and neither admits of being tied nor extracted. There is no means of removing such a polypus, except the knife, by which it is to be cut away piecemeal.

Mr. Whately after failing in several attempts to extract, and tie, a considerable polypus of the nose, succeeded in cutting it out. He used "a narrow, straight bistoury, with a probe-joint, having a sheath fixed upon its edge, by a screw put into a hole in the handle. An eye was made at its point, to receive one end of a thread intended to be passed round the polypus, for the purpose of directing the knife to the extremity of the tumour. There was also a contrivance by which the knife could be unsheathed at its extremity, the length of three quarters of an inch. This was done by means of the screw, which might be fixed in another hole, by drawing back the sheath. By exposing such a length of edge only, the interior parts of the nose were defended from the danger of being wounded." Whoever wishes a particular account of the manner of using the instrument, must consult Mr. Whately's *Cases of two extraordinary Polypi*, &c. 1805.

In the polypus, which arises from a relaxation of the Schneiderian membrane, external astringent applications may be first tried; such as ice-cold water, solutions of acetite of lead, alum, muriate of ammonia, &c. These remedies (says Richter) commonly lessen it, and frequently, when it is not very large, accomplish its entire removal. If this should not happen, there is no reason against putting a ligature round it. Here, also, we may venture to employ a cutting instrument, if it be in our power to do so. At all events, an effort may be made to bring on suppuration of the tumour, by the cautery. But, the practice of extraction is here prohibited.

When the Schneiderian membrane is preternaturally swollen all over the nostril, which is quite obstructed, the pervious state of the cavity is to be restored by the introduction of cat-gut, or bougies. A

thin piece is first passed into the nose, and afterwards a larger, and larger one gradually, until the passage for the air is perfectly re-established. But, usually, this relief is only of short duration, as the nostril very soon closes again. Hence, such patients are advised to make constant use of flexible tubes passed into the nose; or, when this is too troublesome, to fill the nose regularly at bed-time, with catgut, and take it out again in the morning. (See *Richter's Anfangsgr. Band. 1.*)

POLYPI OF THE UTERUS.

The polypus of the uterus is of three kinds, in respect to situation. It either grows from the fundus; the inside of the cervix; or, from the lower edge of the os uteri. The first case is the most frequent, the last the most uncommon. Polypi of the uterus are always shaped like a pear, and have a thin pedicle. They are almost invariably of that species, which is denominated fleshy, hardly ever being scirrhous, cancerous, or ulcerated.

The polypus of the first kind, growing from the fundus uteri, is very difficult to detect in its incipient state. While it is small, it produces not the smallest perceptible change in the organs of generation. As it enlarges, it distends the uterus, and often excites a suspicion of pregnancy, which a more attentive examination, however, soon disperses. The swelling of the abdomen does not take place in the degree and space of time, which it does in pregnancy; the menstrual discharge continues to flow; the breasts do not become full; and, in the progress of the case, no motion is to be felt. While the polypus lies in the uterus, its growth is slow. It frequently, at this early period, occasions profuse bleeding. Women afflicted with the disease, are seldom pregnant, and when they are so, parturition commonly happens prematurely. However, it occasionally occurs, that they hold out till the end of the regular time, and experience an easy and safe delivery.

As the polypus encreases, it expands the os uteri, and, at length, protrudes into the vagina. This either takes place suddenly from an accidental concussion of the body; or slowly and gradually. In the latter circumstance, pains similar to those of labour occur, and cause the tumour to be expelled into the vagina. As soon as it has arrived in this situation, and is no longer confined and compressed by the uterus, it begins to grow more rapidly, and gives rise to far more troublesome complaints. It presses the bladder and rectum, and thus, more or less, dis-

turbs the evacuation of the urine and feces. But, in particular, it causes repeated and profuse hemorrhages, which weaken the patient exceedingly, and often bring her to the brink of the grave. The root of the polypus is situated in the os uteri, and is there so compressed, that the blood in the polypus is prevented from returning through the veins; consequently, all the vessels become turgid, and the above effusions of blood are the result. Though they generally cease spontaneously, the least circumstances cause their recurrence; such as slight concussions of the body in riding, walking, &c. In the mean while, a quantity of mucous and aqueous fluid is voided, by which the patient's strength is more reduced. The polypus, the source of this blood and mucus, is frequently misunderstood, and the patient is in a perilous state. So necessary is it in cases of preternatural discharge from the uterus, always to examine with the finger, *per vaginam*.

When the polypus has been for some time in the vagina, it at length protrudes from it externally. This happens gradually or suddenly, on the occurrence of any concussions of the body. Hence, it again excites additional grievances. As it cannot descend so low, without dragging the fundus of the uterus downward with it, and occasioning its prolapsus, the patient, on walking, or standing, commonly experiences a very painful sense of dragging, or stretching, in the pelvis. As the bladder and ureters are also forced into a deranged position, the evacuation of urine is, more or less, disturbed, or rendered difficult. The flow of the urine over the polypus, as well as the irritation of outward friction on it, frequently causes it to inflame, become painful, and ulcerated.

The polypus situated in the vagina, or protruding from it externally, may easily be mistaken for a prolapsus uteri: an error that may have very perilous consequences; but, by a careful examination, is generally not difficult to avoid. The polypus is softer and less sensible, than the uterus in the state of a prolapsus. The imperfect prolapsus uteri, in which this viscus is not turned inside out, is betrayed by the os tincæ, at the lower part of which it is plainly perceptible. In this situation, the polypus may occasionally have a depression, resembling the mouth of the womb, but easy of discrimination from it. A probe can be passed deeply into the os uteri; but, not so into this other opening. The polypus resembles an inverted pear, that is, it is thickest below, and becomes gradually thinner upward. The above species of the prolapsus uteri, is thinnest below, and gradually

increases in width upward. The fallen uterus may easily be pressed back, and when it is so, the patient experiences relief. The polypus does not admit of being pressed back, and during an attempt to do this, the patient is put to much inconvenience. A probe may be introduced by the side of the polypus deeply to the fundus uteri. When passed by the side of the fallen uterus, it is very soon stopped at the upper part of the vagina, which has sunk down with the cervix of this organ.

It is much more easy to distinguish a polypus protruded externally from the vagina, from a perfect prolapsus uteri, without inversion. The os uteri at once characterises the uterus, as it can here not only be felt, but seen. A probe may be passed deeply into the vagina, along the side of the polypus; but, not so by the side of the uterus, for reasons easy of comprehension. Moreover, the figure of the tumour, and the state of the patient, on an effort being made to reduce the protruded part, betray its real nature.

The *inversio uteri*, is commonly the consequence of a difficult labour, and hence is easily discriminated from a polypus, by its occasional cause. While the inverted uterus lies in the vagina, its shape is broad above, and narrow below; whereas the polypus is thin above, and broad below. Hence, in cases of very large polypi in the vagina, the os uteri is but little dilated; while it is extremely distended by the incomplete descent of the inverted uterus itself. Here, likewise, the reduction of the part is attended with relief; while every effort to push back a polypus causes an aggravation of all the complaints.

When the inverted uterus hangs out of the vagina, its figure, like that of the polypus, is thin upward, and broad downward; and, like the latter tumour, has no aperture at its lowest part. Here, an erroneous opinion is very liable to be formed. An attentive observer, however, will easily avoid it. The inverted uterus includes a circular fold at its upper part, next to the orifice of the vagina. This fold is nothing less than the os uteri itself, through which the body of this viscus has descended. There is nothing of this kind to be felt in cases of polypi. By the side of a polypus the finger or probe may be passed deeply into the vagina; but not so by the side of the uterus. The root of the polypus is firm and hard to the touch; the upper thin part of the uterus, which is hollow, has a soft flabby feel. Useful light is also generally thrown on the case, by the above-mentioned occasional cause of the prolapsus uteri with inversion.

In the two last descriptions of uterine polypi, which are situated either on the inside of the cervix, or at the margin of the os uteri, the disease is, as it were, from its commencement in the vagina, and the tumour, when large, produces all the complaints attending polypi of the first kind, except frequent profuse bleedings. These seldom occur, and when they do, are slight, because the root of the polypus suffers no constriction in the os uteri. As it descends out of the vagina, it occasions a prolapsus uteri without inversion, in addition to the other inconveniences.

TREATMENT OF POLYPI OF THE UTERUS.

Experience evinces, that uterine polypi, when once extirpated, have not that propensity to be re-produced, which those of the nose have. Extraction is not fit to be practised here for obvious reasons. Sometimes, however, uterine polypi are met with, which have such a thin and soft pedicle, that although they ought not to be pulled out, yet they admit of being twisted off with facility and safety. Also, numerous complaints of a serious nature, are occasionally the result of tying a polypus of the uterus. In this circumstance, after the ligature has been applied some days, we may attempt to shorten such complaints, by twisting off the tumour altogether. This object is most conveniently performed with a pair of forceps, made something like Smellie's midwifery forceps. As the part of the polypus in the ligature is constricted, thin, and already partly detached, the tumour, with a little caution, may frequently be easily twisted off, and that without any material bleeding. The actual and potential cautery, are here unnecessary, as there is always room to employ the instruments for applying the ligature.

The ligature is the most proper means of extirpating uterine polypi, and is here much more easy of application, than in the nose. How large soever the polypus may be, there is always abundance of room for the introduction of the necessary instruments. The polypus of the uterus has, commonly, a thinner pedicle, than that of the nose; and, hence, its cure by the ligature is more expeditious, than that of the latter case. The swelling of the tumour, after the ligature is applied, occasions here far less inconvenience, than in the nose, on account of the greater room, and more yielding nature of the parts. The inconveniences that do arise, are easy of removal; for instance, the retention of urine may be relieved by the catheter: costiveness by

glysters, &c. Uterine polypi are also less sensible, than nasal ones; and, hence, less pain and fever follow the application of a ligature to them. The fetid matter, that forms as soon as the polypus sphacelates, has a free vent out, and may easily be washed away by injections.

That the polypus cannot be tied, while it lies in the uterus, is easily comprehensible. But, immediately it has descended into the vagina, the operation may be undertaken, and may be performed with the same kind of double cannula, as was employed in the nose. However, here it is extremely requisite, that the cannula should be rather longer, than that already described, and somewhat curved. But, as the silver wire sometimes breaks, two other very convenient instruments have been invented.

The first is M. Levret's instrument. It consists of two silver cannulæ, which are curved in such a manner, and so united by a joint, that they are shaped like a pair of forceps. After introducing a ligature through the two tubes, so that its ends hang out of their lower apertures, the instrument is to be shut, and passed upward into the vagina, over the polypus, on whichever side seems most convenient. Then it is to be opened, and the polypus is to be pushed through the two branches of the instrument, which is to be brought over the opposite side of the tumour. In doing this, the ligature becomes applied round the root of the polypus, and forms a noose. The extremities of the ligature are next to be drawn as tightly as possible out of the lower openings of the cannulæ, and tied first in a surgical knot, and then in a slip-knot. When this is done, the instrument is shut, and the ligature constricts the root of the polypus. Afterwards it is to be tightened daily, until the tumour separates.

It is plain, that this instrument has some defects, which are, however, easily amended. It is very inconvenient, that it should be necessary for the surgeon to have several such instruments, of various sizes, and curvatures, to be able to select that, which seems most calculated for the magnitude and shape of the polypus. Moreover, as the size and figure of the polypus cannot always be ascertained beforehand, it is often indispensable to try several instruments, ere the most suitable one is found out, and such fruitless attempts must be very irksome and painful to the patient. The worst is, that though the upper ends of the instrument were to touch, when the lower are tied together, yet there would always be a space between the two apertures, where no liga-

ture would be applied to the root of the polypus, and where, consequently, its separation would not easily be accomplished. The tubes may, also, bend with the force used in applying them, and the pain caused by the expansion of the instrument, would then be very considerably increased.

All these defects are done away in the instrument described by Nissen, *de polypis uteri*, (See *Richter's Chir. Bibl.* 9. B. S. 613.) It consists of two silver tubes, twelve inches in length, and as thick as an ordinary writing pen. Both are curved about as much as the os sacrum; but, as they are made of pure silver, the curvature may easily be increased or diminished, according to circumstances. Through each of the cannulæ a strong ligature is to be passed, so that its ends hang out of the lower apertures, while its middle portion forms a noose between the upper apertures of the cannulæ.

The tubes are to be kept together, until they have been introduced into the vagina, as far as the root of the polypus. One is then to be held fast, while the other is to be carried round the tumour, to the opposite side of the cannulæ that remains stationary. Thus the ligature becomes applied round the root of the polypus. After introducing the finger into the vagina, to ascertain that the ligature lies in its proper situation, its ends are to be drawn through a small double cannula, which is only one third of an inch long, but so wide that it can be pushed over both the tubes a certain way with the finger, and the upper end of the long cannulæ with the aid of a sort of long probe, with a forked extremity. Then a third double cannula, through which the ends of the ligatures have likewise been passed, and the width of which is sufficient, is to be pushed over the lower ends of the long cannulæ, so as to unite them. The ligatures are next to be drawn tight in the ordinary way, and fastened to the rings. The management of this instrument is so easy, as to need no further explanation.

This instrument is certainly far superior to any one commonly used in this country. It is difficult to pronounce, whether its simplicity; aptness for the object intended; or, the facility of using it; lays the greatest claim to our commendations. The same reasons, which recommend its employment in polypi of the uterus, equally point out the advantage of having an instrument, constructed on the same principle, for tying nasal ones.

Besides the above instruments, there are numerous other ones, that have been

devised, and recommended for tying polypi of the uterus. That, invented by Desault, claims the attention of such surgeons, as wish to be informed of others.

Acute symptoms frequently follow the application of the ligature, and are either of an inflammatory, or spasmodic kind. The former require antiphlogistic treatment. Sometimes a fever arises, and the polypus becomes exceedingly painful: in this case, venesection is often necessary. The spasmodic symptoms require the exhibition of opium. When this is ineffectual, and the symptoms are severe, it may be proper to slacken the ligature a little. As the polypus at first always swells, it produces great pressure on the adjacent parts. For this reason, it is generally necessary, for the first few days, to draw off the urine with the catheter, and to open the bowels with glysters. Sometimes hemorrhage takes place. This is generally suppressed by astringents; but, when they prove ineffectual, tying the ligature more tightly answers the purpose. The rest of the treatment resembles that of nasal polypi.

When the polypus is large, forceps are, in the end, often necessary for its extraction. The inflammation, or ulceration, that may possibly be occasioned in the vagina by the fetid matter, is easily removed by injections after the detachment of the polypus. As the ligature is always applied round the pedicle, closely to the os uteri, consequently seldom to the root of the polypus, which is usually at the fundus uteri, there is almost always a portion of the root remaining behind, after the tumour has separated. Though it is said, that this afterwards diminishes, and falls off; yet, it is quite a matter of uncertainty. But, it is an undoubted fact, that the polypus uteri is exceedingly seldom reproduced. (*Richter.*)

This author observes, that cutting instruments are, in general, improper to be used for polypi of the uterus, as their employment would injure the vagina, and, for the most part, occasion a dangerous hemorrhage. There is, however, one case, where the knife is indispensable. The polypus has occasionally a ligamentous pedicle, and consequently can neither be tied, nor extracted. This circumstance is usually undiscovered till after a ligature has been applied, which here commonly produces extraordinary pain, and, though it be applied ever so long, and forcibly occasions no detachment of the polypus. In this instance, the surgeon has the choice of two plans. He may either cut off the polypus closely to its root in the vagina; or he may first draw it gradually downward out of this situation. The first

object might, perhaps, be performed with a sharp hook, somewhat curved at its side, and similar to what is used for tearing the fœtus piecemeal in the uterus; or, with what seems better, a pair of long, curved, blunt-pointed scissors. The last object may be accomplished with forceps resembling Smellie's midwifery ones. They are to be introduced into the vagina in the ordinary way. The polypus is then to be taken hold of, and gradually drawn so far out of the vagina, that its pedicle may be divided with a knife. This is, indeed, not done without pain, and a forcible inversion of the uterus; but, it is always free from dangerous consequences. When a polypus, the root of which is attached to the fundus uteri, lies in the vagina, the uterus is always, in some degree, inverted beforehand; and this state is, therefore, only increased by the foregoing plan, which never creates danger, when done slowly, and cautiously. How often has the uterus been suddenly inverted, and forced outward, without fatal consequences! Besides, the above plan has already been successfully practised. (See *Herbiniaux Parallele des differens Instrumens pour la Ligature des Polypes.*)

When a polypus, that has its pedicle attached to the fundus uteri, suddenly falls downward, it occasions a sudden inversion of this viscus. In order to relieve, as speedily as possible, the great pain, and danger of this case, the surgeon must, tie the root of the polypus, as soon, and as firmly as he can, and pass the ligature, by means of a needle, through the pedicle, before the place where it is tied, allowing the ends afterwards to hang down for some length. Then the polypus is to be amputated below the ligature, and the uterus immediately reduced.—This is another example, where a cutting instrument may be used with advantage. The ordinary method of tying such tumours, so situated, accomplishes only a slow detachment of them, and is not sufficiently expeditious in procuring relief.

Fleshy excrescences also occasionally form in the vagina, some of which have a broad basis, and others a thin pedicle. The last merit the appellation of polypi. Their existence is easily ascertained by the touch. By making pressure on the bladder, and rectum, they occasion several impediments to the evacuation of the urine, and feces. They may be most conveniently tied, by means of the double cannula. Should the polypus be situated at the lower part of the vagina, the cannulae would not be required. The ligature might be applied with the hand, and the tumour cut off below it.

There is still another kind of tumour in the vagina, to be classed in the rank of polypi. It resembles, in many points, the polypus of the mucous membrane of the nostril, consisting altogether of the membranous lining of the vagina, which, at the part affected, becomes relaxed, thickened, and elongated; hence, the tumour might more properly be termed a *prolapsus of the membrane lining the vagina*, than a polypus. When it resists the efficacy of astringent and corroborant injections, it may be tied, or, what is better, cut off.

A polypus in the œsophagus renders deglutition difficult; and, when of large size, puts an entire stop to it. When an inclination to vomit is excited by irritating the throat with the finger, or a feather, the polypus, if situated towards the upper part of the tube, ascends into the mouth, so as to become visible. But, as it impedes respiration during its residence in the mouth, the patient is soon necessitated, as it were, to swallow it again. When the polypus is situated at the lower part of the œsophagus, of course, it cannot be brought into the mouth, and is very difficult to detect. The difficulty of swallowing, its only symptom, may result from other causes. In this case, it is also incurable; for, it is impossible to take hold of it with instruments. An operation can only be practised, when the polypus is situated at the upper part of the œsophagus. The tumour obviously cannot be extracted; it can only be tied, and this is difficult. In order to apply the ligature, the excrescence must be first brought into the mouth by exciting an effort to vomit. As this impedes respiration, the operation must be done with the utmost celerity, and the ends of the ligature cut off short, that the patient may immediately swallow the tumour again. It is easy to discern, that in this way, the ligature is never applied sufficiently close to the root of the polypus, nor tightly enough: consequently, the separation of the tied portion either does not take place at all, or very slowly; and a large part commonly remains behind, which soon attains its former bulk, and causes its preceding inconveniences. Perhaps, the operation might be performed with more exactness and success, if an opening were previously made into the trachea by bronchotomy. Then the patient might breathe through the aperture, the polypus might continue in the mouth during the whole cure, until detached; and perhaps, might be tied close to its root, by means of a curved tube. Experience, (adds Richter) must decide, whether this plan is advantageous, and practicable.

Polypi in the rectum may be felt by the
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fingers. The first suspicion of them arises from the impediment to the evacuation of the excrement. They are to be tied with the aid of the cannulæ. Excrescences in the meatus auditorius externus, resembling polypi, have been successfully extirpated by extraction; or rather by twisting them off.

For many of the foregoing remarks, I am indebted to Richter, who has very ably treated of polypi in his *Anfangs. der Wundarzn. Band. 1, Kap. 21.* See also *Pott's Remarks on the Polypus of the Nose. Whately's Two Cases of Extraordinary Polypi. John Bell's Principles of Surgery, Vol. 3, Part. 1. Encyclopédie Méthodique; Art. Polype.*

PROCIDE'NTIA. (from *procido*, to fall down.) A prolapsus, or falling down of any part. (See *Anus, Prolapsus of; Uterus, Prolapsus of, &c.*)

PROGNOSIS. (from *πρὸς*, before, and *γινωσκω*, to know.) A knowledge of the signs, by which we foretel what will happen to the patient.

PROLAPSUS. (from *prolabor*, to slip down.) A falling down of any part. Same as *Procidencia*.

PROSTATE GLAND, DISEASE OF. According to Mr. Home, the prostate gland is not a very sensible part. Dr. Baillie has seen a common abscess situated in it, and he says, that it is also subject to scrophulous disease, as, on cutting into it, he has met with the same white curdy matter, which is formed in a scrophulous absorbent gland. He has likewise forced out of its ducts scrophulous pus.

The most frequent disease of this part is a scirrhus enlargement of it, when, from its natural size of a chesnut, it becomes as large as the fist. When cut into, it exhibits a very firm whitish, or brown substance, containing membranous septa. Sometimes its external surface is ulcerated, though this is not often the case; and fistulous communications are occasionally formed with the rectum. A considerable enlargement of the prostate gland is attended with great difficulty of voiding the urine, and the muscular coat of the bladder becomes, in consequence of the efforts it has to make, very much thickened. This disease of the prostate gland seldom occurs, except in old men, and is not so common as many suppose. Mr. Home observes, that the morbid enlargement of the gland does not diminish the size of the passage into the bladder, but rather increases it. The lateral portions of the gland as they swell, widen the passage between them, rendering it of an oval form; it is therefore the project-

ing portion, from the lower part, which prevents the urine from flowing, and obstructs an instrument in its passage into the bladder. The obstruction, in some instances, arises from the two sides of the gland enlarging unequally; the larger portion pressing against the smaller, which is made hollow to receive it, so that the passage winds round the projecting part, and this winding cannot be followed by an instrument.

Mr. Home remarks, that a stricture may be distinguished from an enlargement of the prostate gland, by the following circumstances: the distance of the obstruction from the external orifice is to be determined by passing a soft bougie, which is to be left in the canal for a minute, so as to receive an impression from the obstruction. If the bougie does not pass further than seven inches, and the end is marked by an orifice of a circular form, (it is immaterial as to the size of the orifice,) the disease is certainly a stricture; but, if it passes further on, and the end is blunted, a disease in the prostate gland is to be suspected. This in general can be ascertained by a flexible gum catheter with a stilet, very much curved, passing into the bladder, which it will do, in most cases of enlargement of the gland.

Among the symptoms of a diseased prostate, we have also to mention, a difficulty of voiding the feces; an occasional discharge of a kind of mucus; an uneasy sensation about the rectum, after going to stool, as if more of the feces remained undischarged. The difference between the symptoms of a stone in the bladder, and those arising from disease of the prostate, is explained in the article *Lithotomy*.

The occasional retentions of urine, to which patients with disease of the prostate are subject, to require the introduction of the catheter, and the surgeon will succeed in passing this instrument better, when he remembers, that the urethra, in consequence of the disease, makes a very sudden turn upward, just before it terminates in the bladder.

The enlargement of the prostate gland may often be felt by passing a finger into the rectum. Surgeons are unacquainted with any certain mode of diminishing the scirrhus enlargement of the prostate gland. The *pilule hydrargyri cum cicuta* have been recommended. (See *Pilule*.) Mr. Home mentions a case, in which suppositories of opium and hemlock, passed up the fundament, and allowed to dissolve there, gave more relief, than any other plan; they not only lessened the irritation, but produced a diminution of the projection of the gland.

Some abscesses, and ulcerations of the prostate, in consequence of strictures, may be cured, by removing the latter disease.

The prostate gland has occasionally small calculi in the ducts: but, the disease is so uncommon, that authors have not ascertained the particular symptoms, &c. I shall conclude with referring to *Baillie's Morbid Anatomy; Home on Strictures. Vol. 1, and on Diseases of the Prostate Gland.*

PRURITUS. (from *prurio*, to itch.) A violent itching.

PSEUDOSYPHILIS. (from *ψευδης*, false, and *Syphylis*, a shepherd, who fed the flocks of King Alcinous, and who, proud of their number and beauty, insulted the Sun; as a punishment for which, the venereal disease was sent on earth; or from *σιφλος*, filthy.) Disease, resembling the venereal, but not really of this nature. The spurious venereal disease. (See *Venereal Disease*.)

PSOAS ABSCESS. See *Lumbar Abscess*.

PSORA. (from *ψαιρω*, to rub.) The itch, which is attended with a perpetual inclination to rub, or scratch the parts.

PSOROPHTHALMY. (from *ψωρα*, the itch, and *οφθαλμια*, an inflammation of the eye.) An inflammation of the eyelids, attended with ulcerations, which itch very much. By psorophthalmia Mr. Ware means a case, in which the inflammation of the eyelids is attended with an ulceration of their edges, upon which a glutinous matter lodges, incrusts, and becomes hard, so that, in sleep, when they have been long in contact, they become so adherent, that they cannot be separated without pain.

Mr. Ware remarks, that "the ulceration in the psorophthalmia is usually confined to the edges of the eyelids; but, sometimes, it is seen to extend over their whole external surface, and even to excoriate the greater part of the cheek. In cases of the latter kind, the inflammation which accompanies, has often much the appearance of an *erisypelas*, and will receive most relief from cooling applications. The use of the citrine ointment, which will hereafter be recommended, must, in such instances, be deferred until the irritability of the skin is in a good degree abated.

"This disorder is also, sometimes, attended with a contraction of the skin of the lower eyelid; in consequence of which, that lid is drawn down, and the inner part turned outward, so as to form a red, fleshy, and most disagreeable appearance, called *ectropium*. Whenever this happens, it proves the complaint to

be of the most obstinate nature; though it is generally removed by the cure of the psorophthalmia, which is the occasion of it." (*Remarks on Ophthalmia, &c.* p. 112.) Mr. Ware recommends, for the cure of this disease, the unguentum hydrargyri nitrati. This is to be melted into an oil, and rubbed with the end of the forefinger, or the point of a small pencil-brush, into the edges of the affected eyelids, once every night, on going to bed. A plaster of ceratum album is then put over the eyelids to keep them from adhering together. If they should still adhere in the morning, he advises cleaning them with milk and butter, well mixed together. In a few cases, it is necessary to touch the ulcers, formed on the edge of the eyelid, after the small-pox, with the argentum nitratum. When the globe of the eye is inflamed, use the thebaic tincture, as directed in the article *Ophthalmia*. In scrophulous subjects, alterative medicines; an issue, or perpetual blister; and attention to diet, &c. are proper. (See *Ware on Ophthalmia, &c.*)

PTERYGIUM. (dim. of πτερυξ, a wing.) Scarpa accurately remarks, that surgeons apply the term "*pterygium*" to that preternatural, reddish, ash-coloured, triangular little membrane, which most frequently grows from the internal angle of the eye, near the caruncula lachrymalis, and gradually extends over the cornea, so as to cause considerable impediment to vision.

Though the pterygium most commonly proceeds from the internal angle, it is observed to arise sometimes from the external one, and, in some instances, from the superior, or inferior hemisphere of the eye-ball. But, whatever be its origin, its figure is invariably that of a triangle, with its base on the white of the eye, and its apex more or less advanced over the cornea, towards its centre, and that of the pupil. Indeed, there are a few cases, in which two, or three pterygia of different sizes occur on the same eye, and are arranged round its circumference at interspaces of various breadths. Their points are directed towards the centre of the cornea, and if they should unfortunately conjoin there, the whole of that transparent membrane becomes covered with an opaque veil, and a total loss of sight is the consequence. It seems to Scarpa, that the term "*pannus*" was applied by the ancients to exactly this sort of complication.

Strictly speaking, chronic varicous ophthalmia, with relaxation, and thickening of the conjunctiva; opacity of the cornea; and the pterygium; only differ in the degree of the disease. In reality,

all the three complaints consist of a more, or less extensive varicous state of the vessels of the conjunctiva, combined with a degree of preternatural relaxation, and thickening, of that membrane.

In chronic varicous ophthalmia, the extraordinary amplitude, and knottiness of the vessels; the flaccidity, and thickening of the conjunctiva; are limited to the white of the eye. In opacity of the cornea, certain veins even dilate, and become knotty, for some way, over that delicate layer of the conjunctiva, which is continued over the surface of the cornea. In the pterygium, an extraordinary swelling of this subtile membranous expansion is added to the varicous state of its veins. Hence, the pterygium seems at first like a new membrane formed on the cornea, while it is really nothing more, than the delicate continuation of the conjunctiva just mentioned, deprived of its transparency, and degenerated, in consequence of chronic ophthalmia, into a thick, opaque membrane, on which there is a plexus of varicous blood-vessels. Consequently, in the case of pterygium, there is no new production on the eye, but only an alteration of one of the thin, transparent membranes, which naturally cover it. The following circumstance, as will be more fully explained presently, illustrates, says Scarpa, the veracity of the preceding statement. The incipient pterygium may be cured in the same manner as opacity of the cornea, viz. by merely cutting off that portion of it, which is situated at the junction of the cornea with the sclerotica, without detaching the whole of it from the surface of the former membrane; just as is practised in opacity of the cornea, in order to destroy the communication of the varicous veins of the conjunctiva with their trunks, the ramifications of which produce, and maintain the disease.

Scarpa observes, that the pterygium would be as common a complaint as the varicous chronic ophthalmia, so often occupying the white of the eye, if the delicate continuation of the conjunctiva, over the surface of the cornea, were not naturally of a denser, and more compact texture, than the rest of the membrane, from which it is produced, and if its vessels were not very minute, and delicate, and not so dilatable as those of the other part of the conjunctiva. This is the reason why the pterygium is comparatively a rare case, in respect to the great frequency of varicous, chronic ophthalmies. But, should the vessels of the transparent layer of the conjunctiva once yield to the impulse of the fluid propelled into them; should they once become varicous; the cellular texture, in which they are enveloped,

never fails to swell gradually, and, thus, the delicate, diaphanous membrane in question, changes into a pulpy, reddish tunic, precisely similar to the pterygium.

That the pterygium is truly nothing else but the natural, delicate, transparent expansion of the conjunctiva, on the cornea, converted, for a certain extent, into a pulpy, flaccid varicous membrane, may be inferred (continues Scarpa) from the folds, which the pterygium and conjunctiva form at the same time, when the morbid eye is turned towards the origin of the disease. The same inference is equally deducible from the tension occasioned in both these parts, whenever the eye is moved in the opposite direction. We become still more convinced of the fact on observing, that in the first position of the eye, both the pterygium, and the corresponding portion of the conjunctiva (which is equally relaxed, varicous, and reddish,) may be easily taken hold of with a small pair of forceps, and raised together in the form of a fold.

When the pterygium is met with in the dead subject, on carefully cutting off, and detaching, that flaccid, and thickened portion of the conjunctiva, in the white of the eye, which corresponded to the part of the cornea in the state of opacity from the pterygium, Scarpa has constantly found, that the pterygium might be separated, with equal facility, both on the white of the eye, and the cornea. The latter membrane was evidently denuded at the seat of the disease, being no longer covered with the transparent continuation of the conjunctiva. But, Scarpa has never been able to deprive the cornea of its natural covering, beyond the limits of the pterygium. Also, when several pterygia occur on the same eye, with interspaces between them, as many flaccid, varicous, pulpy places appear in the conjunctiva on the bulb, and constitute the basis of the pterygia; while the rest of this membrane, covering the white of the eye, continues smoothly spread over the ball, and no varicous blood-vessel is perceptible on the anterior hemisphere of the eye, except where the relaxation of the conjunctiva, and the knottiness of the vessels, have implanted, as it were, the distant roots, and rudiments of the pterygium.

The pterygium, whether large, or small, and whatever its situation may be at the circumference of the eye-ball, constantly retains its triangular shape, with its base on the white of the eye, and its apex on the cornea. The constancy of this fact seems to Scarpa attributable to the increasing degree of firmness, with which the subtile, transparent layer of the conjunctiva adheres to the surface of the cor-

nea, as it proceeds from the circumference to the centre of that membrane. The following consequences must necessarily result from this sort of structure, and the different degree of cohesion, actually existing in healthy eyes. 1. The progress of the pterygium must be slower in every instance on the cornea, than on the white of the eye. 2. As the pterygium always meets with augmented resistance, in proportion as it endeavours to approach the centre of the cornea, it must, from mechanical necessity assume the form of a triangle, with its base on the white of the eye, and its apex directed towards the centre of the cornea. Forestus (*Oper. Med.*) has accurately noticed the circumstances of this appearance, and, he continues: *non cooperit oculum nisi in formâ sagittæ.*

From this invariable appearance, and figure of the pterygium, one of its principal diagnostic characters results, by which the true disease may be discriminated from false instances, and from every other soft, fungous, reddish excrescence, that obscures the cornea. For, on this membrane, excrescences sometimes form, which, from having the colour and consistence of a soft membrane, bear a very great resemblance to the pterygium, though they are really widely different, and strictly speaking, consist of the texture of the cornea itself, degenerated into a soft, fungous substance. Such pellicles, however, not only almost always create a greater prominence on the cornea, than what accompanies the pterygium, but they are constantly of an irregular tuberos form, and never represent a triangle, with the apex pointing towards the centre of the cornea, like the genuine pterygium.

Another distinguishing character of the pterygium (continues Scarpa) consists in the facility, with which the whole of it may be taken hold of with a pair of forceps, and raised into a fold on the cornea. Every other kind of excrescence, attached to this membrane, continues firmly adherent to it, and cannot be folded, and raised from the surface of the cornea, in any manner whatever. This particularity is of the highest importance in the treatment of the disease; for, the genuine pterygium may be cured by simple means, while fungous excrescences of the cornea, can only be radically removed, and perfectly cicatrized with the utmost difficulty. Plenck very properly observes, on this head: *Pterygia, quæ filamentis solummodo adherent, faciliè abscinduntur, difficilimè quæ ubique accreta sunt corneæ, ac in plicam elevari non possunt.* If this excrescence should adhere firmly to the cor-

nea, be of a deep red colour, easily bleed on being touched, and, cause shooting pains in the whole eye, and temple, though it be of a triangular figure, and constitute the true pterygium, it now threatens to assume a malignant cancerous nature, or has done so already. Hence, in the treatment, it is necessary only to adopt a palliative plan, or else extirpate the whole eye-ball.

The true, benign pterygium, says Scarpa, which has a triangular figure, is ash-coloured, or pale-red, is free from pain, and admits of being raised in the form of a fold on the surface of the cornea, may be cured by cutting the opaque triangular little membrane accurately from the surface of the cornea, which is in part covered by it. But, as it appears, from what has been said, that the pterygium is nothing, but a portion of the delicate, transparent layer of the conjunctiva, converted by chronic varicous ophthalmia into a thick, opaque tunic, it follows, that the pterygium cannot be removed in any way, without the spot, which it occupies on the cornea, being bereft of its natural external covering. Also, as this denudation of the cornea renders a cicatrix unavoidable at the place, it equally follows, that the knife cannot be employed in the cure of the disease, without the cornea being rendered more or less opaque at the part, where the pterygium was before situated. Hence, Scarpa cautions young surgeons not to allow themselves to be deceived by the specious accounts of authors, who assert, that they have removed pterygia with the scalpel, and entirely restored to the cornea its former natural transparency. It is true (says he) that, after the removal, and cure, of the pterygium, the cornea at the part affected becomes less opaque than it was before; but, the place always continues dim, and clouded with an indelible, though a superficial cicatrix. The amendment, derived from the operation, cannot but be considerable; by means of the incision, and firm cicatrix, a stop is put to the progress of the complaint, or rather to the increase of the varicous affection, and swelling, of the thin, transparent layer, of the conjunctiva, situated on the cornea; the local cause of irritation, and inflammation of the eye, is entirely obviated; and, thus, complete opacity of the cornea is prevented. But, should it ever have happened after the recision of a large pterygium, that the patient regained his sight, we are to understand a certain degree of vision; in that proportion (Scarpa wishes to signify) which exists between a dense membrane, which entirely obstructs the pas-

sage of the light, and a slight, superficial cicatrix of the cornea, which does not intercept it altogether.

Scarpa's experience enables him to state, however, that the superficial, indelible speck, remaining on the cornea, after the recision of the pterygium, is always less extensive, than the space previously occupied by the disease. This fact, says he, is a constant one, and, in the vast number of pterygia, for which he has operated, some had advanced over the cornea two lines, others two and a half, towards its centre. In all, the scar, and opacity, of the cornea, diminished after the cure was perfected, and never exceeded a line and a half, or a little more, in cases, in which the pterygia had been two lines in length.

The recision of the pterygium is a very easy operation. For this purpose, there is no occasion for a needle threaded with silk, which most surgeons recommend to be passed through the little membrane, in order to make a noose for raising the pellicle, which must be divided at its base. The plan is disadvantageous, as it prolongs the operation considerably, and, particularly, as the bleeding from the punctures prevents the operator from distinguishing, with the necessary clearness, the margin of the parts designed for removal. A pair of dissecting forceps, and a pair of sharp scissors, suffice for this operation.

It is customary (continues Scarpa) to remove the pterygium by making the incision on the cornea, and extending it over the white of the eye, as far as the base of the disease reaches on the conjunctiva; so that when the pterygium grows from the internal angle of the eye, most surgeons continue the section as far as the caruncle. This practice is disadvantageous, first, because it denudes too much of the white of the eye; secondly, because, in consequence of the large portion of the conjunctiva removed at the base of the pterygium, and, in consequence of the direction of the wound, the cicatrix in the white of the eye, forms an elevated frænum, which, like a little cord, keeps the eye-ball approximated to the caruncula lachrymalis, and destroys the freedom of its motions, particularly, towards the external angle.

To avoid this inconvenience, Scarpa says, he has found it useful, in the treatment of pterygia with bases extending far in the white of the eye, to detach them at their apex, as far as the junction of the cornea with the sclerotica, and then to separate them at their base by a semi-circular incision, comprehending one line in breadth of the substance of the conjunc-

tiva, and made in a direction concentrical with the edge of the cornea. Scarpa has observed, that, in this mode of operating, the subsequent cure takes place sooner, than when the common method is adopted; the cicatrix occasions no sort of frænum, and the conjunctiva, circularly stretched by the cicatrix, lies smoothly over the white of the eye, and loses that relaxation, and varicous state, which are the groundwork of the pterygium. Such attention, however, is not requisite, when the pterygium is small, and its base does not extend far in the white of the eye.

Scarpa describes the operation, as follows: The patient being seated, an assistant behind him is to elevate the upper eyelid with the index and middle fingers of one hand, while he depresses the lower eyelid with the corresponding ones of the other. Supposing it the right eye, the operator is to stand, or sit down, just as he prefers, in front of the patient; and the former, after directing the latter to move his eye-ball towards the part corresponding to the base of the pterygium, is to seize the morbid membrane with a pair of forceps held in his left hand, and pinch it into a fold, at about one line from its apex. The duplicature is now to be raised, and drawn out gently until a sensation of something giving way is felt, which indicates the detachment of the pterygium from the delicate cellular texture, by which it is connected with the subjacent cornea. Next, by means of a pair of scissors in the right hand, the surgeon must dissect this fold, as closely as possible, from the cornea, proceeding from the apex towards the base of the pterygium. The section being completed to where the cornea and sclerotica meet, the fold is to be again elevated still more, and, with one stroke of the scissors, the pterygium, and the relaxed portion of the conjunctiva, forming its base, are to be detached, as concentrically, and closely to the cornea, as possible. This second incision will have a semilunar shape, the horns of which ought to extend two lines beyond the relaxed part of the conjunctiva in following the curvature of the eye-ball.

When the operation is finished, the surgeon must promote the hemorrhage; by washing the part with warm water, and then cover the eye, that has been operated on, with a pledget of dry lint, or lint moistened in the aqua vegeto-mineralis, supported by a bandage, that does not make too much pressure on the part.

If no particular symptoms arise, (continues Scarpa) such as pain, tension of the eye, considerable tumefaction of the eyelids, it is sufficient to wash the eye,

and inside of the eyelids, three or four times a day with a warm lotion of mallows, and carefully keep these parts from being exposed to the air, without compressing them. If the symptoms just mentioned should afterwards occur, the antiphlogistic treatment must be adopted in its full extent, &c.

On the fifth or sixth day, at latest, after the operation, all the surface, from which the pterygium was cut, appears yellowish, and covered with a fluid, like mucus. This is a mode of suppuration (says Scarpa) peculiar to membranes in general, and particularly, to those of the eye. The edges of the wound, and the adjoining part of the conjunctiva, assume a reddish colour. Afterwards, the surface of the wound contracts more and more daily, so that, at length, it completely closes, and the cicatrix forms.

During the whole treatment, subsequent to the operation, there is no occasion to employ any other topical applications, but the warm lotion of mallows, three or four times a day. Numerous cases have convinced Scarpa, that astringent collyria, and the boasted powders of the florentine iris, and alum, cause great irritation to the eye operated on, and give rise to tumefaction, and a fungous-like state of the conjunctiva, which are impediments to the cure. What is still more incommodious, is, that such means produce fungous excrescences on the middle of the wound itself, which only admit of being repressed and cicatrized with difficulty. Scarpa has seen all these inconveniences arise from one single unnecessary application of the argentum nitratum. On the other hand, when a mere lotion of mallows is the only remedy employed in the treatment, the cure proceeds regularly; the yellowish surface of the incision diminishes daily, and in three, or, at most, four weeks, the wound is quietly healed. The vitriolic collyrium, containing a few drops of camphorated spirit of wine, can only be prudently instilled, three or four times a day, into the eye, for the purpose of strengthening the conjunctiva and its vessels, after the wound is perfectly cicatrized.

We have already repeated Scarpa's sentiment, that the incipient pterygium, strictly speaking, is nothing more, than an opacity of the cornea, in which the venous vessels of the conjunctiva covering that part of the cornea, which is the seat of the disease, are somewhat more dilated, than in the case, to which the term, "*opacity*," is usually assigned; and, also that the density, and opacity, of the delicate layer of the conjunctiva are much more considerable, at the part affected, in the

instance of pterygium, than in that of simple opacity of the cornea.

The incipient pterygium (adds this author) is not a dense, opaque membrane, but a pellicle as fine as a cobweb, interwoven in different places with varicous blood-vessels, the iris continuing tolerably visible behind it. In this early state of the pterygium, it is unnecessary to deprive the cornea of its natural covering; it is quite enough to cut off a portion of it, in order to intercept all communication between the dilated venous ramifications of the pterygium, and the varicous trunks in the white of the eye.

The recision, says Scarpa, is accomplished by cutting out, with a pair of forceps and scissors, a semilunar piece of the conjunctiva, at the point where the cornea and sclerotica conjoin, and exactly at the base of the incipient pterygium, just as is practised for opacity of the cornea. The recent pterygium is observed to disappear gradually after the operation, or to change into a slight dimness of the cornea, extending over a part of the space previously occupied by the disease. This opacity is commonly much more trivial, than what follows a cicatrix. Acrell, in his *Surgical Observations*, mentions having successfully treated an incipient pterygium in this manner. Scarpa has also tried the plan several times with success. *Scarpa sulle Malattie degli Occhi, cap. 11.*)

PTOSIS. (from *πτωω*, to fall down.) An inability of raising the upper eyelid. The affection may be owing to several causes, the chief of which are a redundancy of skin on the eyelid; a paralytic state of the levator muscle, a spasm of the orbicularis. Ptosis from the first cause may be cured by cutting away the superfluous quantity of skin. When the case depends on paralysis, the surgeon may try bathing the eye and surrounding parts with cold spring water, and rubbing the eyelid and eyebrow with any liniment containing a little of the tincture of cantharides. The linimentum camphoræ; the shower bath; and bark; may also be occasionally tried. The spasmodic ptosis requires antispasmodic medicines; the application of a blister to the temple; and fomenting and bathing the eye and eyelids with a decoction of cicuta, or poppy-heads.

PTYALISMUS. (from *πτυαλιζω*, to spit.) A copious discharge of saliva.

PUNCTURED WOUNDS. See *Wounds*.

PUPIL, CLOSURE OF. An inconvenience, not frequent indeed, but which however sometimes follows the operations of depression, and extraction, is a closure of the pupil in such a degree,

that it becomes almost, or quite shut, attended at first with a diminution, and afterwards with an entire loss, of sight.

This unpleasant occurrence, says Scarpa, is most frequently the consequence of a vehement inflammation of the internal membranes of the eye, especially, the iris, occasioned by the extraction, or depression, of the cataract. In some particular instances, this inconvenience follows one of these operations, but without the inflammation of the internal parts of the eye, and especially of the iris having any share in its origin, at least, as far as we can judge from appearances. In such circumstances, after an indeterminate time from the operation of depression, or extraction, the pupil is perceived to diminish in diameter daily, without any evident cause, so that at last it becomes, as it were, entirely obliterated, and that without the patient complaining of any uneasiness in the eye, if we except, in a few individuals, a greater sensibility, than is natural, in the immediate organ of vision, even to a very moderate degree of light. In both cases, the pupil ordinarily closes so much, that it can hardly admit a small pin's head, and continues motionless; while within the situation of the pupil itself, the iris assumes a stellate, rugose appearance, with a little irregular aperture in the centre, behind which, when the cataract has been extracted, or depressed, the deeper part of the eye seems black; or, if a portion of the anterior convexity of the opaque crystalline capsule, should chance to remain behind after one of these operations, and has subsequently come into contact with, and adhered to, the posterior surface of the iris, a small whitish speck, or veil, may be seen there.

Theory has induced some to suppose, that, when this morbid closure of the pupil originates from an excessive distention of the vessels of the iris, in consequence of severe inflammation affecting that membrane, it may be cured by means of local and general bleeding, purgatives, blisters, and a seton in the nape of the neck. On the other hand, they have deemed emollients, and internal and external antispasmodics, serviceable, in the instance of constriction of the pupil arising from spasm of the iris, and increased morbid sensibility of the immediate organ of sight, in consequence of the sympathy of the latter with the iris. But, how plausible soever these curative indications may seem to be for the closure of the pupil, practice has not admitted their efficacy. On the contrary, says Scarpa, it has clearly evinced, that this disease cannot be remedied, except by making an

artificial opening in the iris, as a substitute for the natural pupil, now wholly, or partly obliterated, and as an aperture, which is to do the functions of the original one.

To the best of Scarpa's knowledge, Cheselden was the first, who ventured to devise, and execute a section of the iris, for the purpose of forming an artificial pupil. He introduced a couching needle, having a sharp edge only on one side, through the sclerotica, at the distance of a line and a half from the cornea, into the interior of the eye. After perforating the iris towards the external angle, and then pushing the point of the needle through the anterior chamber of the aqueous humour, as far as that side of the iris, which is nearest the nose, he turned the edge of the instrument backward, and withdrew it, so as to make a transverse division of the iris.

It is related, that this operation was attended with the greatest success. However, Janin (*Mem. sur l'Œil*) assures us, that, having performed it on two subjects with the utmost care possible, he did not find the smallest benefit follow it; for, in these two patients, as soon as the symptoms, produced by the operation, subsided, he found the transverse section, made in the iris by the edge of the needle, re-united, and consolidated. Sharp had experienced the same thing, before Janin. (*On Operations*, chap. 29.)

An accident occurred to Janin, in the act of extracting a cataract; viz. he included the iris together with the cornea, in Daviel's scissars, and cut it perpendicularly. This circumstance taught him, as he expresses himself, that a perpendicular section, made in this membrane, on one side of the pupil, was the only truly efficacious method of preventing the edges of the wound of the iris from growing together again, so as to form a durable artificial pupil. This is exactly what led this oculist to make it an operative method, and to propose it, as the best expedient for making an artificial pupil. His plan consisted in opening the cornea, as is practised for the extraction of the cataract, and in dividing the iris perpendicularly with scissars, near that part of the pupil, which is next to the nose, and he affirms, that he has seen strabismus result from making the section towards the external side, on account of the too great divarication of the optical axes.

In the small number of cases of closure of the pupil, which Scarpa has seen and treated, as consequences of the operation of the cataract by extraction, or depression, he has never been able to make up his mind to open the cornea, in order to

accomplish with scissars the perpendicular section of the iris, as proposed by Janin, or with the knife, as recommended by any other person. He has felt conscious of the frequent severe symptoms, which arise from making an opening into the cornea, when the eyes have already been affected, after the first operation, with violent internal ophthalmy, spasm, and morbid increase of sensibility in the immediate organ of sight. He says, he will never cut the cornea again after the extraction of the cataract, lest an irregular cicatrix should be the consequence. He is the less inclined to do so, as he is convinced, that it is not so easy, as some may conceive, to divide the iris, with scissars, when it has become flaccid in consequence of the escape of the aqueous humour. Scarpa had had occasion to see more frequently, than once, the edge of the iris detached, by blows on the eye-ball, from the ciliary ligament, to the extent of two lines, and without any laceration of the body of this membrane. At the place where the iris had been separated from the ciliary ligament, he says, he had seen an oval fissure remain during the rest of the patient's life, and it might have answered every purpose of an artificial pupil, had not the immediate organ of vision, and the crystalline, in the instances alluded to, suffered too severely from the violence of the blow. In a case of prolapsus of the iris, through a small ulcer of the cornea, where the former part was very much dragged, in consequence of the large portion of it protruded, and the adhesion, which it had contracted with the edges of the ulcer of the cornea, Scarpa had remembered, that this same part, the iris, instead of being lacerated at its middle, had rather been detached, for a certain extent of its circumference, from the ciliary ligament, so as to produce there an artificial pupil, which was very serviceable to the patient after the cure of the prolapsus of the iris. Scarpa likewise called to mind, that in depressing a cataract, he had seen a similar separation of the margin of the iris from the ciliary ligament take place, in consequence of having merely pushed the opaque crystalline inadvertently against the internal edge of this membrane, at the moment, when the lens continually rolled round the spear of the straight needle, without his being able to seize it, so as to immerse and depress it deeply in the vitreous humour. Besides these circumstances, it had often occurred to him to observe in frequent dissections of the eye, that on taking hold of the iris with forceps, and pulling it, not only at a little distance

from its greatest disk, but also at the very edge of the pupil, this delicate membrane more readily became detached from its junction with the ciliary ligament, than lacerated at its middle, although it is certainly of a very soft nature. Lastly, it cannot be doubted, that the iris is a membrane perfectly distinct from the choroides, and has a proper, though feeble, connexion with the ciliary ligament, independently of the union of the choroides with the same ligament.

All these considerations taken together, especially that of the feeble union of the iris with the ciliary ligament, and, consequently, of the greater facility of detaching the edge of the iris from the ligament, with which it is connected, than of lacerating the body of this membrane, have induced Scarpa to try a new method of forming an artificial pupil, when the natural one has become too much contracted, or quite obliterated, after the extraction, or depression of the cataract. This method of operating, consists in detaching, by means of a couching needle, a certain extent of the circumference of the iris from the ciliary ligament, without ever preceding this operation by a section of the cornea. The attempt met with success.

The patient being seated, and supported, as if he were about to have the operation for the cataract performed, a straight couching needle, not so large as that which most surgeons use, but slender, like that which Scarpa prefers, (see *Cataract*,) is then to be introduced through the sclerotica, at the external angle of the eye, about two lines from the union of this membrane with the cornea; and its point is to be pushed as far as the upper and inner edge of the iris; in other words, as far as that side of the iris which is nearest the nose. The needle advances nearly to the ciliary ligament, and the surgeon perforates the internal edge of the iris, at its upper part, so that the point of the instrument scarcely appears in the anterior chamber of the aqueous humour, because, that part of the anterior chamber being very narrow, the point of the instrument, how little soever it might advance beyond the iris, would enter the substance of the cornea. The moment the needle appears in the anterior chamber, the instrument must be pressed on the iris from above downward, and from the internal towards the external angle, so as to bring it in a parallel line to the anterior surface of the iris, for the purpose of detaching a portion of the edge of this membrane from the ciliary ligament.

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This separation being effected, the operator (continues Scarpa) must depress the point of the needle, in order to apply it to the inferior angle of the slit, that he has begun to make. Then the aperture may be enlarged at pleasure, by pushing the iris towards the temple, and withdrawing the needle from before backward, parallel to the anterior surface of the iris, and the greatest axis of the eye. If, when this detachment has been accomplished, no opaque body should appear at the bottom of the eye, the needle is to be withdrawn altogether. If any portion of opaque capsule, left behind after the depression or extraction of the cataract, should afterwards advance, and present itself in the vicinity of the new pupil, the little opaque membrane must be reduced to fragments, and pushed through the artificial opening into the anterior chamber, where, as we have shewn in the article *Cataract*, such membranous portions, or flakes of the capsule, are, in time, dissolved and absorbed with the aqueous humour, which is continually undergoing a renovation.

This separation of the iris from the ciliary ligament, invariably occasions an extravasation of blood, which always renders the aqueous humour more or less turbid; but the turbidness is afterwards absorbed, and the eye recovers its original transparency.

The patient, says Scarpa, complains, during the operation, of a vast deal more suffering, than at the time when he undergoes the extraction or depression of a cataract. It cannot be otherwise; for, in detaching a part of the edge of the iris from the ciliary ligament, some filaments of the ciliary nerves, which proceed to be distributed in the iris, must at least be dragged, or lacerated. However, on the whole, the symptoms consequent to this operation, have neither been obstinate nor fatal in the two cases which Scarpa has seen. From some experiments made on the dead subject, Scarpa thinks the curved needle, which he uses for the depression of the cataract, would also be better than the straight one for making an artificial pupil; a thing which he intends to ascertain the first favourable opportunity. (*Scarpa sulle Malattie degli Occhi, Capo 16.*) Consult also Gibson on the *Artificial Pupil*. Richter *Vonder Verschlossnen Pupille, in Anfangsgr. der Wundarzn. Band 3, Kap. 9, Gottingen, 1795.*

PUS. (from *πύον*, matter.) The fluid formed by the process of suppuration. (See *Suppuration*.)

O o

R.

RACHITIS. (from *ραχίς*, the spine of the back, because the disease was once supposed to depend on disease of the spinal marrow.) The rickets. (See this word.)

RANULA. (dim. of *rana*, a frog.) A whimsical name applied to a tumour under the tongue, arising from an accumulation of the saliva in the ducts of the sublingual gland. The term has either been derived from an imaginary resemblance of the swelling to a frog; or, from the disease making the patient, as it were, croak when he attempts to articulate. The writers, who have treated of this disease, before it was known, that the parts affected by it were destined for the secretion of the saliva, have had no accurate notions of its true nature. Celsus has been supposed to have alluded to the ranula, in the fifth section of his seventh book, where, after treating of the diseases of the tongue, he continues with the following passage: *sub lingua quoque interdum aliquid abcedit, quod fere consistit in tunica, doloresque magnos movet.* The latter circumstance, however, renders it probable, that some other affection was alluded to, as a ranula is rather attended with a sense of restraint, than of pain. Various erroneous sentiments were entertained, concerning ranula, by authors, who treated of it subsequently to Celsus. Paré thought it proceeded from an accumulation of a pituitary, cold, viscid matter, which descended from the brain beneath the tongue. Fabricius ab Aquapendente considers the ranula as an encysted tumour of the meliceris kind. Dionis is of a similar opinion. Munick, better acquainted with the modern discoveries of anatomy, does not mistake the nature of the present disease; and he expressly says, that the affection originates from a thick, acrid saliva, which, not being able to pass out of the salivary ducts, accumulates under the tongue, so as to cause a swelling in that situation. Far from adopting the opinion of Munick, Heister fell back to that of Fabricius, and borrows every thing from this author.—Lastly, De la Faye, in his notes on Dionis, has taken up Munick's sentiments; he says, that, "there are two sorts of ranulæ; some, which are round,

and situated beneath the tongue, seem only to be produced by a dilatation of the excretory duct of the sublingual gland; the others are longer, than they are round; are situated at the side of the tongue, and are formed by a dilatation of the excretory duct of the inferior maxillary gland. The fluid, which fills such tumours, is the saliva which lodges and gradually accumulates in them, in consequence of its viscosity and atony of the duct.

The ranula is said to be frequently met with in persons who move their tongue a great deal, and in those who sing. The fluid in the tumour is precisely like white-of-egg; but, it is thicker after having remained a long while in the swelling; it is occasionally of a calcareous, and even stony nature. Modern surgeons are of opinion, that the ranula does not proceed from an inspissation of the saliva, but from an obliteration of the duct, or orifice, of this tube. The collection of saliva often produces a tumour of very large size; but, it generally bursts when it has attained the dimensions of a walnut, and then leaves an ulcer, which cannot be healed while the real cause of the disorder remains unknown.

Mr. B. Bell mentions his having seen an ulcer of this kind treated with the utmost care for several months; various detergent and corrosive applications had been employed; and even a mercurial course was resorted to; but all in vain. At length, the true cause of the disease having been ascertained, a cure was accomplished in a few days, by removing a piece of calcareous matter, which by obstructing the ducts, had first caused a swelling, and then the ulceration which ensued.

The edges of the opening very often close again, especially when it has been made with a lancet, and not of sufficient size. In this case, the swelling makes its appearance again, some time afterwards. M. Louis observes, that the ancients have made the same remark; and hence, Paré preferred the actual cautery to the lancet. Dionis also mentions his having seen ranulæ, which recurred in consequence of a mere opening having been made with a lancet; and he recommends, for the pre-

vention of this, applying a mixture of honey of roses and vitriolic acid to the inside of the cyst, so as to destroy it. M. Louis remarks, that all authors seem to regret, that the situation of the tumour should prevent the sac from being totally dissected out. The success, which Fabricius ab Aquapendente experienced, when he merely opened the tumour its whole length, did not free him from this prejudice; and Heister says, he should prefer extirpation, if the nature of the adjacent parts, which would be wounded, were not a formidable objection. But, if this pretended cyst, this pouch, is nothing else than the gland itself, or its duct, dilated by the retention of the saliva, its inside should not be irritated. Whenever a sufficient opening is made, no relapse takes place. Munick particularly advises such an incision, and Rossius mentions the smallness of the opening, among the defects in the treatment, and its being a cause of the disease returning. However, he does also recommend destroying the sac; but, specifies for the purpose, only astringent drying applications, which did not act in so powerful a manner.

In a ranula, there is nothing like a cyst which ought to be extirpated. It is enough to lay the cavity open, and occasionally to cut off the edges of the incision, when they will not otherwise unite. M. Louis always observed, that the radical cure depended on a fistulous aperture, through which the saliva continued to flow; and that, when this opening was situated behind the lower incisor teeth, a very annoying ejaculation of the saliva took place, in certain motions of the tongue. This inconvenience must be obviated, to render the cure complete. For this purpose, such an opening for the saliva must be made, as will not close. The perforation of the tumour with the actual cautery, was Paré's method; and thus a durable opening might certainly be obtained, for the excretion of the saliva, in a part of the mouth more backwards, so that patients would be freed from the disagreeableness of continually slobbering, or having their spittle ejected from their mouths in talking.

The ranula, when of long standing, is sometimes so large as absolutely to hinder a person from articulating. M. Le Clerc has recorded a case, in which the root of the swelling extended under the tongue; the tumour filled the whole mouth; the prominence it formed outwardly, was as large as a duck's egg; and the disease, in its progress, had made the teeth of both jaws project outward. At some parts of its surface, a fluctuation was perceptible; other places were exceedingly hard. The

patient, who could hardly breathe, demanded assistance: and a puncture was made in the softest part of the outside of the swelling. A thick yellowish fluid issued out of the cannula. The opening was enlarged with a knife; and about a pint of gritty, inodorous matter was extracted. There was no hemorrhage from the cut; and, no sooner had the contents of the swelling been taken out, than the patient began to articulate, which he had not been able to do for a long while. The sides of the tumour having been so prodigiously distended, M. Le Clerc thought it proper to destroy the inside of the cavity with a tent, dipped in a mercurial solution. The cure was completed in a month, and the tongue gradually regained its original size, a part of which it had lost.

But, as M. Louis observes, fortunate as the termination of this case was, it must not be indiscriminately set down, that destroying the cyst, or even opening the tumour, is always requisite. A more simple method will sometimes succeed. In a particular case, which this gentleman has related, a sinuosity, which divided the swelling into a right and left portion, made him suspect that it consisted of two sacs, in contact with each other. On each side, in front, and in the same line, there was a point, which was the orifice of the salivary duct, somewhat dilated, and blocked up with a viscid matter. Having very easily passed a small probe into the orifices, a matter, similar to white of egg, made its escape. A small leaden probe was passed into each opening, and, two days afterwards, the sacs were emptied again, and two pieces of lead, somewhat larger, introduced. The man was advised to take out the pieces of lead every morning, empty the swelling, and then replace them. In a fortnight, the openings, having been kept continually dilated, had no tendency to close; the saliva had not accumulated since, and the ranula had not appeared again.

In certain cases, the above means are quite inadequate, and the tumour must be totally extirpated. M. Boinet has related, to the French Academy, a case in which the swelling not only filled the whole mouth, but one half of the tumour projected out, and a cure could only be accomplished in the latter manner. The two upper incisor teeth, on the left side, were lodged in a depression observable there; and the canine tooth, of the same side, forced outward by the mass of disease, had pierced the lip near its commissure. A fluid, resembling mucus, flowed from a narrow aperture, at the

lower part of the swelling. The tongue could not be seen, so much was it pushed backward; and, for some time, the patient had only subsisted on liquid food, which he was first necessitated to convey to the back of the throat, with some mechanical contrivance. The four incisor teeth, two canine, and first grinders of the lower jaw, had been pushed out of their sockets, by the pressure of the swelling. The patient's aspect was alarming, and he was threatened with suffocation. Extirpation was deemed necessary, and it was performed, with all the caution, which the situation of the tumour demanded. The large cavity thus occasioned, was filled with lint. The lower jaw being found diseased, M. Boinet scraped some of its surface off, and covered the places with lint, either dry, or dipped in spirit of wine. Some exfoliations followed, and the fungous granulations which grew, were repressed with proper applications. In three months, the parts were healed in so regular a manner, that the motion of the tongue was not in the least obstructed, and no change continued, except the alteration of the voice, occasioned by the loss of teeth. This case is very interesting, and shews how much may be hoped for in difficult cases, from prudent and judicious measures. (*Encyclopédie Méthodique; Art. Grenouillette. Mem. de l'Acad. de Chirurgie, Tom. 3.*)

RASPATORIUM. (from *rado*, to scrape.) A kind of rasp formerly employed by surgeons.

RECTUM. The last large intestine, terminating in the anus, is so named, from an erroneous opinion that it was straight, while, in fact, it is semilunar, being adapted to the concavity of the sacrum.

Piles, which are a disease of the veins of this bowel, are treated of under the term *Hemorrhoides*.

The rectum is also subject to have tumours formed in it. Mr. Hey mentions a young man, who had had, for two years, a swelling in this bowel. The tumour protruded from the anus, whenever the patient went to stool, and generally bled on the same occasion. The disease had been, from the first, attended with pain in the loins. On examination, Mr. Hey found the swelling to be of the size of a nutmeg, adhering to the intestine by a narrow basis. It was firmer in its texture than piles usually are, except when inflamed. The apprehension of a troublesome hemorrhage, led Mr. Hey to prefer tying the base of the swelling to cutting it away, and thus he successfully extirpated the disease. (*Practical Observations in Surgery, p. 443.*)

The *scirrhus-contracted* rectum is what we have chiefly to consider in the present article. Scirrhus of the rectum is not uncommon at an advanced period of life. Sometimes it extends over a considerable length of the gut, but generally it is more circumscribed. The coats of the bowel become much thicker and harder than in the natural state. The muscular is subdivided by membranous septa, and the internal coat is sometimes formed into hard, irregular folds. The surface of the inner membrane is occasionally ulcerated, so as to form a cancerous disease. Every vestige of the natural structure is sometimes lost, and the gut is changed into a gristly substance. The cavity of the bowel is always rendered narrow at the scirrhus part, and is, sometimes, almost obliterated. When the passage through the gut is very much obstructed, the bowel is always a good deal enlarged just above the stoppage, or stricture, from the accumulation of the feces there. As the disease advances, adhesions form between the rectum and adjacent parts, and ulcerations produce communications between them.

The disease is usually not much noticed till somewhat advanced, not being at first very painful. The patient only thinks, that he is costive, and that he voids his stool with a little difficulty. In time, a good deal of pain is felt in the part affected, especially at stool, after which, some relief is experienced. Pus and blood may sometimes be noticed with the excrement, particularly when the disease has advanced to the ulcerated state. The patient at length becomes sallow, the constitution suffers, and dissolution follows. Severe tenesmus attends the whole course of the disease.

Desault has often seen the disease form a communication between the rectum and vagina, and the feces have passed through the latter part. In the latter stage of the affliction, the rectum, bladder, vagina, uterus, and adjacent parts, are all involved in one common ulceration.

When the disease has attained the ulcerated state, it is probably always incurable. Palliatives can now only be resorted to, such as anodyne and emollient glysters, the warm-bath, &c. with the exhibition of medicines like opium, cicuta, uva ursi, &c. Claudius applied his remedies to the inside of the bowel, by means of tents, and did not employ the latter as a mode of curing the disease, when less advanced. Valsalva used to introduce a cannula, pierced with numerous holes, when his patient got into the bath, so as to let the fluid enter the intestine. Numerous practitioners, among

them Morgagni, made mercurials the base of their treatment, from a supposition that the complaint was of venereal origin.

When the disease is not attended with ulceration, the contraction and thickening of the gut may be diminished, by introducing bougies, keeping them for a certain time, every day, so introduced, and increasing their size gradually. The pressure of these instruments seems to lessen the disease, and stop its progress; a proof that its nature differs from that of what is usually understood by scirrhus. Desault used to employ long tents, made of lint, smeared with cerate, and passed into the bowel by means of a probe, with a forked end. This surgeon gradually increased the size of the tents, so as to continue the compression, to which he conceived all the good was owing. Their length was also augmented, by degrees. Fresh ones were, at first, introduced twice every day. When any hardnesses were situated on the outside of the anus, Desault cured them on the same principle, viz. by making pressure on them, with compresses and a bandage. This eminent surgeon effected a cure of a scirrhus-contracted rectum by this method. The woman was taught to pass occasionally the tents herself, so as to prevent a relapse. The disease is said to afflict women more frequently than men: from a comparative table kept at the Hôtel-Dieu, this has been the case there in the proportion of ten to one.

See *Baillie's Morbid Anatomy. Œuvres Chirurgicales de Desault par Bichat, Tom. 2. p. 422.*

REFRIGERANTS. (from *refrigero*, to cool.) A term often applied by surgeons to such remedies and applications as cool the whole body, or any part of it.

REGIMEN. (from *rego*, to govern.) The regulation of the diet.

REPELLENTS. (from *repello*, to drive back.) Applications are sometimes so named which make diseases recede, as it were, from the surface of the body.

RESOLVENTS. (from *resolvo*, to loosen.) Medicines which disperse swellings, inflammations, &c. The term originated from the idea that the tenacious humours were loosened.

RESOLUTION. (from *resolvo*.) The subsidence of inflammation, without any abscess, ulceration, mortification, &c. being occasioned, is so named. The dispersion of swellings, indurations, &c.

RETENTION OF URINE. See *Urine, Retention of.*

RETROVERSIO UTERI. A turning backward of the womb. See *Uterus, Retroversion of.*

REVULSION. (from *revello*, to draw away.) An old term, used by the humoral pathologists, signifying the drawing of humours a contrary way.

RHACOSIS. (from *ραχος*, a rag.) A ragged excoriation of the scrotum.

RICKETS. (*Rachitis*.) Is mostly met with in young children; seldom in adults. Morand, however, (*Acad. des Sciences, 1753*.) mentions an instance in which an adult became affected. Pinel has given a description of the skeleton of a rickety fœtus. (*Fourcroy's Journal*.) The disease seems to consist of a want of due firmness in the bones, in consequence of a deficiency of the phosphate of lime in their structure. The causes of the affection are involved in great obscurity, and authors have referred them to scrophula, scurvy, lues venerea, difficult dentition, &c.; mere conjectures, which it is not worth while to enquire into. Rickety subjects are often at the same time scrophulous; but, this is, probably, the only reason for scrophula being accounted a cause of the other affection. The particular appearances of rickety children, we need not detail, as every one is familiarly acquainted with them: such children are usually of a bad, weak constitution, and their limbs and bones become bent in such directions as the actions of the muscles, the weight and pressure, &c. which they sustain, determine. When the affection is very general, the spine becomes shorter, and is curved in various directions; the breast becomes deformed, not only in consequence of the curvature of the spine, but by the depression of the ribs, and projection of the sternum. The bones of the pelvis fall inwards, and the os pubis generally approaches the sacrum. The latter circumstance is one of the causes of difficult parturition. The clavicles become more bent and prominent forward; the os humeri is distorted outward; the lower ends of the radius and ulna are twisted in the same direction; the thighs are curved forwards, or outwards; the knees fall inwards; the spine and front surface of the tibia become convex; and the feet are thrown outwards.

When the thoracic viscera are considerably oppressed by the alteration in the figure of the chest, produced by the rickets, the disease may bring on fatal consequences.

Many infants, which are very rickety and deformed, improve as they grow up, and their constitutions acquire strength. The deformity of the bones of their limbs spontaneously diminishes, and these parts gain a due degree of firmness, resulting from a proper deposition of the phosphate of lime in their texture.

The restoration of the proper figure of the bones may sometimes be promoted by the constant pressure of bandages and mechanical contrivances, sold in the shops. (See *Distortion*.) Some authors, however, contend, that in very young children machines are useless, as the confinement and inactivity of the muscles, necessarily occasioned by such contrivances, must increase the general debility, and consequently the disease. But, all writers allow, that, after a certain age, and when the strength is not too much exhausted, mechanical aid is proper. Were I to offer my own sentiments on this subject, they would be in favour of the employment of proper machines and bandages, at an early age.

No medicine is known, which possesses any direct efficacy in cases of rickets.—Tonics are indicated, and should be employed. More good, however, may be effected by keeping children in healthy situations, and in a salubrious air, than by

any medicines, whatever. Light, wholesome, nutritious, easily digestible food; cold bathing; the use of the flesh-brush, &c. are also highly serviceable. The constitutional treatment of rickets belongs more properly to the physician than the surgeon; and it is not necessary to introduce more of the subject in a Dictionary expressly allotted to surgery. The reader may consult *Boyer's Lectures on the Bones*, Vol. 2, Chap. 2, if he wishes to see the various absurd notions which many have entertained concerning rickets.

RIGOR. (from *rigeo*, to be cold.) A cold chill. A shivering.

RUBEFACIENTS. (from *rubefacio*, to make red.) Applications which make the skin red.

RUBINUS. (from *ruber*, red.) A carbuncle, named from its colour.

RUPTURE. A protrusion of some of the abdominal viscera. A hernia. See *Hernia*.

S

SABINA. (said to be named from the Sabines, whose priests used it in their religious ceremonies.) Savine. The use of the leaves of this plant, in forming the active ingredient in the ointment commonly preferred for keeping open blisters, we have explained in the article *Blisters*. The other chief surgical use of savine, is as a stimulating application for destroying warts, and other excrescences. For the latter purpose, it is generally powdered, and mixed with an equal proportion of *æugo æris*. The same powder is also sometimes employed by surgeons for maintaining the hollows in which peas are inserted in issues. The best plan is, first to wet the peas, then roll them in the powder, and put them, in this state, on the issue. But, when the whole surface of the issue has risen high, above the level of the skin, the powder must be sprinkled all over the sore, so as to produce an absorption of the high granulations.—Indeed, even in this manner, a good cavity often cannot be obtained; and, it becomes necessary to destroy the surface of the issue, by rubbing it with the *kali purum*, or *kali purum cum calce viva*.

SACCHARUM SATURNI. Sugar of Lead. *Cerussa Acetata*. Acetite of Lead. This is very extensively used in surgery,

chiefly as a local application to inflamed parts, and in the form of a lotion. See *Inflammation*, *Collyrium*, *Lotio*, *Gonorrhœa*, *Ophthalmia*, and numerous other articles of this Dictionary, for an explanation of the uses of acetite of lead.

SAL-AMMONIAC. *Ammonia Muriata*. *Muriate of Ammonia*. Employed a good deal by surgeons, as an ingredient in discutient lotions. See *Lotio Ammon. Mur.*

SALIVARY FISTULÆ. See *Parotid Duct*.

SALIVATION. An increased secretion of the saliva, excited by mercury.

SA'NIES. (*Latin*.) A thin, serous matter, discharged from fistulæ, unhealthy sores, &c. It is sometimes tinged with blood.

SAPO TEREBINTHINÆ. (*Starkey's Soap*.) \mathfrak{z} . *Kali præpar. calidi* \mathfrak{z} j. *Olei Terebinth.* \mathfrak{z} ijj.—The hot *kali præparatum* is to have the oil of turpentine gradually blended with it, in a heated mortar. Indolent swellings were formerly rubbed with this application, and, perhaps, some chronic affections of the joints might still be benefited by it.

SARCOCE'LE. (from *σαρξ*, flesh; and *κύλη*, a tumour.) A fleshy enlargement of the testicle. See *Testicle*, *Diseases of*.

SARCO'MA, *Sarcosis*. (from *σαρξ*, flesh.) A fleshy tumour on any part of the body. (See *Tumours*, *Sarcomatous*.)

SARCO'TICS, (from *σαρκω*, to incarnate.) *Sarcotica*. Medicines which promote the formation of granulations in wounds and sores.

SARSAPARILLA. The root of sarsaparilla was brought into Europe about 1550. It was at first reputed to possess singular efficacy in venereal cases; but, afterwards lost all its fame. Sarsaparilla was again brought into notice by Dr. W. Hunter, who advised Dr. Chapman to make trial of it in a bad case of phagedenic bubo; and the benefit, obtained in this instance, led Dr. Hunter to extend the recommendation of the medicine. Sir W. Fordyce stated, that sarsaparilla would quickly relieve venereal head-achs, and nocturnal pains, and if persisted in, cure them; that in emaciated, or consumptive habits, from a venereal cause, it was the greatest restorer of appetite, flesh, colour, and strength, which he knew of; that when mercurial frictions had been previously employed, it would generally complete the cure of the disease of the throat, nose, palate, or spongy bones; and that it would promote the cure of blotches and ulcers, sometimes accomplish it, even without mercury; though, in this circumstance, there was danger of a relapse. Sir W. Fordyce said, sarsaparilla was of little use in chancres; but, when these or buboes, would not heal, after the employment of mercury, it would, often cure, and always do good. He allows, however, that in all venereal cases, *sarsaparilla is not to be trusted to, unless preceded by, or combined with, the use of mercury*; and he thought sarsaparilla would, probably, always cure what resisted mercury. (*Medical Obs. and Inq.* Vol. 1.)

The celebrated Cullen considered sarsaparilla as possessing no virtues of any kind; for, (says he) "tried in every shape, I have never found it an effectual medicine in syphilis, or any other disease." (*Mat. Med.* Vol. 2.)

Mr. Bromfield declares, that he never saw a single instance in which sarsaparilla cured the venereal disease, without the aid of mercury, either given before, or in conjunction with it. (*Pract. Obs. on the Use of Corrosive Sublimate*, &c. p. 78.) Mr. Pearson also contends, that sarsaparilla has not the power of curing any one form of the lues venerea; but, he allows that it may suspend, for a time, the ravages of that contagion, the disease returning, if no mercury should have been used. This gentleman admits, also, that sarsaparilla will alleviate symptoms derived from the venereal virus. He maintains, that

the exhibition of sarsaparilla does not diminish the necessity for giving less mercury. Nocturnal pains in the limbs, painful enlargements of the elbow and knee, membranous nodes, cutaneous ulcerations, and certain other symptoms, resembling venereal ones, are often experienced after a full course of mercury. Such complaints, Mr. Pearson allows, are greatly benefited by sarsaparilla, and exasperated by mercury; and, he observes, that it is from these complaints having been mistaken for venereal ones, that the idea has arisen, that sarsaparilla has cured syphilis, when mercury has failed. Mercury, and the venereal poison, may jointly produce, in certain constitutions, symptoms which are not strictly venereal, and are sometimes more dreadful, than the simple effects of syphilis. Some of the worst of these appearances are capable of being cured by sarsaparilla, while the venereal virus still remains in the system. When this latter disease had been eradicated by mercury, sarsaparilla will also cure the sequelæ of a course of the other medicine. (*Pearson on the Effects of various Articles in the cure of Lues Venerea*; 1807.)

SCA'BIES, (from *scaber*, rough.) The itch.

SCA'LPEL. (from *scalpo*, to scrape.) *Scalpēllum*. *Scālprium*. Originally a raspatory, or instrument for scraping diseased bones, &c. The term now generally signifies, a common, straight, surgical knife.

SCARIFICATION. (from *scarifico*, to scarify.) *Scarificatio*. The operation of making little cuts, or punctures, in a part, for the purpose of taking away blood, letting out fluid in anasarca cases, or air, in instances of emphysema.

SCIRRHUS, **SCIRRHOMA**, **SCIRRHOSIS**. (from *σκιρρω*, to harden.) The etymological import of these terms seems merely to be any induration. The first is now generally restricted to the induration, which precedes cancer, in the ulcerated state.

SCLERIASIS, **SCLEROSIS**. (from *σκληρω*, to harden.) A hard tumour, or induration.

SCLOBETOPLA'GA. (from *sclopetum*, a gun; and *plaga*, a wound.) A gun-shot wound.

SCOLI'ASIS. (from *σκολιαω*, to twist.) A distortion of the spine.

SCORBU'TUS. (from *schorboet*, Germ.) The scurvy.

SCRO'PHULA, OR **SCROFULA**.—(from *scrofa*, a sow.) The king's evil, so named, because swine are said to be subject to it, called also, *struma*. A disease, the chief, or at least, the most palpable symptom of which is a swelling of the ab-

sorbent glands, in various parts of the body, which glands tend very slowly to a state of suppuration, that is almost always imperfect. Scrophula generally shews itself during infancy, between the age of three and seven; sometimes rather sooner; but, frequently, as late as puberty, and in some instances, though a very few, not till a much more advanced period of life. In the latter cases, the disease is said to be rarely so complete, or well marked, as it is in young subjects. Scrophula is also as hereditary as any disease can be; that is to say, it is so as far as any particular kind of temperament, or constitution, can descend, more or less completely, from parents to children. Mr. White, in his treatise on struma, has strongly censured calling the disease hereditary; but his observations only lead to these conclusions, that children, born of scrophulous parents, are not invariably affected with scrophulous diseases; and that, sometimes, one child has some strumous affection, while the parents, and all the rest of the family, have no appearance of scrophulous habits. However, I should conceive, that neither Mr. White, nor any other writer will maintain the opinion, that scrophula does not much more frequently afflict the children of scrophulous parents, than the offspring of persons, who have always been perfectly free from every tendency to any form of this affliction. Too numerous are the facts, which occur to my own mind, to allow me to entertain the smallest doubt, that scrophula runs very much in certain families. In this sense, I think the term *hereditary* perfectly accurate and allowable. But, at the same time, I beg the reader to understand, that I have no intention of questioning what seem to be irrefragable truths, viz. that the children of scrophulous parents often continue, as long as they live, entirely free from the disease; and that one child is sometimes afflicted, while its father, mother, brothers, sisters, and all the rest of its relations, have never had any tendency to strumous disorders.

When scrophula does not actually take place at a very early period of life, it is generally stated by writers on the subject, that the particular constitutions, in which there is a disposition to the disease, are, in a certain degree, distinguishable. In the individuals, possessing the disposition in question, a peculiar softness and flaccidity of fibre are remarkable; their hair is more frequently light coloured than dark; and their eyes are said to be more often of a blue, than any other colour. Their skin is generally very fine, and even handsome, both in regard to its outward texture, and complexion. Subjects with

scrophulous constitutions, frequently have a kind of thickening of the upper lip; this swelling is sometimes very considerable, and occasionally extends as far as within the nostrils. Scrophula is also very often complicated with rachitis, or follows the latter affection; but, there is as little reason for supposing rickets to arise from scrophula, as this latter from rickets. In some instances, however, the complexion is dark, and the skin coarse; but, in these subjects, at least when young, the face is generally tumid, and the look unhealthy. (*Burns on Inflammation, Vol. 2, p. 232.*)

Mr. White seems, as I think, with some appearance of truth, to deny that grey, or blue eyes, light hair, and a fair complexion, ought to be considered as marks of a scrophulous predisposition; for, the majority of children in this country have light hair, and eyes, while young, which become darker as they advance in life. Now, as the majority of scrophulous patients are children, and young subjects, and as most children in this country have naturally the kind of hair and eyes above described, it seems inaccurate to lay any stress on persons affected with struma, or predisposed to this disease, having such appearances. (*See White on the Struma, or Scrophula, p. 38. Edit. 3.*)

I believe the fact is now almost generally admitted, that females are rather more subject, than males, to scrophulous disease.

Struma, according to Mr. White, is as universal a complaint as it is ancient; but it prevails more extensively in temperate latitudes, than in very hot or very cold climates. It is also more frequent in some parts of Europe than others; and, in this country, it has been found to be most general in the counties of Suffolk, and Lancashire. At all periods, it seems to have been a very common complaint in this island. From history, we learn, that it was denominated the king's evil in the time of Edward the Confessor, who is supposed to have been the first that attempted to cure it by the royal touch. From a register kept in the royal chapel, we find that Charles the Second touched 92,107 persons, in a certain number of years; and this equally bigotted and useless practice was not discontinued till a recent period, when kings were found to be, as well as their poorest subjects, totally destitute of all supernatural power.

Scrophula is not communicable from one person to another; neither can it be conveyed into the system by inoculation. The opinion also, that scrophulous nurses may infect children, seems also to rest on little foundation. (*See White, p. 56, 57.*)

The parts, which are most frequently affected by scrophula, next to the lymphatic glands, are the spongy heads of the bones, and the joints. The form, which the disease assumes in the latter situations, is particularly described in the article *Joints*. The disorder of the spine, attended with a paralytic affection of the lower extremities, is, no doubt, very frequently of scrophulous origin. (See *Vertebrae*.) The abscess, which forms in the cellular substance, between the peritoneum and psoas muscle, is often regarded as a strumous disease; and when the contents of the abscess are found to contain flakes of a curdy matter, somewhat resembling white-of-egg, a substance peculiar to scrophulous abscesses, no one can doubt, that the complaint is connected with this constitutional affection. (See *Lumbar Abscess*.) The chronic enlargement of the thyroid gland, is by many considered as scrophulous; and, the opinion seems to be strengthened by the fact, that patients, with this affliction, very often have, at the same time, other complaints, which are unequivocally strumous. It might also be noticed, that this enlargement of the thyroid gland most frequently commences at an early period of life, like other scrophulous diseases; and, like them, is benefited by the mineral alkali. (See *Bronchocele*.) Scrophula also frequently makes its appearance in the form of imperfect suppurations, in various parts of the body; the contents of such abscesses being a curdy kind of matter, and the skin covering them, having an unhealthy red appearance, and a thickened doughy feel. The mesenteric glands are particularly often found universally diseased, and enlarged in scrophulous subjects; and, as all nutriment has to pass through these parts, before it can get into the circulation, we cannot be surprised at the many ill effects which must be produced on the system, when such glands are altered, and, no doubt, obstructed, in the way in which they frequently are. Scrophula also frequently makes its attack on the testicle. (See *Testicle, Diseases of*.)—The female breast not unfrequently becomes affected with scrophulous tumours, and abscesses.

The scrophulous inflammation (says Mr Burns) is marked by a soft swelling of the affected part, which, very frequently is one of the lymphatic glands. The covering, or coat of the gland, becomes slightly thickened, and its substance more porous and doughy. The swelling increases, and the doughy feel changes by degrees into that of elasticity, or fluctuation, and a firm, circumscribed, hardened margin, can be felt round the base of the

tumour. The skin is slightly red. If, at this time, an incision, or puncture, be made, either no matter, or very little, is evacuated, the lips of the wound inflame and open, displaying a sloughy-looking substance within; and, betwixt this and the skin, a probe can often be introduced for some way all round. If, however, the disease should have advanced further, then there is very little elasticity in the tumour; it is quite soft, rather flaccid, and fluctuates freely; the skin becomes of a light purple colour, and small veins may be seen ramifying on its surface. Some time after these appearances, the skin becomes thinner at one particular part, and here it also generally becomes of a darker colour. It afterwards bursts, and discharges a thin fluid, like whey, mixed with a curdy matter, or thick white floculi. The redness of the skin still continues; but the aperture enlarges as the tumour subsides, and thus a scrophulous ulcer is produced. The margins of this kind of sore are generally smooth, obtuse, and overlap the ulcer; they are of a purple colour, and rather hard, and tumid. The surface of the sore is of a light red colour; the granulations are flabby and indistinct, and the aspect is of a peculiar kind, which, says Mr. Burns, cannot be described. The discharge is thin, slightly ropy, and copious, with curdy flakes. The pain is inconsiderable. When this ulcer has continued for some time, it either begins slowly to cicatrize, or, as more frequently happens, the discharge diminishes and becomes thicker. An elevated scab is next formed, of a dirty white, or yellowish colour. This continues on the part a good while; and when it falls off, leaves the place covered with a smooth purple cicatrix. Mr. Burns adds, that the preceding description corresponds to the mild scrophula, or the *struma mansueta*, of the old writers. This gentleman next remarks, that, occasionally, especially if a bone be diseased below the ulcer, the sore has a more fiery appearance, the surface is dark-coloured, the margins soft, elevated, and inflamed, and sometimes retorted. The discharge is watery, the pain very considerable, and the surrounding skin inflamed. This has been called the *struma maligna*. Such overacting scrophulous sores are most frequently met with over the smaller joints, particularly, those of the toes. (Burns.) Sometimes a scrophulous abscess, after it has burst, forms a sinus; the mouth of which ulcerates, and assumes the specific scrophulous appearance, while the track of the sinus still continues to emit a discharge. Mr. Burns also remarks, that scrophulous swellings are often disposed to subside in winter,

and recur on the approach of summer ; but, he adds, that this is not an invariable law. The glandular enlargements are very apt to become smaller, in a short time, in one place, while other glandular swellings originate with equal suddenness, somewhere in the vicinity of the former ones. Ulcers, also, very often heal, upon the appearance of the disease in other parts. (See *Dissertations on Inflammation*, by John Burns, Vol. 2, 1800)

With regard to the proximate cause of scrophula, medical men may be said to remain, even at the present day, in entire ignorance. Of the exciting causes, very little is also known. Mr. John Hunter remarks, that "in this country, the tendency to scrophula arises from the climate, which is in many a predisposing cause, and only requires some derangement to become an immediate cause, and produce the whole disease." (*Treatise on the Venereal Disease*, p 26.) In the same part of the work, this celebrated writer takes notice of slight fevers, colds, small-pox, and measles, exciting scrophulous diseases. He observes also, that, in particular countries, and in young people, there will sometimes be a predisposition to scrophula : and that, in such subjects, buboes will more readily become scrophulous. (P. 27.) In short, it was one of Mr. Hunter's opinions, and probably a most correct one, that the venereal disease is capable of calling into action such susceptibilities as are remarkably strong, and peculiar to certain constitutions and countries ; and that, as scrophula is predominant in this country, some effects of other diseases may partake of a scrophulous nature (P. 96.) Mr. Hunter, speaking of venereal buboes, mentions his having long suspected a mixed case, and adds, "I am now certain that such exists. I have seen cases, where the venereal matter, like a cold, or fever, has only irritated the glands to disease, producing in them scrophula, to which they were predisposed. In such cases, the swellings commonly arise slowly, give but little pain, and seem to be rather hastened in their progress, if mercury is given to destroy the venereal disposition. Some come to suppuration while under this resolving course ; and others, which probably had a venereal taint at first, become so indolent, that mercury has no effect upon them ; and, in the end, they get well of themselves, or by other means." (P. 269.) For such buboes, Mr. Hunter used to recommend sea-bathing ; and, in case of suppuration, poultices made with seawater.

It would be tedious and useless to expatiate on the many absurd notions, which

have been entertained concerning the proximate cause of stroma. All that we need add in this work, is, that certain constitutions probably have a congenital disposition to the disease ; that such disposition may probably be increased, or diminished, by the operation of climate, mode of life, age, &c ; and that irritations of a thousand kinds may excite the disease into action, when the system is predisposed to it, by inexplicable causes. That climate has great influence, cannot be doubted, when we reflect, that the inhabitants of certain countries, in which the temperature is invariably warm, never suffer from scrophula. There can also be no doubt that, with age, the disposition to scrophula diminishes ; for, children much afflicted while young, frequently get quite well when they approach the adult state ; and, if a person has remained perfectly free from any mark of a scrophulous constitution, till the age of twenty-five, he may be considered as almost entirely exempt from the disease.

TREATMENT OF SCROPHULA.

"For the cure of scrophula, (says the celebrated Cullen,) we have not yet learned any practice that is certainly, or even generally successful. The remedy which seems to be the most successful, and which our practitioners especially trust to, or employ, is the use of mineral waters." "But, (adds this eminent physician,) in very many instances of the use of these waters, I have not been well satisfied, that they had shortened the duration of the disease more than had often happened when no such remedy had been employed. With regard to the choice of the mineral waters most fit for the purpose, (says Cullen,) I cannot, with any confidence, give an opinion. Almost all kinds of mineral waters, whether chalybeate, sulphureous, or saline, have been employed for the cure of scrophula, and seemingly, with equal success and reputation ; a circumstance, which leads me to think, that, if they are ever successful, it is the elementary water that is the chief part of the remedy. Of late, sea-water has been especially recommended, and employed ; but, after numerous trials, I cannot yet discover its superior efficacy." Dr. Cullen next speaks of bark ; but seems to consider its efficacy in scrophula, as very dubious and trivial. He mentions that, in several instances, the leaves of colt's-foot appeared to him to be successful. He used it frequently, in a strong decoction, and even then with advantage ; but he found more benefit from the expressed juice, when the plant could be had in rather a succulent state, soon

after its first appearance in the spring. Dr. Cullen observes, that he had frequently employed the hemlock, and sometimes found it useful in discussing obstinate swellings; but, that it also frequently disappointed him, and he never remarked that this medicine disposed scrophulous ulcers to heal. The sentiments of Cullen are decidedly against the use of antimony, and mercury, in scrophulous cases. (See *First Lines of the Practice of Physic*, Vol. 4.)

Dr. Fordyce extolled bark for its efficacy in scrophulous diseases; he endeavours to prove, by some cases which are adduced, that in cases of tumefied glands, attended with a feeble habit, and a weak circulation, it is a most efficacious medicine, and acts as a resolvent and discutient. He also brings forward a case, in support of bark being a means of cure for the ophthalmia strumosa. (See *Med. Obs. and Inq.* Vol. 1. p. 184.) Dr. Fothergill, in the same work, p. 303, writes in favour of the good effects of bark in similar cases; the latter sometimes gave, at the same time, small doses of calomel.

Mr. Burns remarks, that bark has been frequently found useful in the cure of scrophulous inflammation, but more often of ulceration, than tumefaction of the glands. But, adds this gentleman, it does not appear to possess, by any means, that certain power of curing scrophulous affections, which is attributed to it by Dr. Fothergill and several other authors. He observes, that we are not to suppose, that it will infallibly cure scrophulous inflammation, or ulceration of parts which, even when affected with simple inflammation, are very difficult of cure. If it be difficult to cure a simple inflammation, or ulceration of a tendon, cartilage, or bone, we must not be disappointed if even a specific remedy for scrophula (were such ever discovered) should prove ineffectual in procuring a speedy restoration to health. Mr. Burns contends, that bark is often ineffectual, because improperly administered. Given in small quantities, once or twice a day, it may prove a stomachic, and increase, like other tonic bitters, the power of the stomach, or the functions dependent on it; but, in order to obtain the benefits of the specific action of bark, he maintains, that it should be given in large quantities, for several weeks, with a good diet, air, and proper exercise.—(*Dissertations on Inflammation*, Vol. 2. p. 371.)

As far as I can judge, Mr. White has, with much reason, recommended paying attention to such circumstances as may have effect in preventing the disease, viz. air, cleanliness, exercise, and diet. He mentions cold bathing among the prevent-

ives of struma, and speaks of sea-bathing as being the best. He advises attention, also, to be paid to the manner of clothing children, keeping them more covered in winter than summer. Mr. White thought, that allowing children to sleep a great deal was prejudicial; but, this seems to me only conjecture.

In noticing the treatment of the disease, Mr. White states, that "the general idea of the struma is, that it is a disease of debility; and therefore, the great object is, to invigorate the habit by every possible means; the chief of which are tonic medicines, and sea-bathing. Some are of opinion, that in the case of young patients, this should be continued, during the summer months, every year, to the age of fourteen or sixteen. Many recommend it, not only in the summer, but throughout the year: whilst others are for administering alteratives, principally the alkaline salts, with or without antimonials, and the different tonics, during the winter; and the sea-water, and sea-bathing, or cold-bathing, during the summer, for a continuance of two or three years from the commencement of the disease; with this general observation, that they will outgrow the complaint." Mr. White adds, that the chief external means are fomentations of sea-water, and cataplasms, made with the same. With respect to regimen, some recommend a milk and vegetable diet; others animal food, and fermented liquors.

Mr. White maintains, that the preceding plans of treatment are not, in general, efficacious, though in some instances, they may prove useful. "In early affections of the lymphatic glands, (says this gentleman,) and from the want of a pure air, and proper exercise, where children are delicate and irritable, a change of situation to the sea-side, together with bathing, when they have acquired some strength, must be exceedingly proper; and, in gross plethoric subjects, who have diseased lymphatics, from improper feeding, and want of necessary exercise, a journey to the sea-coast may be very useful, particularly if the salt-water is drank often, and in a sufficient quantity to become purgative. This, with the novelty of their situation, which may naturally produce an increase of exercise, might answer every expectation; but, these are the kind of cases that, with a very little attention, are easily cured." (*White on the Struma*, Edit. 3. p. 104.)

The conclusion to which Mr. White's remarks upon this part of the subject tend, is, that sea-bathing only deserves praise, as a preventive, and in the early stages of the disease. He particularly condemns cold-bathing, for poor, weakly, debili-

tated children, whose thin visage, enlarged belly, and frequent tickling cough, sufficiently indicate diseased viscera; such do not recover their natural warmth, after cold-bathing, for hours, and their subsequent head-ach, livid lips, and pale countenance, are sufficient marks of its impropriety. (P. 107.)

"Cold-bathing, especially cold sea-bathing (says Mr. Russell) is a remedy universally employed in scrophula, and I believe with great advantage in many cases; for it not only appears to improve the patient's general health and strength, but likewise to promote the detumescence of enlarged glands, and the resolution of indolent swellings in the joints, even after they have attained a considerable size, and have existed for a great length of time. But, in order that cold-bathing may be practised with safety, and advantage, the constitution must have vigour to sustain the shock of immersion without inconvenience. If the immersion be succeeded by a general glow over the surface of the body, and the patient feels cheerful, and has a keen appetite, we may conclude that he agrees with the cold bath; but if he shivers on coming out of the water, continues chill, and becomes drowsy, we may be assured that the practice of cold-bathing does no good, and had better be omitted.

"In estimating the comparative merit of cold-bathing and warm-bathing, in the cure of scrophulous complaints, my own experience, together with the result of different conversations on the subject with some of the most judicious practitioners of my acquaintance, would lead me to bestow much more commendation on the effects of warm-bathing. I should not even be inclined to circumscribe the practice to cases of emaciation and debility, since from observation, I am fully satisfied with regard to the beneficial effects of the warm bath to patients of plethoric constitutions, who were much affected with swelled scrophulous glands. Several of those instances occurred in young women, about the prime of life, who were in all respects healthy and vigorous, abating the swellings of the glands, and those symptoms of distress which were connected with fullness of blood.

"The sensation of the warm bath is exceedingly grateful to most patients, and the practice is universally safe. It may be employed at all seasons of the year, and in all weather, without danger or inconvenience; the risk of suffering from exposure to cold, immediately after immersion in the warm bath, having been much magnified by prejudice. There is not even any good reason to believe in the

existence of such a risk. The precautions, however, which are employed to avert it, are perfectly innocent; and, provided they do not impose any unnecessary and incommoding restraints upon the practice, may be encouraged, so far as to relieve the patient's mind from uneasiness and groundless apprehensions.

"It requires many weeks, and sometimes several months, to ascertain the full effects of warm-bathing in relieving scrophulous complaints; but, as the practice is not attended with any inconvenience, nor followed by any bad consequence, there can be no reason to intermit the course, till the trial is completely satisfactory; and I am convinced, that the practice of warm-bathing, in cases of scrophula, will be more universally adopted, after the knowledge of its beneficial effects is more widely diffused." (See *Russell's Treatise on Scrophula*.)

With regard to electricity, Mr. White thinks it is useful, when from length of time the enlarged glands have acquired a degree of hardness and insensibility.

Mr. White, after enjoining attention to air, exercise, and diet, as promotive of a recovery, as well as preventive of the disease, proceeds to explain his own practice. The internal cases, which properly belong to the physician, we shall dismiss from consideration. The first external symptoms, such as swellings of the lips, side of the face, and of glands under the chin, and round the neck; also, other symptoms, usually considered as strumous, viz. roughness of the skin, eruptions on the back of the hand, and different parts of the body, redness, and swelling of the eyelids, and eyes; are accompanied, according to Mr. White's conceptions, with an inflammatory diathesis, though seldom such a one, as to require bleeding. Calomel is the medicine, which this gentleman recommends for the removal of the foregoing complaints. It is not to be given in such quantities, as to render it a powerful evacuant, either by the intestines, or any other way; but, in small doses, at bedtime. Thus, says Mr. White, "it remains longer in the intestinal canal, a greater quantity is taken into the habit, and the patient is less susceptible of cold, than when taken in the day-time. The first, and, perhaps, the second dose may prove purgative, which is, in general, a salutary effect; but, afterwards, the same quantity will seldom do more, than is sufficient to keep the body open; and should it fail of answering that purpose, I have usually recommended some gentle purgative, every third or fourth morning, according to circumstances. If there

should be a prevailing acidity, a few grains of the sal sodæ, magnesia, or some testaceous powder, may be added to the medicine. By this simple method (continues Mr. White) most of the symptoms before-mentioned, will, in a short time, disappear; but if the tumours should continue hard, and retain their figure, without dividing into smaller ones, we may derive some benefit from external applications, particularly the steam of warm water. I have used a variety of medicinal herbs with success; but, am inclined to believe, that the advantage was principally derived from the warm water, &c. At other times, I have stimulated the part affected by electricity, insulating the patient, and drawing sparks from the tumour, until a slight degree of inflammation was excited. After the application of the steam, or the use of the electrical machine, I have sometimes rubbed a little of the unguentum mercuriale into the tumour, and neighbouring parts, or applied the emplastrum saponaceum, or mercuriale cum ammoniaco, over the swelling, or a liniment with camphor, ol. olivarum, and sp. terebinth." Mr. White adds, that in such cases, if the tumours should suppurate, and burst, the parts will, in most instances, heal without much trouble. For eruptions on the head, he recommends applying the ung. saturn. album camphoratum, or the cerat. alb. cum hydrarg. præcip. alb. For the roughness of the skin, which is generally followed by eruptions, he also advises the aqua-vegeto-mineralis, aqua calcis, solutions of sal. tartar. or of the hydrarg. mur. as outward applications. "This last (says Mr. White) will seldom fail to check the progress of the complaint, and dry the sores; and in the quantity of ten or twelve grains, to a quart of warm water, the use of it will not be productive of any pain. If the eruption should ulcerate, and require any unctuous application, to prevent the adhesion of the linen, the ointment beforementioned may be applied; the best remedy will be warm-bathing, and when practicable, the sea-water claims a preference." (P. 114.) The author next mentions his having occasionally recommended the vinum antimoniales, tartarum emeticum, decoctum Lusi-tanicum, decoctum lignorum, or sarsaparillæ; and that he sometimes found advantage derived from artificial drains. We need not detail this gentleman's mode of treating affections of the eyelid, as the reader may find all the necessary instruction, concerning scrophulous diseases of the eye and eyelids, by referring to *Ophthalmia* and *Psorophthalmia*.

For the cure of indurations in the breast, remaining after mammary ab-

scences, Mr. White speaks very highly of the effects of the steam of warm water; and cautions us against indiscriminately employing calomel, which will often affect the mother little, but the child violently. Mr. White mentions his employing a small tin machine, large enough to hold a pint and a half, or two pints of boiling water. From the top proceeded a narrow tube, ten, or twelve inches long, through which the steam passed. Near its end, which was moveable and curved, was a joint, for the greater convenience of directing the steam to the diseased parts. The water was easily kept boiling, by means of a lamp under the machine. Mr. White says, that the steam should be employed twice, or thrice a day, and a piece of flannel, or skin, afterwards applied. The body should also be kept open. In obstinate, neglected cases, mercurial preparations, according to Mr. White, must likewise be given, and, if they affect the child much, sucking should be suspended. (P. 117, 118.)

Mr. White treats largely of the treatment of cases, in which the mesenteric glands are diseased; but, this subject strictly belongs to the physician. When, in these instances, the glands of the neck, or other parts of the body, tend to a state of suppuration, it is very slowly, the skin appearing uniformly thin, and of a deep red colour, and the tumour seeming flaccid. In such cases, Mr. White recommends the use of the lancet or caustic; for, if no artificial opening is made, it will be a long time, before the skin gives way; and, when it does, the aperture will not only be very small, but often unfavourable in its situation. Mr. White adds, that the contents will often be more like mucus, than pus, or like a mixture of both; and the discharge will continue for a great length of time, if no remedy is applied. This gentleman mentions his having found a solution of gum myrrhæ in aqua calcis, used as a lotion, and the ceratum saponaceum, or some similar outward application, the best method of treating this symptom.

We need not describe Mr. White's practice in the treatment of scrophulous joints, as the subject is fully considered in the article *Joints*. It appears, however, that he confirms the efficacy of stimulating applications, and pressure with bandages, when the fingers and toes are affected with strumous disease. (P. 143.)

Dr. Crawford, M. Pinel, and others, have tried the muriated barytes, as a remedy, in scrophulous cases. (*Med. Communications*, Vol. 2. *Nosographie Philosophique*, Vol. 2. p. 238.) Mr. Burns says,

that the muriate of barytes has no effect on diseased glands; but, that it is occasionally serviceable in scrophulous ulceration, though, he adds, that it deserves little dependence. (*Dissert. on Inflamm. Vol. 2. p. 372.*) This gentleman recommends the following formula: *℞. Terræ Ponder. Salit. Chryst. gr. x. Aq. Font. Aq. Cassiæ, utriusque, ʒij. Syrup. Aurent. ʒij.* Half an ounce of this may be given at first, twice or three times a day, and gradually increased to such quantity, as the stomach can bear without sickness.

Fourcroy purposed trying the muriate of lime; but, its efficacy is very doubtful, and inconsiderable. "Professor Thomson (says Mr. Russell) has favoured me with the following observations on the effects of muriate of lime. He employed muriate of lime in various cases of scrophula, without having derived benefit from it in a single instance. Some patients, indeed, he admits, got well, while under a course of muriate of lime; but then he had no reason to ascribe the cure to the effect of the medicine. In other cases, on the contrary, the muriate of lime produced severe sickness and oppression at the stomach, and the patients got daily worse, till the muriate of lime was intermitted, and other medicines employed. The relief, experienced from the intermission of the muriate of lime, left, no doubt, with regard to the injurious effects, which the use of it had produced; and from extensive experience and accurate observation on the subject, Professor Thomson is satisfied, that muriate of lime is attended with prejudicial effects in many cases of scrophula." (See *Russell's Treatise on Scrophula*.) The same may be said of iron given either alone, or joined with the fixed, or volatile alkali. Burnt sponge, milliperles, and kali vitriolatum, have all been extensively tried: the first of these is, in my opinion, sometimes useful in diminishing enlarged scrophulous glands: that it has this effect on bronchoceles, is indisputable.

The Marischal de Rougeres employed a remedy, composed of iron filings, muriate of ammonia, kali præparatum, &c. (*Journ. de Med. tom. 40. p. 219.*)

Fothergill praised cicuta, and, perhaps, it is as good an internal medicine as can be tried; but, it is far from being generally efficacious. It is highly deserving of recommendation for irritable scrophulous ulcers.

With regard to mercury, we have already noticed, that calomel was much employed by Mr. White. Some have exhibited the sublimate; others the acetite of mercury. All these preparations have been at times conjoined with cicuta, anti-

mony, &c. Calomel, is, perhaps, the best mercurial preparation in scrophulous cases; but, mercury, given internally with any view of exciting a salivation, is justly deemed hurtful by all the best practitioners. As an alterative, and an occasional purgative, it is undoubtedly, a good medicine for strumous patients.

Mr. Burns thinks the nitrous acid has some effect in promoting the suppuration of scrophulous glands, and tumours, and disposing ulcers to heal. He says, two, or three drams may be given every day, for a fortnight; but, if in this time, it should do no good, its employment ought to be discontinued.

The pills containing natron præparatum (see *Pilulæ*.) and the different soda waters, sold at the shops, have repute, for their good effects on scrophulous constitutions, and diseases.

Eight, or ten drops of the hepatized ammonia, given thrice a day, are useful, according to Mr. Burns, in irritable strumous ulcers. The breathing of oxygen gas has been proposed; but, of this plan I can say nothing myself.

Dr. Cullen mentions, that cold bathing seemed to produce more benefit, than any other remedy, which he had occasion to see employed. (*First Lines of the Practice of Physic, Vol. 4.*)

The local treatment, preferred by Mr. White, has been already described. I have only a few words to add, concerning this part of the subject. Dr. Cullen states, that, in his practice, he had very little success in discussing incipient scrophulous tumours by topical applications; and that a solution of the saccharam saturni, though sometimes useful, more frequently failed. Dr. Cullen found the aqua ammoniæ acet. not more successful. "Fomentations of every kind (says he) have been frequently found to do harm; and poultices seem only to hurry on a suppuration. I am doubtful, if this last be ever practised with advantage; for scrophulous tumours sometimes spontaneously disappear, but never after any degree of inflammation has come upon them; and, therefore, poultices, which commonly induce inflammation, prevent that discussion of tumours, which might otherwise have happened." Even when scrophulous tumours have advanced towards suppuration, Dr. Cullen thought, that hastening the spontaneous opening, or making one with a lancet, was hurtful.

With respect to ulcers, Dr. Cullen remarks, that escharotic preparations, of either mercury, or copper, have been sometimes useful in bringing on a proper suppuration, and thereby disposing the ulcers to heal; but, they have seldom

succeeded, and more commonly, they have caused the ulcer to spread more. The escharotic, from which Cullen saw most benefit result, is burnt alum, mixed with some mild ointment. But, this celebrated writer gives the preference to keeping the sores continually covered with linen wet with cold water in the day-time, and some ointment, or plaster at night. Cullen says, that he usually found sea-water too irritating, and no mineral water better, than common water. (*First Lines of the Pract. of Physic, Vol. 4.*)

Formerly the extirpation of scrophulous tumours was advised; but, this method is now considered as, being for the most part, injudicious, and unnecessary, with the exception of diseased joints, and a few other parts, which frequently require being amputated, for the sake of saving the patient's life. Certainly, no particular danger (generally speaking) would attend cutting out scrophulous glands, and tumours; the objections to the plan are founded on the pain of the operation; on the number of such glands frequently diseased; on their often subsiding either spontaneously, or by surgical treatment; on the operation doing no good to the general affection of the system, &c. When, however, a scrophulous testicle, breast, or joint, seriously impairs the health, and endangers life, the very existence of the patient demands the immediate removal of the diseased part. Wiseman relates, that he was in the habit of cutting out scrophulous glands, and tumours, with great success; but, for reasons, already alleged, most of the moderns think such operations in general at least unnecessary.

Caustics have been employed for the same purpose, instead of the knife; but, as they effect the object in view less certainly, more painfully and tediously, and cause extensive ulcers, they are disused by all the best surgeons of the present day.

Some authors have advised making issues, and keeping them open, in order to prevent any ill effects from healing scrophulous ulcers. Issues are certainly quite unnecessary for any purpose of this kind; but they are eminently useful as a part of the local treatment of scrophulous joints and abscesses, (as we have more particularly explained in the articles *Joints, Lumbar Abscess, and Vertebrae.*)

Mr. Burns notices, that issues have hitherto been chiefly used in diseases of the bones and joints; but, he adds, that it is reasonable to suppose, that they ought likewise to be useful in the cure of enlargements of the glands, and other scrophulous tumours, if inserted in the immediate vicinity of the part. The only

objection to their use is the scar, which they leave, and which, in certain situations, one would particularly wish to avoid. When the tumour is thickly covered with the integuments, the issue may be made directly over it, and kept open with the savine ointment. In other cases, a small pea issue, or seton, may be inserted by the side of the tumour. This method would be objectionable, for scrophulous glands in the neck, in consequence of the scar; but, it might be employed, when the mamma is diseased. (*Dissertations on Inflammation, Vol. II.*)

Preparations of lead: cloths dipped in cold water, sea-water, or weak vegetable acids; æther; sea-salt mixed with bile; the linimentum camphoræ; a mixture of æther and the linimentum opiatum; and hemlock poultices; form a long list of applications, which have been employed for scrophulous tumours.

According to Mr. Burns, moderate pressure, by means of adhesive plaster, conjoined with the applications of cold water, is one of the best plans of treating mild scrophulous ulcers, when their situation admits of it. In other cases, he recommends applying a powder, five parts of which consist of cerussa acetata, and the sixth of burnt alum. A piece of dry lint is next to be applied, and a compress, with such pressure as can be used. Benefit occasionally results from dipping the compress in cold water.

The ceratum è lapid. calamin. is a good common dressing, when it is wished not to interfere much with the progress of the ulcer. The ung. hydrarg. nitrat. rub. and the ung. hydrarg. nitrat. are the best stimulating ointments. Poultices of bread and sea-water; solutions of alum, cuprum vitriolatum, and the hydrarg. mur.; solutions of the nitrates of copper, bismuth, and silver; the recent leaves of the wood-sorrel bruised; lint dipped in lemon juice, or vinegar and water; are among the applications to common scrophulous ulcers.

For irritable ones, diluted, hepatized ammonia; ointments containing opium: carrot and hemlock poultices; a solution of opium; and carbonic acid gas; are commonly recommended.

The following are Mr. Russell's sentiments respecting the treatment of scrophulous ulcers: "Scrophulous complaints in general do not agree well with stimulant applications. In the treatment of scrophulous ulcers, under the ordinary circumstances of complaint, the simplest and mildest dressings answer best. When the patients are using a course of sea-bathing, it is usual to wash the sores with sea water, over and above the momentary

application of the sea water during the immersion of the whole body. Cold spring water is likewise a favourite application with many practitioners; and, from much observation, it appears that the operation of cold is well suited to counteract the state of inflammation, which accompanies scrophulous sores. Preparations of lead are, upon the whole, very convenient and useful applications, provided the solutions be used in a state of sufficient dilution to prevent irritation. Liquid applications are applied by means of wet linen, which is renewed whenever it dries, so that the surface of the sore may be kept constantly moist, when under this course of management. Upon the same principle, simple ointment and Goulard's cerate, furnish the best dressing in ordinary cases.

"Scrophulous congestions, of a solid nature, in the more external parts of the body, are little adapted to the practice of local bleeding, unless they be attended with symptoms of inflammation, but as some degree of inflammation is, in general, present during the incipient stage, it may be prudent to employ local bleeding in moderation at the commencement of the attack, although there may be no indication to persist in the practice, after the complaint has advanced farther in its progress. If, however, these congestions are more of an indolent nature, unaccompanied with heat or pain, there is no benefit to be expected from the local detraction of blood; warm fomentations, together with the use of stimulants, and a repetition of blisters, are the most serviceable class of remedies: such cases, too, are the best adapted to the use of friction as a discutient. Friction, indeed, has long been employed for this purpose; but, of late years, it has been introduced to an extent, and with an effect, far beyond the experience of all former practice. As yet, it has been circumscribed to the practice of a very few individuals, with whom it is said to have performed very great cures; and if, upon the test of more extensive experience, it is found to answer its present high character, I shall consider the use of repeated frictions to be one of the most valuable improvements which has been introduced into practice in modern times. The safety and simplicity of the practice recommend it very strongly to favour, though I am afraid they are the very circumstances which retard its adoption by the public in general. I only regret that I do not feel myself entitled to give a decided opinion upon the subject from my own experience, though I have known some instances of successful cures; but the reports of success are so numerous

and so well supported, that I am inclined to think very favourably of the practice.

"There is no substance interposed between the surface of the swelling and the hand of the person who administers the friction, excepting a little flour, to prevent the abrasion of the skin. The friction is applied regularly two or three hours every day, with great celerity, the hand being made to move to and fro one hundred and twenty times in a minute, and the course may require to be continued without interruption, for some months." (See *Russell on Scrophula*.)

I shall not enlarge upon this endless subject, which still stands in need of elucidation, as much as any disease, that can be instanced. The scrophulous affections of the joints are explained in *Joints*. *Bronchocoele*; *Lumbar Abscess*; and *Vertebra*, are other articles, containing matter connected with the preceding observations.

With regard to sources of information, concerning scrophula, I profess myself totally unacquainted with any, which are even moderately respectable. The reader may consult *Wiseman's Chirurgical Treatises*. *Heister's Surgery*. *Cullen's First Lines of the Practice of Physic*, Vol. 4. *Ferne on the King's Evil*. *Cheyne on the King's Evil*. *B. Bell's Surgery*, Vol. 5. *B. Bell on Ulcers*. *Kirkland's Medical Surgery* Vol. 2. *White on the Struma*, Edit. 3, 1794. *A. G. Kortum's Comment. de Vitio Scrophuloso*, in 2 Vol. 4to. *Lemgovia*, 1789. *London Med. Obs and Inq.* Vol. 1. *Encyclopédie Méthodique*, Art. *Ecroûelles*. *Dissertations on Inflammation*, by John Burns, Vol. 2. *Crowther's Obs. on the Disease of the Joints, commonly called White Swelling; with remarks on Caries, Necrosis, and Scrophulous Abscesses, &c.* Edit. 2, 1808. *A Treatise on Scrophula*, by James Russell, Edinburgh, 1808. Of the preceding works, Cullen's First Lines, White's Treatise, Mr Burn's Dissertation in Vol. 2, and Mr. Russell's Treatise, have been most useful to me, in the compilation of the present article.

SCROTOCE'LE. (from *scrotum*, and *κελε*, a tumour.) A rupture, or hernia in the scrotum.

SCROTUM, CANCER OF. (*Chimney-Sweeper's Cancer*. *The soot-wart*.) Mr. Pott gives the following account of this peculiar disorder.

"It is a disease, which always makes its first attack on, and its first appearance in, the inferior part of the scrotum; where it produces a superficial, painful, ragged, ill-looking sore, with hard and rising edges: the trade call it the soot-wart. I never saw it under the age of puberty, which is, I suppose, one reason why it is generally taken, both by patient and sur-

geon, for venereal, and being treated with mercurials, is thereby soon and much exasperated: in no great length of time, it pervades the skin, dartos, and membranes of the scrotum, and seizes the testicle, which it enlarges, hardens, and renders truly and thoroughly distempered; from whence it makes its way up the spermatic process into the abdomen, most frequently indurating and spoiling the inguinal glands: when arrived within the abdomen, it affects some of the viscera, and then very soon becomes painfully destructive.

"The fate of these people seems singularly hard: in their early infancy, they are most frequently treated with great brutality, and almost starved with cold and hunger; they are thrust up narrow, and sometimes hot chimneys, where they are bruised, burned, and almost suffocated; and when they get to puberty, become peculiarly liable to a most noisome, painful, and fatal disease.

"Of this last circumstance there is not the least doubt, though perhaps it may not have been sufficiently attended to, to make it generally known. Other people have cancers of the same parts; and so have others beside lead-workers, the Poitou colic, and the consequent paralysis: but it is nevertheless a disease to which they are peculiarly liable; and so are chimney-sweepers to the cancer of the scrotum and testicles.

"If there be any chance of putting a stop to, or preventing this mischief, it must be by the immediate removal of the part affected; I mean that part of the scrotum where the sore is; for, if it be suffered to remain until the virus has seized the testicle, it is generally too late even for castration. I have many times made the experiment; but though the sores, after such operation, have, in some instances, healed kindly, and the patients have gone from the hospital seemingly well, yet, in the space of a few months, it has generally happened, that they have returned either with the same disease in the other testicle, or in the glands of the groin, or with such wan complexions, such pale leaden countenances, such a total loss of strength, and such frequent and acute internal pains, as have sufficiently proved a diseased state of some of the viscera, and which have soon been followed by a painful death.

"If extirpation ever bids fair for the cure of a cancer, it seems to be in this case; but then the operation should be immediate, and before the habit is tainted. The disease, in these people, seems to derive its origin from a lodgment of soot in the rugæ of the scrotum, and at

first not to be a disease of the habit. In other cases of a cancerous nature, in which the habit is too frequently concerned, we have not often so fair a prospect of success by the removal of the distempered part; and are obliged to be content with means, which I wish I could say were truly palliative: but here the subjects are young, in general in good health, at least at first; the disease brought on them by their occupation, and in all probability local; which last circumstance may, I think, be fairly presumed from its always seizing the same part: all this makes it (at first) a very different case from a cancer, which appears in an elderly man, whose fluids are become acrimonious from time, as well as other causes; or from the same kind of complaint in women who have ceased to menstruate. But be all this as it may, the scrotum is no vital organ, nor can the loss of a part of it ever be attended with any, the smallest degree of inconvenience; and if a life can be preserved by the removal of all that portion that is distempered, it will be a very good and easy composition; for when the disease has got head, it is rapid in its progress, painful in all its attacks, and most certainly destructive in its event." (*Pott's Works*, vol. 3.)

SEARCHING. The operation of introducing a metallic instrument, through the urethra into the bladder, for the purpose of ascertaining whether the patient has a stone, or not. See *Sounding*.

SE'DATIVES. (from *sedo*, to appease.) *Sedantia. Sedativa.* Medicines, which diminish irritability.

SEMICU'PIUM. Strictly a bath for about one half of the body: medical men, however, now frequently mean by the term only a warm bath, especially, the slipper-bath.

SERPI'GO. (from *serpo*, to creep, because it gradually creeps over the surface of the skin.) A ring-worm, or tetter. See *Herpes*.

SETON: (from *seta*, a bristle, because horse-hairs were formerly used for keeping open the wound.) *Setaceum.* A kind of issue. It is usually made by means of a particular needle, which is of various breadths, from half an inch to a full inch. The needle is commonly a little curved; but, if straight, it would be better calculated for the purpose. From the point, to its broadest part, it is double-edged, and, behind, it has a transverse eye, through which a skein of thread, or silk, of exactly the same breadth as the needle, is placed.

A fold of skin is to be pinched up, at

the part where the seton is designed to be made, and the needle is to be pushed through it, together with the skein of thread, which is to be dipped in sweet-oil. The instrument is not to be introduced too low into the base of the fold, nor too high, near its edge. In the first case, the muscles, and parts, which ought to be avoided, might be wounded; in the second, the interspace, between the two wounds, would be very narrow, and the seton soon make its way through it.

When no seton-needle is at hand, the fold of the skin may be punctured with a lancet, and the skein of thread introduced by means of an eye-probe. A seton may be applied almost to any part of the surface of the body, when circumstances require it; but, one of its openings should always be made lower, than the other, that the matter may readily flow out. The skein of thread is to remain untouched, for a few days after the operation, until the suppuration loosens it. Afterwards the part of the thread nearest the wound, is to be smeared with oil, white cerate, or any digestive ointment, and drawn under the fleshy interspace between the two wounds, and what was there before is to be cut off. The seton is to be drawn in this manner once, or twice, a day, according as the quantity of matter may require. A new skein of silk, or thread, is to be attached to the preceding one, as often as necessary. Care is to be taken to keep the thread on the outside of the wound well covered, and free from the discharge, which would make it stiff and hard, and apt to occasion pain and bleeding on being drawn into the wound. If the discharge should be deficient in quantity, powdered cantharides may be mixed with the digestive ointment.

SIGHT, DEFECTS OF. There are persons, who, from their infancy, are incapable of distinguishing one colour from another. A man, who was affected with this infirmity, could not distinguish green at all. Green and red appeared to him the same. Yellow and blue he could discern very well. With regard to dark-red and dark-blue, he frequently made mistakes. In other respects, his vision was sound and acute. The father of this patient was afflicted with the same infirmity. The mother and one sister was free from it. Another sister and two of her children had it. The patient himself had two children, who did not labour under the disorder. (See *Phil. Trans.* Vol. 68, Part 2.) Another subject, whose eyes were in other respects healthy, and whose eyesight was sharp, could not distinguish a dark-green from a dark-red.

Sometimes, objects appear to the eye

to be of a different colour from what they really are. This is occasionally owing not to the eye, but to the unclear and coloured light, by which the object is illuminated. Thus, for instance, a bad tallow candle, which emits a yellow flame, makes every thing appear yellow. When brandy is burning all objects appear blue. In short, it is only by the light of the sun, that any object can be seen in its clear natural hue. In certain cases, the infirmity is owing to the transparent parts and humours of the eye, which do not happen to be of a proper colour. Thus, persons having the jaundice in a high degree, see all things yellow, because the transparent parts of the eye are of that colour. When, in consequence of external violence applied to the eye, blood is effused, and the aqueous humour rendered red by this fluid, all objects seem to the patient to be red; and, white, when the aqueous humour has been made of this colour by the couching of a milky cataract. Sometimes this defect in vision is ascribable to the duration of an impression. When one has surveyed a bright coloured object a long while, as for example a bright red or yellow wall, on which the sun shines, that colour will often remain a good while before the eyes, although one may not be looking any more at an object of this hue. There are some eyes, which seem much disposed to retain the impression of objects, which are not very bright coloured; but, such a disposition always betrays great weakness and irritability of those organs. The most frequent cause of this defect in vision, is an irritation operating upon the optic nerves, so as to produce the irritability in them, which alone makes objects appear of one colour. The seat of such irritation, according to Richter, is also most commonly in the abdominal viscera, and the case demands evacuations, tonics, and anodyne medicines. But, the disorder may also originate from other causes. The operation of bright-coloured or shining objects upon the eye, sometimes has this consequence, that, for a certain time afterwards, objects of diverse colours appear to be moving before the eyes. In extreme terror, or fright, things may also seem to have a different colour from their real one. The same often happens in fevers attended with delirium. A sudden exposure of the head to cold, at a period, when it was perspiring much, in one instance, caused many coloured appearances before the eyes; but, the disorder subsided in a couple of days. *Richter's Anfangsgr. der Wundarzneykunst, Band. 3, p. 523.*

Also a healthy eye sees a distant object with uncertainty, and error, in a room, or

space, the extent, length, and breadth, of which are unknown, when the size of the object itself is unascertained, and when there are few or no other objects intervening at a smaller distance between the eye and the thing looked at. The more numerous the objects are between the eye and the principal thing looked at, the more distant it is made to appear; the fewer they are, the nearer it seems to be. In a country covered with snow, and upon the sea, very distant objects appear to be close. The smaller an object is to the eye, in relation to its known magnitude, the further off it seems. The errors, which the eye makes, in regard to the distance of objects, also tend to deceive. But, there are certain cases, in which the eye is almost entirely incapable of judging of the distance of objects. The first is, when the object, of which we wish to ascertain the distance, is looked at with only one eye. Hence all one eyed persons, and persons affected with strabismus, are unable to judge well of the real distance of objects. However they are only so for a certain time; and, by practice, they gradually acquire the faculty. Even when two eyes are employed, it requires some exercise, in order to enable them to judge of the right distance of objects. Persons, born blind, but who have their sight restored in both eyes by the operation for the cataract, are a long while incapable of judging of distances, and only obtain this power very gradually. Lastly, this infirmity is sometimes owing to an irritation affecting the optic nerves, whereby their sensibility is so altered, that distant objects make the impression upon them of near ones. In this circumstance, all objects appear to the patient closer than they really are. This is the only case, which admits of being treated as a disease. The irritation, producing the disorder, is mostly seated in the abdominal viscera, and requires evacuations and such medicines as invigorate the nerves. A suppression of the perspiration is alleged to be sometimes a cause. (*Richter's Anfangsgr. der Wundarzn. Band. 3, p. 525.*)

A sound eye likewise does not always judge with accuracy and uniformity of the magnitude of objects. This may arise from three causes. In order to judge rightly of the size of any thing, its precise distance must be known; for, the more remote it is, the smaller will it seem to the eye. Hence, any conjecture, respecting the magnitude of an object, is constantly erroneous, unless the distance be ascertained. Size is invariably something relative. A single large object, surrounded by many small ones, always appears

to be larger, than it really is; et vice versa. An object, whose magnitude is known, seems smaller, than it actually is, when one has been a little previously looking at another that is still larger. Lastly, the refraction of the rays of light in the eye, by which operation an object is made to appear large or small, is not always accomplished in the same degree, as the eye is not at all times equally full and distended with its humours. Hence, at one time, the same object will appear to the same eye, and at the same distance, larger; at another time, smaller. Sometimes, however, the eye judges so erroneously of the magnitude of objects, that there is reason for regarding the case as an infirmity, or disease. It is for the most part owing to a defective sensibility in the nerves, caused by some species of irritation acting upon the eye, and generally seated in the gastric organs. A man, to whom every thing seemed one half smaller and nearer, than it really was, was cured by means of an emetic bark, an issue, and valerian. (*Leutin, obs. fascic.*)

Sometimes to the eye, under circumstances of disease, straight lines appear serpentine; perpendicular objects, sloping, things standing upright, to be inverted, &c. All these cases are set down by Richter as depending upon a wrong sensibility of the nerves, occasioned by the effect of some irritation. The irritation, he says, may be of many kinds; but, experience proves that it is mostly seated in the gastric organs. These defects of sight may generally be cured by first exhibiting emetics and purgatives, and afterwards having recourse to remedies for strengthening the nerves, bark, oleum animale, valerian, issues, &c. One mark of a very weak and irritable eye, is when objects, after being looked at a good while, and presenting a right appearance, begin to move, swim about, mix together, and, at length, become quite indistinguishable. This principally happens when the objects regarded are small and strongly illuminated. Here such remedies, both general and topical, as have the effect of invigorating the nerves, are indicated. However, sometimes, the infirmity is partly owing to the operation of some species of irritation, which will require removal, ere the tonic medicines and applications can avail. Indeed, in particular cases, the dispersion of such irritation is alone sufficient to accomplish the cure.

Sometimes, all objects appear to the eye, as if they were in a more or less dense mist. This defect in vision is always owing either to some slight opacity of one of the humours of the eye, or to excessive

debility of the optic nerves. (See *Rich-ter's Anfangsgr. der Wundarzn. Band. 3, p. 521, &c.*)

SINGULTUS. (*a sono vocis*, from its peculiar noise.) The hiccup.

SINUS. (a gulph, from *κενος*, void.) This term in surgery means a long, narrow, hollow track, leading from some abscess, diseased bone, &c.

SIPHILIS. (from *σιφλος*, filthy.) The venereal disease. (See *Venereal Disease*.)

SOLUTIO ARGENTI NITRATI.—*℞. Argenti Nitrati ℥j. Aq. Distillat. ℥ss. M.* This is a very good application for sores, which are frequently met with round the roots of the nails, both of the fingers and toes. It is also useful in herpetic affections, *noli-me-tangere*, and several kinds of ulcers. The proportion of the *argentum nitratum* may be lessened, or increased, as occasion requires. A strong solution of this substance is a good application for destroying warts, to which it must be applied by means of a hair pencil. When used for sores, it is best to dip little bits of soft lint in it, lay them on the part affected, and cover them with a common pledget.

SOLUTIO FERRI VITRIOLATI.—*℞. Ferri Vitriolati ad albidinem calcinati ℥j. Aq. Distillat. ℥viij. Misc.* Has been recommended as an application for sores on the nipple, and other ulcers.

SOLUTIO HYDRARGYRI CUM PLUMBO. *℞. Hydrarg. ℥ij. Plumbi ℥ss. Acidi Nitrosi ℥j.* The two metals are to be dissolved in the acid, in a glass vessel, placed in a sand heat. Plenck employs this caustic solution for destroying warts, and excrescences.

SORDI'TIES. (from *sordeo*, to be filthy.) Putrid pus of bad quality; any fetid discharge.

SOUND. An instrument, which surgeons introduce through the urethra into the bladder, in order to discover, whether there is a stone in this viscus, or not. The sound is usually made of very highly polished steel, that it may be well calculated for conveying to the surgeon's fingers the sensation of any thing, against which its end may strike. It is also generally rather less curved, than a catheter, so that its extremity may be more easily inclined to the lower part of the bladder, where the stone is most frequently situated.

SOUNDING. The operation of introducing the foregoing instrument.

Sounds are generally introduced much in the same way as catheters, either with the concavity towards the abdomen, or the convexity, in which last method, it is necessary, as soon as the beak of the sound

has arrived in the perineum, to bring the handle of the instrument downward by a semicircular movement on the right, while the other end is kept as much fixed as possible. This is what the French term the *coup*, or *tour de maitre*; a plan, that is often followed at the present day, though, except in very corpulent subjects, it has no particular recommendation.

When a patient is to be sounded, he is usually put into a posture very similar to that adopted in the lateral operation for the stone, with the exception that he is not bound in this position, as there is sometimes an advantage in being able suddenly to alter it, in order that the stone may thereby be made to come into contact with the end of the sound. The instrument having been introduced, its extremity is to be turned, and moved in every direction within the bladder, when, if there be a calculus, its presence will usually be indicated by the collision against the beak of the sound.

SPARGANO'SIS. (from *σπαρνω*, to swell.) An enlargement of the breast from a redundancy of milk: the mammary abscess.

SPA'TULA. (dim. of *spatho*, a broad instrument.) An instrument for spreading salve.

SPECILLUM. (from *specio*, to examine.) A probe.

SPE'CULUM. An instrument intended for facilitating the examination of parts, and also operations on them: thus we have *specula ani*, *specula oculi*, *auris*, &c.

SPERMATOCE'LE. (from *σπέρμα*, and *κηλη*, a tumour.) The old writers seem to signify, by this term, a swelling caused by a stagnation of the semen. I am acquainted with no real disease, which answers to any meaning of this kind.

SPHACELI'SMUS. (from *σφακελιζω*, to mortify.) A mortification.

SPHA'CELUS. (from *σφαζω*, to destroy.) Surgeons imply, by this word, complete mortification, which is mostly preceded by a stage of the disorder, termed *gangrene*. (See *Mortification*.)

SPICA. (from *σπαχνη*, an ear of corn.) A name, given to a kind of bandage, in consequence of its turns being thought to resemble the rows of an ear of corn. Of spica bandages there are several kinds: but, we shall here only mention a few.

In order to apply the spica bandage, employed in dislocations of the shoulder, we are to take a common single-headed roller, and place the end of it under the opposite arm-pit. After conveying the bandage backward, obliquely over the

shoulders, we are then to bring it forward over the head of the dislocated bone. The roller is next to descend under the arm-pit, then be carried upward again, and made to cross on the deltoid muscle. The roller is now to be carried obliquely downward over the front of the chest, and under the opposite arm-pit, where the end of it is to be pinned, or stitched. The bandage is next to pass across the back, over the part of the roller previously applied in this situation, and is to be conveyed round the head of the os brachii, so as to form a turn, or *doloire*, with the first circle of the roller. Three, or four *doloires*, or turns, each of which covers about one-third of the preceding one, are to be made, and then the upper part of the arm is to be once surrounded with a plain circle of the bandage. This last circular application leaves between it, and the cross previously made, a triangular, equilateral space, technically named by writers *geranis*. The roller is now to be carried upward in a spiral manner; its head is to be brought to the opposite arm-pit, and the application of the whole concludes with a few turns round the body. The bandage is to be fastened with pins at the place, where it commenced.

Before putting on the spica, the injured part, and margin of the axillæ, must be guarded from the effects of the pressure by compresses.

The spica bandage for the broken clavicle is applied in the same manner, with the exception, that the crossings are made over this bone. It is proper to state, in this place, that the spica is a very ineffectual bandage for this kind of case. (See *Fractures of the Clavicle*.)

In order to apply, what is named, the *spica inguinis*, the end of the roller is to be placed on the spine of the os ilium, of the affected side. The bandage is then to be carried obliquely over the groin, and under the perinæum. Then it is to pass over the back of the thigh, and next forward, so as to cross the part previously applied on the front of the groin. The application is continued by carrying the roller over the pubes, over the opposite os ilium, and next round the body above the buttocks. The bandage thus returns to the place, where it began. Its application is completed by making a few *doloires*, and turns, like the preceding ones, and lastly, a few turns round the body.

The spica for the thigh is applied in the same way; only the crossings are to be made on the upper and outer part of the limb. (See *Encyclopédie Méthodique, Part. Chirurgicale, Art. Spica*.)

SPINA BIFIDA. (i. e. the Cloven

Spine.) *Hydro-Rachitis*. A disease, attended with an incomplete state of some of the vertebræ, and a fluid swelling, which is most commonly situated over the lower lumbar vertebræ, sometimes over the dorsal and cervical ones, and, in some instances, over the os sacrum. The same name has also been given to an analogous tumour, which sometimes occurs on children's heads, attended with an imperfect ossification of some part of the cranium.

The Arabians, who first treated of this disease, erroneously imputed the deficiency of one, or more of the spinous processes to the tumour, while it is now well known, that the incomplete state of the affected vertebræ is a congenital malformation, and that the swelling is only an effect. In fact, the tumour generally becomes larger and larger, the longer it continues. The spina bifida may be regarded as an affliction only met with in children: few, very few, live to the adult age with this incurable affection. Warner, however, has related a case, in which the patient lived till he was twenty.—(*Cases in Surgery, p. 134, Edit. 4.*)

As I have remarked, the swelling is most frequently situated towards the lower part of the spinal canal, particularly at the place, where the lumbar vertebræ join the sacrum. The fluid, which it contains, resembles serum, being somewhat more liquid, than the white-of-egg, and, like the latter, frequently coagulable. It is in general limpid and colourless; but, occasionally, it is turbid, and tinged with blood. On pressing the tumour, a fluctuation is very perceptible, and a preternatural space may also be felt existing between some of the spinous processes. The fluid is contained in a kind of cyst, which is composed of the continuation of the dura mater, investing the spinal canal, and is usually closely adherent to the integuments.

Spina bifida is sometimes attended with hydrocephalus. It has even been recorded, that the enlargement of the head has undergone a considerable diminution, when the tumour of the spine casually burst, and discharged the fluid, which it contained; a proof of some communication between the two parts. (*Ephem. Cur. Nat. Decad. 3, Ar. 1, Decad. 2, Art. 2.*) The fluid, which was lodged in the lateral ventricles, and third ventricle, passed into the fourth, through the aqueductus Sylvii, ruptured the calamus scriptorius, and thus got into the spinal canal.

Spinæ bifidæ usually occur on the lower part of the spine; but, they occasionally take place on the cervical vertebræ, in which latter situation, the tumours have

the same characteristic marks, as those which form near the sacrum. Many facts, recorded by Ruysch, in his *Anatomical Observations*, confirm the preceding account.

The present affliction is one of a most incurable nature: at least, (with the exception of two or three recently published by Mr. Astley Cooper,) there is not, I believe, in all the records of medicine, or surgery, any case, which either got well of itself or was benefited by any mode of treatment. Opening the tumour, either with caustics, or cutting instruments, has hitherto only tended to hasten the fatal event of the disease. Death soon follows an operation of this kind, and, it is said, that the child sometimes dies immediately. Tulpus observes on this subject: *quam calamitatem si quidem reformides, chirurgi, cave sis improvide aperias quod tam facile occidit hominem.* Observ. Med.

But, whether the tumour be opened, or not, still the disease is one of the most fatal, to which children are exposed. When afflicted with it, they very seldom live till three years of age: but, after lingering several months from their birth, suddenly die. It has been said, that children, with spina bifida, always have their legs in a paralytic state. This, however, is not true; for, the largest spina bifida I ever saw, was under my friend Mr. Maul, now resident at Southampton, and was unattended with any weakness of the legs. Indeed, the child was, to all appearances, as stout, healthy, and full of play, as possible. The fatal event, however, took place after a time, as usual; and, if my memory does not fail me, Mr. Maul noticed, that a little before death, a remarkable subsidence of the swelling occurred, though it never burst externally. It is a fact, notwithstanding, that many infants, with spina bifida, have paralytic legs; and can neither retain their feces, nor urine.

If we draw our inferences from the cases, and remarks, offered by almost every writer on spina bifida, we must regard all attempts to cure the disorder, by making any kind of opening, as exceedingly perilous, if not positively fatal. It is to be observed, at the same time, that some very eminent surgical authors have not altogether abandoned the idea of devising a mode of accomplishing a cure, at least, in a few instances. Mr. B. Bell says, that if the tumour proceeded from disease of the spinal marrow, or its membranes, no means of cure will probably ever be discovered. But, if the deficiency in the spinous processes of the vertebrae, with which the disease is always accom-

panied, is not an effect of the complaint, as was commonly imagined, and if the collection of fluid takes place from the want of resistance in the dura mater, in consequence of the imperfection of the bones, Mr. B. Bell questions, whether it would not be proper to tie the base of the tumour with a ligature, not merely with a view of removing the swelling, but in order to resist the propulsion of the cyst further outward. Mr. Bell acknowledges, that the event of this practice must be considered as very dubious; but, expresses his wish to devise any plan, that would afford even the least chance of success, in a case which must terminate in an unfavourable manner. Mr. Bell mentioned his design of putting the method to a trial, on the first opportunity, and after the detachment of the swelling on the outside of the ligature, he intended to keep a soft compress on the part with a proper bandage. I do not know whether this gentleman ever put the above scheme in practice; but, suppose not. It is properly objected to by the author of the article *Spina Bifida*, in the *Encyclopédie Méthodique, Part. Chir.* because the disease is often attended with other mischief of the spinal marrow and brain, and the base of the swelling is almost always too large to admit of being tied at all, or not without hazard of dangerous consequences.

Richter has proposed the trial of two caustic issues at a little distance from the swelling; but, I am not acquainted with any facts in favour of this practice.

Mr. Abernethy first suggested trying a gentle degree of pressure on the tumour from its commencement, with a view of producing absorption of the fluid, and preventing the distention of the unsupported dura mater. Were the fluid to continue to increase, notwithstanding such pressure, Mr. Abernethy thinks, that as death would be inevitable on the tumour bursting, it might be vindicable to let out the fluid, by means of a puncture, made with a finely-cutting instrument. The wound is to be immediately afterwards closed with sticking plaster, and, if possible, healed. Another accumulation is then to be prevented, if practicable, with bandages and topical applications. Mr. Abernethy actually made the experiment of trying a puncture in one hopeless instance, in which indeed, the swelling had previously just begun to burst. The puncture was repeated, every fourth day, for six weeks, during which time the child's health continued unaffected. The wounds were regularly healed; but the plaster having been rubbed off one of the punctures, the part ulcerated, the opening could not be healed, the discharge,

from having been of an aqueous quality, became purulent, and death ensued. This case was unfavourable for the trial of the method, as the integuments covering the tumour were diseased, and had no disposition to contract.

The annexed case, published by Mr. Astley Cooper, will serve to shew the benefit, which may be derived from pressure.

"James Applebee, Baldwin Street, Old Street, was born on the 19th of May, 1807, and his mother, immediately after his birth, observed a round and transparent tumour on the loins, of the size of a large walnut.

"Mr. Deering, who was her accoucheur, requested Dr. Petch to see the child with him, who informed the mother of the dangerous nature of the complaint, and of the probability of its fatal termination.

"On the 22d of June, 1807, the child was brought to my house, and I found, that although it had spina bifida, the head was not unusually large; that the motions of its legs were perfect; and its stools and urine were discharged naturally.

"I applied a roller around the child's waist, so as to compress the tumour, being induced to do so from considering it as a species of hernia, and that the deficiency of the spine might be compensated for by external pressure.

"The pressure, made by the roller, had no unpleasant influence on its voluntary powers; its stools and urine continued to be properly discharged, but the mother thought, that the child was occasionally convulsed.

"At the end of a week, a piece of plaster of Paris, somewhat hollowed, and that hollow partly filled with a piece of lint, was placed upon the surface of the tumour: a strap of adhesive plaster was applied to prevent its changing its situation, and a roller was carried around the waist, to bind the plaster of Paris firmly upon the back, and to compress the tumour as much as the child could bear.

"This treatment was continued until the month of October, during which time, the tumour was examined about three times a week, and the mother reported, that the child was occasionally convulsed.

"When the child was five months old, a truss was applied, similar in form to that, which I sometimes use for umbilical hernia in children, and this has been continued ever since.

"At the age of fifteen months, it began to make use of its limbs; it could

crawl along a passage, and up two pair of stairs.

"At eighteen months, by some accident, the truss slipped from the tumour, which had become of the size of a small orange, and the mother observed, when it was reduced, that the child appeared in some degree dull; and this was always the case, if the truss was left off for a few minutes, and then reapplied.

"At fifteen months, he began to talk; and at two years of age, he could walk alone.

"He now goes to school, runs, jumps, and plays about, as other children. His powers of mind do not appear to differ from those of other children. His memory is retentive, and he learns with facility. He had the measles and small-pox in the first year, and the whooping-cough at three years. His head, previously and subsequently to the bones closing, has preserved a proper proportion to the other parts of the body.

"The tumour is kept by the truss entirely within the channel of the spine; but, when the truss is removed, it soon becomes of the size of half a small orange. It is therefore necessary, that the use of the truss should be continued. When the truss is removed, the finger can be readily pressed through the tumour into the channel of the spine." (*Medico-Chirurgical Transactions, Vol. 2. p. 323, &c.*)

The next case, also published by Mr. Astley Cooper, will prove, that spina bifida may sometimes be treated on another plan, so as to accomplish a permanent cure.

"January 21st, 1809, Mrs. Little, of No. 27, Lime-house Causeway, brought to my house her son, aged ten weeks, who was the subject of spina bifida.

"The tumour was situated on the loins; it was soft, elastic, and transparent; and its size about as large as a billiard-ball when cut in half; his legs were perfectly sensible, and his urine and feces were under the power of the will, &c.

"Having endeavoured to push the water, contained in the tumour, into the channel of the spine, and finding that if the whole was returned, the pressure would be too great upon the brain; I thought it a fair opportunity of trying what would be the effect of evacuating the swelling by means of a very fine pointed instrument, and by subsequent pressure to bring it into the state of the spina bifida in Applebee's child.

"I therefore immediately punctured the tumour with a needle, and drew off about two ounces of water.

"On the 25th of January, finding the tumour as large as before it had been

punctured, I opened it again, and in the same manner, and discharged about four ounces of fluid. The child cried when the fluid was evacuated, but not whilst it was passing off.

"On January 28th, the tumour was as large as at first, I opened it again, and discharged the fluid. A roller was applied over the tumour, and around the abdomen.

"February 1st, it was again pricked, and two ounces of fluid discharged.

"On the 4th, three ounces of fluid were discharged.

"On February 9th, the same quantity of fluid was evacuated as on the 4th; but, instead of its being perfectly clear, as at first, it was now sanious, and it had been gradually becoming so in the three former operations.

"On the 13th, the same quantity of fluid was taken away; a flannel roller was applied over the tumour and around the abdomen; a piece of pasteboard was placed upon the flannel roller over the tumour, and another roller over the pasteboard to confine it.

"On the 17th, three ounces of fluid, of a more limpid kind, were discharged; the pasteboard was again applied.

"On the 27th, the surface of the tumour inflamed; the fluid, not more than half its former quantity, was mixed with coagulable lymph, and the child, suffering considerable constitutional irritation, was ordered calomel and scammony, and the rollers were discontinued.

"February 26th, the tumour was not more than a quarter of its former size; it felt solid; the integuments were thickened, and it had all the appearance of having undergone the adhesive inflammation.

"On the 28th, it was still more reduced in size, and felt solid.

"On March 4th, it was in the same state as on the 28th of February.

"March 8th, the swelling was very much lessened; the skin over it thickened and wrinkled; a roller was again had recourse to; a card was put over the tumour; and a second roller was applied.

"March 11th, the tumour was much reduced; the skin covering it was a little ulcerated. On the 15th, it was flat, but still a little ulcerated.

"On the 27th, the effused coagulable lymph was considerably reduced in quantity, and of a very firm consistence.

"On the 2d of May, nothing more, than a loose pendulous bag of skin remained, and the child, appearing to be perfectly well, the bandage was soon left off.

"On December 18th, it was attacked

with the small-pox, and went well through the disease.

"The skin now hangs flaccid from the basis of the sacrum; its centre is drawn to the spine, to which it is united, and thus the appearance of a navel is produced in the tumour by retraction of the skin.

"The pricks of the needles are very obvious on each of the punctured parts of the tumour, forming slight indentations." (See *Medico-Chirurgical Transactions*, Vol. 2, p. 326—329.)

At the time when Mr. A. Cooper transmitted this case to the Medico-Chirurgical Society, it had been under his observation two years and a half.

The first of the preceding observations exemplifies the palliative treatment, adopted by the latter gentleman, and consisting of the application of pressure, in the manner of a truss for hernia; the second shews the radical mode of cure by puncturing the swelling from time to time with a needle, and exciting the adhesive inflammation, which, with the assistance of pressure, stops the disease altogether, that is to say, in such examples as admit of cure.

Consult *Ruysschii Observ. Anat. Warner's Cases in Surgery. B. Bell's System of Surgery*, vol. 5. *Abernethy's Surgical and Physiological Essays*, Part 1 and 3. *Encyclopédie Méthodique*; Part. Chir. Art. *Spina Bifida*. *Richter's Anfangsgr. der Wundarzneykunst. A. Cooper in Medico-Chirurgical Transactions*, Vol. 2. p. 322, &c.

SPINA VENTOSA. The Arabian writers first employed this term to express a disease, in which matter formed in the interior of a bone, and afterwards made its way outward beneath the skin. Until the matter had escaped from within the bone, these authors describe, that the pain was incessant and intolerable; but that after the pus had made its way outward by fistulous openings, the pain underwent a considerable diminution. The matter sometimes insinuated itself, from the interior of the bone, into the cavities of the cellular substance, so as to render them soft and flabby, unattended occasionally with any change of colour in the skin. The swelling being partly a serous and partly an inflammatory one, had some of the appearance of emphysema. To express this state, the Arabians added the term *ventosa* to that of *spina*, which was employed, before them, to describe the nature of the pain attendant on the disease. (See an account of this subject in the *Encyclopédie Méthodique*, Part. Chir. Art. *Spina Ventosa*.)

The term *spina ventosa* has, since the time of the Arabian writers, been used by

many to signify the disease named *white-swelling*, and the former might also mean by it a similar affection, though we should infer the contrary from their account of the matter passing from the interior of the bone to get under the integuments, a thing which I believe never yet happened in any case of white-swelling. Another, and, perhaps, a decisive argument, against the original signification of the word being the same as that of white-swelling, is, that it was not restricted to diseases of the joints and heads of the bones; but was also applied to abscesses, which commenced in the cavities of the middle portions of the long bones, on which parts, I need hardly observe, white-swellings never make their attack.

For these reasons, many respectable authors have implied by the term *spina ventosa*, an abscess in the interior of a bone. See, on this subject, *Latta's System of Surgery*, vol. 1, p. 165. Cases of this latter kind, I know, are infinitely rare, compared with that common disorder, in this country, the white-swelling; and, I am also certain, from the descriptions given by some authors, that they have mistaken instances of necrosis for cases of *spina ventosa*. But, that abscesses do occur, and begin in the interior of the bones, more particularly of those of young persons, I have no doubt myself, both from two or three cases, which I remember having seen in St. Bartholomew's Hospital, and from some cases recorded by the most authentic writers. J. L. Petit relates, that a man, with a tumour on the middle of the tibia, who had been treated by him as a venereal patient, found, a fortnight afterwards, that the pains, which had never ceased, now began to grow more violent. The patient was feverish, his leg became red, and even painful, externally. An incision was made in the situation of the tumour with a view of letting out the matter which was suspected to be the occasion of the bad symptoms, and to have insinuated itself under the periosteum. The incision was of no service, and, two days afterwards, the trepan was applied, by which means, a large quantity of matter was let out. The medullary part of the bone seemed quite annihilated, and the cavity almost empty. Petit made three other perforations with the trepan, and cut away the intervening pieces of bone. The actual cautery was also used several times to destroy the caries, and the patient at length got well. (*Traité des Maladies des Os*, de J. L. Petit.) If any one doubt, that abscesses now and then form in the middle of the long bones, I must request him to consult Mr. Hey's *Practical Observations in Sur-*

gery, p. 22, where he may peruse two very interesting cases illustrative of what Mr. Hey calls *Abscess in the Tibia with Caries*. One of these I shall take the liberty of quoting.

"Towards the conclusion of the year 1786, a young lady from Richmond, in Yorkshire, consulted me on account of a small tumour in the anterior and middle part of the tibia. It had exactly the appearance of a common node; and had such a degree of softness in its centre, that I apprehend a small quantity of fluid was contained in it; though that could not, from the thickness of the periosteum, be distinctly felt. The account which she gave me of her disorder was as follows:

"In the preceding May she had a fever, which continued about four weeks; at the expiration of which, a violent pain began to affect her leg. The pain continued, without intermission, during six weeks, and then abated upon the appearance of a small tumour on the shin. She could then walk about with little or no uneasiness: but sneezing or coughing caused a painful sensation in the tumour. She was, in other respects, in perfect health.

"I recommended the trial of some means to effect the dispersion of the tumour; and, with this view, I directed Plummer's pill, with the decoction of mezezeon, and applied mercurial ointment to the part, covering the tumour, in the intervals of this application, with ceratum saponis. By the use of these means the tumour became less, and the uneasiness was diminished; so that the young lady thought herself nearly well. But before the expiration of winter, the tumour began again to increase in bulk; and in the summer 1787, she returned to Leeds to put herself entirely under my care.

"The tumour was then larger and softer, and there remained not the least hope of curing my patient without discharging the matter, and afterwards treating the case as the state of the periosteum and tibia might require.

"Upon laying open the tumour, I found the periosteum diseased and thickened; separated from the tibia, and including a small quantity of purulent matter. The surface of the tibia was rough, as far as the matter had covered it; and in the centre of the rough part there was a hole equal in bore to a goose's quill, which penetrated the bone in a direct line about a quarter of an inch.

"As the bone was firm on the rough part, and resisted the pressure of a probe, I thought it right to try whether the sur-

face, upon exposure to the air, would not produce good granulations; and, therefore, after removing so much of the periosteum as I found in a morbid state, I dressed the wound simply.

"Upon continuing this treatment about a fortnight, I became sensible, that more matter issued from the wound than the surface of it ought to have produced. Suspecting, that the hole above mentioned might lead to some cavity in the bone, I plugged it up with lint, and found, on removing the plug the next day, that more purulent matter flowed out than the perpendicular cavity of the bone could contain. I made an examination with a bent probe, and discovered a horizontal cavity connected with the perpendicular one, and running both upwards and downwards in the longitudinal direction of the bone. It was now clear, that the bone was affected with an internal caries; but it was impossible to ascertain the extent of the caries by such an examination.

"Nothing now remained to be done, which could afford a rational hope of curing this disease, except amputation of the limb, or a bold attempt to explore fully the extent of the internal caries, and to remove the diseased part of the bone. I explained the case fully to my patient, who submitted entirely to my judgment the means to be used for her recovery. She had, apparently, a good constitution; and, excepting the caries of the bone, was in perfect health. I determined, therefore, to avoid, if it were possible, disfiguring this young lady by an amputation. I was satisfied, that she would not reproach me on account of my ineffectual endeavours to preserve her limb, if my attempt to remove the diseased part of the bone should prove unsuccessful.

"I began the operation by dissecting off the granulations of flesh, which had arisen from the bone, and then sawed out, by means of a circular headed saw, a wedge of the tibia two inches in length, which I had previously marked at each extremity of the longitudinal cavity in the bone. This wedge was half an inch in breadth, and a quarter of an inch in thickness, and consisted entirely of the laminated part of the bone. The removal of this portion of the tibia brought to view a caries of the cancelli almost as extensive as the length of the piece which I had sawn out. With different trephines, suited to the breadth of the caries, I removed the diseased cancelli of the bone quite through to the opposite lamella, as this part of the bone was carious throughout its whole thickness.

"As the caries extended itself in various directions, it was not possible to re-

move the whole of it with a trephine, without removing also a large portion of the sound part of the bone. But this I wished to avoid as much as possible. By the assistance, therefore, of a strong sharp pointed knife, I pursued the caries in every direction, until I had removed every part which had an unsound appearance.

"This operation took up more than two hours; yet the young lady bore it with the utmost patience and fortitude. I dressed the cavity in the bone, and the rest of the wound, with dry lint, in the most simple manner. The whole surface was speedily filled with good granulations, and a complete cure was obtained without any exfoliation.

"The limb which was diseased, has now as much strength as the other; and no uneasiness is produced even by violent exercise." (*Practical Observations in Surgery*, p. 22, &c.)

In the *First Lines of the Practice of Surgery* I described, under the name of *spina ventosa*, a disease in which matter formed in the interior of a bone, attended with expansion of the part affected. In giving this meaning to the word *spina ventosa*, the reader is already aware, that I have only imitated many of my predecessors, and that, perhaps, the original import of the term would vindicate me in so doing. Mr. Crowther, in his book on the white-swelling, observes, "it is singular, that Mr. Cooper should allow to the *spina ventosa* that expansion which he has denied to the white-swelling. Did this gentleman (he continues) not know, that the *spina ventosa* of the joints has been considered as a scrophulous caries of the ends of the bones?" To this passage, my preceding statement answers every purpose of a reply, and I am only left a little surprised, that this gentleman should have been disposed to make an attack on me, without first ascertaining, by a careful perusal of proper works, whether I had any authority for my remarks. With regard to the swelling of the bone, in the *spina ventosa*, or case of abscess in the interior of the part, I cannot decide from my own observation, if it be a fact or not; and, as Mr. Crowther had no idea that the term *spina ventosa* was ever used to signify the kind of disease already described, I conclude, that he is equally uninformed concerning the other point. As a systematic writer, I was, of course, obliged to take from other authors some descriptions which were, of necessity, not founded on my own observation. But, without pretending to decide the question myself, I may safely say, that the account, given by authors, of the bone becoming swollen, when affected with ab-

cess within it, has nothing to do with what is the case in white-swellings, and that, because the heads of the bones are not expanded in the latter disease, we are not to infer, that bones may not sometimes swell in a totally different disorder.

For an account of spina ventosa, in the sense of white-swelling, refer to *Joints*.

SPIRITUS AMMONIÆ COMPOSITUS. Besides the well known uses of this medicine, internally exhibited, its vapours are an exceedingly proper application to the eye in some cases of chronic ophthalmia. Scarpa recommends a remedy of a similar nature.

SPLINTS. Long pieces of wood, tin, or strong pasteboard, employed for preventing the ends of broken bones from moving so as to interrupt the process by which fractures unite. These instruments are sometimes used in other cases, for the purpose of keeping limbs from moving, particularly in some kinds of dislocations, wounds, &c. For an account of the principles on which splints ought to be employed, see the article *Fractures*.

SPONGIA PRÆPARATA. (*Prepared Sponge; Sponge-tent.*) This is formed by dipping pieces of sponge in hot melted emplastrum ceræ compositum, and pressing them between two iron plates. As soon as cold, the substance thus formed, may be cut into pieces of any shape. It was formerly much used for dilating small openings, for which it was well adapted, as when the wax melted, the elasticity of the sponge made it expand and distend the opening, in which it had been put. The best modern surgeons seldom employ it.

SPONGIA USTA. (*Burnt Sponge.*)—This is often given in the form of lozenges, in cases of bronchocele, in which particular instances much efficacy is imputed to allowing the lozenges to dissolve gradually in the mouth, after putting them under the tongue. Burnt sponge is also exhibited in many scrofulous diseases. Its good effects are supposed to depend on the quantity of soda which it contains. The dose is from a scruple to a dram.

STAPHYLOMA. (from *σταφυλή*, a grape.) A disease of the eye, so named from its being thought to resemble a grape. Staphyloma is that disease of the eyeball, in which the cornea loses its natural transparency, rises above the level of the eye, and successively even projects beyond the eyelids, in the form of an elongated, whitish, or pearl-coloured tumour, which is sometimes smooth, sometimes uneven, and is attended with total loss of sight.

Scarpa observes, that infants are often

attacked by this disease soon after their birth, and mostly in consequence of the purulent ophthalmia. It is also produced by the small-pox, yet never during its eruption, which is singular; nor during the stage of suppuration; but, when the pustules dry, and even after the detachment of the variolous scabs.

In a great number of subjects, says Scarpa, when the staphyloma has attained a certain elevation above the cornea, it becomes stationary, or only increases in due proportion to the rest of the eye. In other instances, the small tumour of the cornea successively enlarges in all its dimensions, and in such a disproportion to the rest of the eye, that it at length protrudes considerably between the eyelids, to the great molestation and deformity of the patient.

Scarpa notices, that this disease is justly considered as one of the most serious, to which the eyeball is subject; for, to the total and irremediable loss of sight that it occasions, are added all the evils which necessarily result from the bulk and protuberance of the staphyloma, after the swelling of the cornea has acquired such a size, that it can no longer be covered by the eyelids. In such circumstances, the continual exposure of the eyeball to the contact of the air, and particles of matter suspended in it; the friction of the eyelashes against it; the incessant flux of tears down the subjacent cheek; are enough to render the eye painful and inflamed; the sound one is affected by sympathy, and the diseased one at length ulcerates, together with the lower eyelid and cheek, on which it presses.

Scarpa next remarks, that surgeons have long thought, that, in this disease, the cornea yields to the distention produced by the turgescence of the humours of the eye, nearly in the same manner as the peritoneum yields to the pressure of the abdominal viscera, when an intestinal hernia takes place. Richter (*Obs. Chir. Fasc. 2.*) has opposed this theory, observing, that the staphyloma, for the most part, forms, without the swelling of the cornea having been preceded by any of those morbid dispositions, which are generally considered capable of weakening the texture and elasticity of the cornea; that this membrane, when affected with staphyloma, acquires a much greater thickness than what it has in its natural state, and, consequently, that the staphyloma, far from being concave within, is every where compact and solid; though it ought to be quite the contrary, if the tumour had been occasioned by an immoderate distention, operating on the

cornea from within outward, with an attenuation of its natural texture.

In regard to this circumstance, says Scarpa, though I would wish to give Richter all the praise, to which he is entitled for his conspicuous merit in every branch of the healing art, I cannot refrain from noticing, that this celebrated author, in pointing out a matter of fact, as he has done, respecting the origin and nature of the staphyloma, has generalized his doctrine too much, by not drawing any line of distinction between the staphyloma of recent occurrence in infants, and that of adult subjects, in whom the disease has acquired so large a volume, as to protrude considerably beyond the eyelids. I fully agree with Richter, (for it is a certain and demonstrable fact,) that the recent staphyloma in infants is quite compact and solid, on account of the augmented thickness of the cornea in this disease; but it is equally certain, as I have been convinced by repeated observation, that, in this very same staphyloma, originally quite solid and compact, the cornea, strictly speaking, becomes thinner, or, at all events, is not thicker, than in its natural state, after the disease has existed a series of years in adult subjects, and in whom the swelling of the cornea has attained such a size, as to protrude between the eyelids. I wish to imply, that the tumour is not solid throughout, except in regard to its containing, in its amplified state, the iris, the crystalline, and very often, also, a portion of the vitreous humour. These parts, having quitted their natural position, are propelled forward, so as to fill the cavity, which gradually forms in the cornea, and grows larger.

As Scarpa continues, the cornea of infants, in its natural state, is, at least, twice as thick and pulpy as that of adults, and, consequently, the anterior chamber of the aqueous humour, in the former, is comparatively so contracted, to what it is in the latter, that, in infants at the breast, the cornea may be considered as in contact with the iris. In the latter subjects, the softness, flexibility, and succulency of the cornea are naturally such, that, when this membrane is separated from the rest of the eye in the dead subject, and compressed between the fingers, it loses, at least, one half of its volume, and thickness, which does not happen in adults. The cornea of young children is so supple, and distensible, that, in minute injections of the head, when the injected matter is copiously extravasated in the eye-ball, the cornea distended from behind forward, elevates itself in the dead subject considerably towards the

eyelids; a thing, says Scarpa, that is not observable, under similar circumstances, in the eyes of adults.

To such qualities of the cornea, in children of tender years, and to the natural narrowness of the anterior chamber of the aqueous humour, Scarpa imputes the cause, why ophthalmies in infants so often produce opacity and thickening of this membrane. The cornea swells, becomes preternaturally thickened, and is very soon converted into a pointed, whitish, or pearl coloured tumour, without any cavity internally, and either in perfect contact with, or adherent to, the iris. In the course of years, however, Scarpa remarks, that this disease undergoes new modifications. For, as the whole eye enlarges with age, the iris, and crystalline, from causes not sufficiently understood, abandon their natural situation, and are incessantly urged forward. This effect is increased, by the very limpid and copious state of the vitreous humour, always existing, when the disease under consideration is inveterate. In this circumstance, whenever the cornea is not completely indurated, and inflexible, the crystalline and iris are insensibly propelled, from within outward, nearer and nearer to the cornea, which they in time distend in all its dimensions, so as to make it project beyond the eyelids, at the same time attenuating it, in a ratio to the bulk, and magnitude, which it assumes. Scarpa has never met with a voluminous staphyloma, projecting beyond the eyelids in adult persons, which had not originally made its first appearance in infancy; and he has invariably found, that the thickness, and density of the cornea, both in the living, and dead bodies of those, who have been affected with this disease, were in an inverse ratio to the eye. In inveterate cases of staphyloma, forming a large protuberance beyond the eyelids, the iris may here and there be clearly discerned through the diseased cornea, and, if it be not equally manifest at all points of the tumour, it is because the conjunctiva externally spread over the cornea forms, in conjunction with its various vessels, on the surface of the tumour, a stratum of matter, not every where equally dense, and opaque. This dense stratum of the conjunctiva, spread over the cornea, easily causes deception, in the staphyloma that has attained a considerable bulk. The more the tumour increases, the more the substance of the cornea seems to become dense and thickened; while, in reality, the contrary happens; for the augmentation in the density of the layer of the conjunctiva, covering the cornea, only partly supplies

the diminution in the thickness of the texture of this last membrane. Scarpa thinks it very improbable, that the accurate observers of all ages would have neglected to notice, that the cornea, in this advanced stage of the disease, instead of being attenuated, according to the common opinion, is even quite a compact and solid body. Scarpa says, the contrary is recorded in their works, where they speak of the extirpation of thick staphylomas by means of a ligature, and they caution us to tie the thread very gently, lest the cornea, which, in these cases, is very thin, should easily be torn. Gunz relates, that he was an eye-witness of such an accident, which happened to a patient, in whom a staphyloma had been tied by means of a needle, and thread. (*De Staphylom. Dissect. vid. Disput. Chir. Halleri.*)

Scarpa allows, that Richter's doctrine is then a matter of fact, as it relates to the recent staphyloma of infants; but, as far as his own experience goes, it admits of exceptions, in regard to the thickness of the cornea, in the staphyloma of old date, considerable bulk, protruding beyond the eyelids.

Some pretend, says Scarpa, that the sclerotica is also subject to staphyloma, that is, to a partial distention, and prominence of its anterior hemisphere in the white of the eye. Others question the existence of such a disease. Scarpa acknowledges, indeed, that he has never yet met with any tumour, or prominence on the front surface of the sclerotica, corresponding to the white of the eye. On the contrary, what will seem extraordinary and singular, this celebrated surgeon has twice seen, in the dead subject, a staphyloma, in the posterior hemisphere of the sclerotica, a situation, in which it has neither been seen, nor described, by any one, as far as Scarpa knows. The first instance was in an eye, removed for quite another motive, from the body of a woman, forty years of age. This eye was of an oval shape, and altogether larger than the other, which was healthy. On its posterior hemisphere, on the outside of the optic nerve, or the part nearest the temple of the same side, the sclerotica was elevated, in the form of an oblong tumour, resembling a small nut. As the cornea was healthy and pellucid, and the humours still retained their natural transparency, on looking into the pupil of the eye in question, an unusual brilliancy could be seen at the bottom, formed there by the light passing through that part of the cornea, affected with staphyloma, which had become attenuated, and diaphanous. On opening this eye, Scarpa

found the whole of the vitreous humour deranged in its organization, and converted into a limpid, aqueous fluid, and the crystalline somewhat yellowish, but not opaque. The posterior hemisphere of the eye being immersed in spirit of wine, to which a few drops of nitrous acid had been added, in order to give to the retina consistence, and opacity, Scarpa could distinctly discern, that the cavity of the staphyloma, in the sclerotica, was not invested with the nervous expansion of the retina; that the choroides, in this place, was very subtile, discoloured, and destitute of its usual reticulated vascularity; and that, in particular the sclerotica was so attenuated, in the situation of the staphyloma, that it was hardly as thick as a sheet of writing-paper. Scarpa learnt, that the woman, from whose body this eye was taken, had some years previously lost the power of seeing with this organ, during the prevalence of an obstinate ophthalmia, attended with habitual and excruciating head-achs.

Scarpa had an opportunity of observing a similar disease of an eye, accidentally taken from the body of a woman, thirty-five years of age. It was sent to him from Milan, by Doctor Monteggia. It was of an oval shape, and larger, than its fellow. The staphyloma of the sclerotica was situated on its posterior hemisphere, on the outside of the entrance of the optic nerve, in other words, towards the temple. The vitreous humour was converted into water, the capsule of the crystalline was very turgid, with a limpid, whitish fluid; the lens was yellowish, and smaller, than natural; in the interior of the staphyloma of the sclerotica, the retina was wanting; the sclerotica itself, and the choroides were elevated in the form of a tumour, and attenuated in such a manner, that the light passed through them. Scarpa could not learn any thing concerning the state of this woman's sight; but, in regard to the disease he much doubts, whether art will ever succeed in administering efficacious means for the stoppage of its progress, much less for its cure.

But, to return to the staphyloma of the transparent cornea, this part of the eyeball being, in this circumstance, affected with an irremediable opacity. Scarpa remarks, that the surgeon can have no other aim in the treatment of this disease, when it is recent in children of ten years, but to hinder the increase of the swelling of the cornea, the organization of which membrane is already destroyed. The tumour must be levelled, and flattened as much as possible; and when the swelling of the cornea is inveterate, very large, and prominent beyond the eyelids, it is to be di-

minated by surgical means, so as to return within the orbit, sufficiently to permit the deformity of the face to be amended by the application of an artificial eye.

Richter proposes, in cases of recent staphyloma, to make at the bottom of the tumour of the cornea an artificial ulcer, by repeatedly applying the argenti nitratum, or the oxygenated muriate of antimony (butter of antimony,) and to keep it open by the continued use of the same caustic, with a view of affecting by means of this little issue, the dispersion of the gross tenacious humour, which is the immediate cause of the preternatural opacity, and swelling of the cornea. The author assures us, says Scarpa, that, in this way, he has many times effected a diminution of the staphyloma, and, in one particular case, even restored the transparency of the cornea. This cure has always seemed to Scarpa, the most rare, and surprising, of all, that are recorded on the subject of diseases of the eyes; the more so, as this success was obtained in the space of fourteen days. *Ter repetitâ operatione, quarto scilicet, septimo et decimo die, ne vestigium quidem morbi die decimo-quarto supererat.* Obs. Chir. Fasciculus 2.

Scarpa declares, that though he has frequently attempted to cure the recent staphyloma, in infants, by the above method of making an issue, and this with the greatest confidence of success, and in the persuasion, that this plan of cure was founded on certain, and obvious premises, respecting the nature of the disease, when it is recent, and in children of tender years; though, in doing so, he had for imitation a master in surgery of the highest authority; he has never yet met with such success, as can be at all compared with Richter's, either in restoring the transparency of the cornea, or accomplishing a diminution of the volume of the staphyloma. Having formed with the argenti nitratum a small ulcer, at the bottom of the cornea, and kept the sore open thirty days and more, he failed in obtaining any benefit, in respect to the diminution, much less the opacity of the cornea, in three infants, one a year and a half old, and the two others somewhat more than three, all which subjects had been recently attacked with staphyloma in one eye, in consequence of the small-pox. A violent chemosis, in a very short time, produced a staphyloma in the eye of a child, five years old. Scarpa made an ulcer at the bottom of the cornea, in the unorganized, swollen substance of which he introduced, for a little depth, the flat part of a lancet. Scarpa kept the sore open, for five weeks, with a solution of the argenti nitratum, and he remarked,

that the staphyloma became somewhat flatter, so as to lose the acute prominence, which it had at its centre; but the cornea continued as before, every where opaque. Though Scarpa employed the same method in two other subjects, of about the same age, and in the same circumstances; though he kept the ulcer open fifty days, he was never able to effect any depression or diminution of the staphyloma; and, consequently, the pointed, pearl-coloured, projecting part of the tumour continued in the same state as it was before. Scarpa states, that the conical shape, which the cornea assumes in this disease, is a characteristic symptom, by which a staphyloma may be distinguished from the leucoma, with total opacity of the cornea.

If, also, in the course of further trials, partial benefit be found to accrue from this plan, adopted not for the purpose of re-establishing the transparency of the cornea, but for that of merely checking, and diminishing the recent staphyloma in infants, still Scarpa is of opinion, that no one will be easily persuaded, that the same treatment can ever prove of the least service, in diminishing the size of the large, inveterate, staphyloma in adults; in other words, of that, which projects beyond the eyelids, and rests on the cheek. What advantage can be expected from an artificial ulcer, formed in the substance of the cornea, no longer soft and pulpy, nor merely thickened by a viscid matter, effused in the interstices of its texture, but become dry and coriaceous from time, protruding in consequence of the excessive distention from within outward, and covered with a callous crust, consisting of the layer of the conjunctiva, and its varicous vessels? Certain it is, says Scarpa, that as often as it has happened, that the inveterate staphyloma, protruding out of the eyelids has accidentally ulcerated from the irritation of any extraneous body, the tears, or long pressure of the parts, on which it rests, the ulcer has never been seen to effect a diminution of the disease; we even read, that the ancient staphyloma, under such circumstances, has often degenerated into a malignant fungus.

Hence, Scarpa observes, that in the highest stage of the disease, when the staphyloma projects beyond the eyelids, art has, at present, no more effectual means for restraining the progress of the complaint, and removing the deformity, than cutting away the staphyloma, and when the place is healed, applying an artificial eye.

Celsus thus expresses himself on the subject of this operation: *Curatio duplex*

est. Altera ad ipsius radices per medium transuere acu, duo lina ducente, deinde alterius lini duo capita ex superiore parte, alterius ex inferiore adstringere inter se quæ paulatim secundo id excident. Altera in summâ parte ejus ad lenticulæ magnitudinem excindere; deinde spodium, aut cadmiam infricare. Utrolibet autem facto, album ovi lana excipiendum, et imponendum; postaque vapore aquæ calidæ fovendus oculus, et lenibus medicamentis unguendus est. De Medicina, lib. 7. cap. 7.

Though, says Scarpa, the first plan or that of the ligature, is at present abandoned, as being generally thought the least appropriate; the majority of surgeons still persevere in passing a needle and ligature, through the lower part of the staphyloma, not for the purpose of tying, or constricting the tumour, it is true, but of making a noose, in order to fix the eye conveniently, when the staphyloma is to be cut off in a circular manner. But Scarpa proves, that the same advantage may be obtained by a very simple method, which is more expeditious, and less inconvenient to the patient, and, he is therefore, persuaded, that the apparatus of the needle and ligature will very soon be disused, both as a means of cure, and an auxiliary in the operation.

With regard to the second method of removing the staphyloma, or that of excision, Scarpa thinks, that sufficient attention has not hitherto been paid to what Celsus has written on this subject. In fact, Celsus does not forbid cutting away the staphyloma, by a circular incision at its base, as is practised at the present day, but says, that this operation is to be done in the centre, or conical point of the tumour, and that as much of this part of the staphyloma is to be cut away, as will equal a lentil in size: *In summâ parte ejus ad lenticulæ magnitudinem excindere.* Scarpa remarks, that the great importance of this precept of Celsus in regard to the successful treatment of the staphyloma, can only be duly appreciated by such as have often had occasion to compare the advantages of Celsus's doctrine, with the serious inconveniences, which result from the common practice of cutting away the staphyloma circularly at its base; and with the evils produced by a semicircular section, comprehending the sclerotica, in Woolhouse's manner, always followed by acute inflammation of the eyeball and eyelids, violent pains in the head, restlessness, spasms, copious and sometimes gangrenous suppurations of the eye and eyelids. To Scarpa it is a matter of fact, proved by a numerous series of observations, that, the more the semicircular recision of the staphyloma is

distant from the centre or apex of the tumour, approximating its base, and advancing towards the sclerotica, the more aggravated are the symptoms consequent to this operation; *Et vice versâ.*

The following is Scarpa's method of effecting the destruction of the inveterate staphyloma, protruding out of the eyelids. The patient being seated, Scarpa directs an assistant to support his head properly; then taking in his hand a knife, similar to what is used in the extraction of the cataract, he passes the instrument completely across the staphyloma, at the distance of one line and a half, or two lines, from the centre or apex of the tumour, from the external towards the internal angle of the eye, and, by passing the knife forward in the same direction, just as is done in the extraction of the cataract, he makes a semicircular incision downwards, in the most prominent part of the tumour. Having done this, he takes hold of the segment of the staphyloma with the forceps, and turning the edge of the knife upward, he completes the circular recision of the apex of the tumour, in such a way, that the detached portion is one, two, three, or four lines in diameter, according to the size of the staphyloma. As a portion of the iris, adhering to the cornea, from the very commencement of the disease, is commonly included in this section of the pointed part of the tumour, no sooner is the circular division of the apex of the staphyloma made, than the crystalline, or its nucleus, issues from the eye, followed by a portion of the dissolved vitreous humour. In consequence of this evacuation, continues Scarpa, the eye-ball often diminishes in such a degree, that it can be covered by the eyelids, to which Scarpa immediately applies a pledget of dry lint, supported by a retentive bandage.

The pain, produced by this section, is of the smallest consequence, and it is common to see patients perfectly tranquil, the three, or four first days after the operation. The eye and eyelids most frequently begin to be painful, inflame, and swell, on the fourth day. On the appearance of these symptoms, which ordinarily are very mild, the eye, on which the operation has been done, is to be covered with a bread and milk poultice, in order to promote and accelerate the suppuration of the internal membranes of the eye. When things proceed in a regular manner, the tumefaction of the eyelids subsides about the seventh, or ninth day, and purulent matter is seen on the poultice, blended with the dissolved vitreous humour, which slowly issues from the bottom of the eye. The matter afterwards

becomes thick, and whitish, with relief to the patient, and manifest diminution of the whole eye-ball, which not only shrinks within the eyelids, but even sinks into the orbit.

At this period, observes Scarpa, on gently separating the eyelids, the conjunctiva is found swollen, and reddish, and the margin of the wound of the staphyloma seems like a whitish circle. When the detachment of this gelatinous circle takes place, which usually is on the twelfth or fourteenth day after the operation, the edge of the surface, from which the staphyloma was cut, becomes red, contracts, and daily diminishes, so that, at last, the wound is entirely closed. There only remains in the centre of the cornea, for a few days, a small fleshy prominence resembling a little reddish papilla, which, after being touched a few times with the argentum nitratum, contracts, and becomes completely healed.

So far, says Scarpa, are alarming symptoms from following this operation, that in a great number of cases, the surgeon is even obliged, several days afterwards, to stimulate the eye, on which it has been performed, in order to make it inflame, partly by leaving it a long while uncovered, and exposed to the air, partly by enlarging the circular resection made in the centre of the staphyloma, of which another circular portion, half a line broad, is removed, in order to facilitate the more abundant discharge of the humours, and the ingress of air into the cavities of the eye, which are so backward to inflame. As soon as inflammation has invaded the interior of the eye, and suppuration has taken place, the rest of the cure regularly follows under the use of topical emollients, and is soon completed with all possible mildness. As by putting into execution the above method of destroying the staphyloma, the consequent shrinking of the eye-ball takes place equally around the great axis of this organ, the stump, which follows, has also a regular circumference, and presents an easy, and commodious place for the application of an artificial eye. (*Scarpa sulle Malattie degli Occhi.*)

Wenzel and numerous other writers, imply by staphyloma, a protrusion of a piece of the iris, through a wound or ulcer of the eye. See *Iris*, *Prolapsus of*.

STEATOMA. (from *στεαρ*, fat.) A wen, or encysted tumour, containing fat. See *Tumours*, *Encysted*.

STELLA, or STELLATED BANDAGE. A bandage so named because it makes a cross, or star on the back. It is a roller, applied in the manner of the figure 8, so as to keep back the shoulders. It is

often employed in cases of fractures, and dislocations of the clavicle.

STERNUTATORIES. (from *sternuto*, to sneeze.) *Sternutatoria*. Medicines, which provoke sneezing. In surgery, they are sometimes recommended in cases of gutta serena. See *Amaurosis*.

STERTOR. (from *sterto*, to snore.) A snoring noise, or rattling, in the throat; a symptom of several surgical, as well as medical affections.

STRABISMUS. (from *στραβιζω*, to squint.) Squinting.

STRANGURY. (from *σπαγγε*, a drop, and *ουρον*, the urine.) *Stranguria*. A difficulty of voiding the urine, which comes away by drops, and with pain.

STRICTURE. (from *stringo*, to bind.) A diminution, or contracted state of some tube, or duct in the body. See *Urethra*. *Strictures of; Oesophagus, &c. Rectum, &c.* Stricture also means, in cases of strangulated hernia, the narrowest part of the opening, or passage, through which the bowels protrude, which narrowest part makes on the viscera the pressure causing all the bad symptoms. See *Hernia*.

STRUMA. (from *struo*, to heap up,) Scrofula, or Scrophula. The King's Evil. See *Scrophula*.

STYE. A little inflammatory tumour on the eyelid. See *Hordeolum*.

STYPTICS. (from *στυφω*, to bind.) *Styptica*. Medicines and applications for stopping hemorrhage. See *Hemorrhage*.

SUBSULTUS. (from *subsilio*, to leap a little.) An involuntary spasmodic twitching of the muscles and tendons.

SUDORIFICS. (from *sudor*, sweat, and *facio*, to make.) Medicines which produce perspiration.

SUFFUSION. (*Suffusio*, from *suffundo*, to pour down.) The cataract was so named by Celsus, from an idea, that the opacity arose from the pouring down of a thick humour from the crystalline lens.

SUGILLATIO. (from *sugillo*, to make black and blue with beating.) The discolouration, following a bruise, and caused by an extravasation of blood; an ecchymosis.

SUPPOSITORY. (from *suppono*, to lay under.) *Suppositorium*. A globular, medicated substance, intended to be introduced into the rectum.

SUPPRESSION OF URINE. See *Urine*, *Retention of*.

SUPPURATION. (*Suppuratio*, from *suppuro*, to suppurate.) This signifies a process, by which a peculiar fluid, termed *pus*, is formed in the substance, or from the surface, of parts of the body, when such parts are particularly circumstanced.

The article *inflammation* made us understand, that phlegmonous inflammation, when it exceeds a certain pitch, sometimes terminates in suppuration, and consequently, it follows, that parts, in a certain state of inflammation, are in one of those circumstances, which qualify them for the production of pus.

SYMPTOMS OF SUPPURATION.

When matter is fully formed in a tumour, there is a remission of all the symptoms. The throbbing pain, which was before frequent, now goes off, and the patient complains of a more dull, constant, heavy pain. A conical eminence, or *pointing*, as it is termed, takes place at some particular part of the tumour, generally near its middle. In this situation, a whitish, or yellowish appearance is generally observable, instead of a deep red, which was previously apparent, and a fluctuation of a fluid underneath may be discovered, on a careful examination with the fingers. Sometimes, indeed, when an abscess is thickly covered with muscles and other parts, the fluctuation cannot be easily distinguished, though, from other concurring circumstances, there can hardly be the least doubt of there being even a very considerable collection of matter. An œdematous swelling over the situation of deeply situated abscesses is a symptom, which often occurs, and is well worthy the attention of every practical surgeon.

The discovery of the existence of deep abscesses is a circumstance of the highest importance in practice, and one which greatly involves the practitioner's reputation. In no part of the surgeon's employment is experience, in former similar cases, of greater use to him, than in the present; and however simple it may appear, yet nothing, it is certain, more readily distinguishes a man of observation and extensive practice, than his being able easily to detect collections of deep-seated matter. On the contrary, nothing so materially injures the character and professional credit of a surgeon, as his having in such cases, given an inaccurate or unjust prognosis; for, in disorders of this kind, the nature and event of the case are generally at last clearly demonstrated to all concerned.

Together with the several local symptoms of the presence of pus, already enumerated, may be mentioned the frequent shiverings, to which patients are liable on its first formation. However, these rigors seldom occur so as to be distinctly observed, unless the collection of matter is considerable, or situated internally in some of the viscera.

The pain, attending what Mr. Hunter termed the suppurative inflammation, is increased at the time when the arteries are dilated, and this gives the sensation called throbbing, in which every one can count his own pulse, by merely paying attention to the inflamed part. Perhaps, this last symptom is one of the best characteristics of this species of inflammation. When the inflammation is moving from the adhesive state to the suppurative, the pain is considerably increased; but, when suppuration has taken place, the pain in some degree subsides. (*Hunter.*)

The redness that took place in the adhesive stage, is now increased, and is of a pale scarlet colour. The part, which was firm, hard, and swelled, in the previous stage of the inflammation, now becomes still more swelled, in consequence of the greater dilatation of the vessels, and the greater quantity of coagulating lymph thrown out. (*Hunter.*)

THEORY OF SUPPURATION.

The dissolution of the living solids of an animal body into pus, and the power of this fluid to continue the dissolution, are old opinions, which, however, are still entertained by many, for their language is, *pus corrodes, it is acrid, &c.* If these notions were true, no sore, which discharges matter, could be exempted from a continual dissolution. Such ideas probably arose from the circumstance of an abscess being a hollow cavity in the solids, and from the supposition, that the whole of the original substance of this cavity was now the matter, which was found in it. This was a very natural way of accounting for the formation of pus by one entirely ignorant of the moving juices, the powers of the arteries, and what takes place in an abscess after it is opened. The knowledge of these three subjects, abstracted from the knowledge of the abscess before its being opened, should have led surgeons to account for the formation of pus from the blood by the powers of the arteries alone. According to the above erroneous principle, abscesses would continue to increase after being opened, as fast as before. Upon the principle of the solids being dissolved into pus, the practice of bringing all indurated parts to suppuration, if possible, and not making an early opening, was founded. This was done for the purpose of giving time for the solids to melt down into pus; but, it was apparently forgotten, that abscesses formed matter after they were opened, and, therefore, the parts stood the same chance of dissolution into pus as before. Blinded with the idea, that the solids entered into the com-

position of pus, the partisans of this doctrine could never see pus flowing from any internal canal, as from the urethra, in cases of gonorrhœa, without supposing the existence, of an ulcer in the passage. Such sentiments might be forgiven, before it was known, that such surfaces could, and generally did, form pus, without a breach of the solids; but the continuance of this way of thinking now is not mere ignorance, but stupidity. The formation of pints of matter in the cavities of the chest, and abdomen, without any breach in the solids, could not have been overlooked by the most zealous advocates for the doctrine of dissolution. (*Hunter.*)

The moderns have been still more ridiculous; for, knowing, that it was denied, that the solids were ever dissolved into pus, and that there was not a single proof of it, they have been busy in producing what to them seemed a proof. They have been putting dead animal matter into abscesses, and, finding, that it was either wholly, or in part dissolved, they, therefore, attributed the loss to its being formed into pus. This, however, was putting living and dead animal matter upon the same footing, which is a contradiction in itself; for, if the result of this experiment were really what they supposed it to be, the idea of living parts being dissolved into pus must be abandoned, because living and dead animal matter can never be considered in the same light. (*Hunter.*)

It might have been remarked, that even extraneous animal matter would lie in abscesses for a considerable time, without being dissolved, and, that in abscesses arising, either from violence, or from a species of erysipelatous inflammation, there were often sloughs of the cellular membrane, which sloughs would come away, like wet tow, and therefore, were not dissolved into pus. (*Hunter.*)

It might also have been noticed, that in abscesses in tendinous parts, as about the ankle, a tendon often mortified, and sloughed away, and that the sores would not heal till such sloughs were detached; but though this separation was sometimes not completed, before the expiration of months, yet the sloughs at last were thrown off, and consequently could not be converted into pus. Pieces of dead bone often lie soaking in matter for many months, and yet without being changed into pus, and although bones, so circumstanced, may lose a considerable deal of their substance, a loss which some might impute to the dissolution of the bone into pus, yet that waste can be accounted for and proved on the principle of absorption. The loss is always upon that surface, upon which the continuity is broken off, and

it is a part of the process by which the exfoliation of a dead piece of bone is accomplished. The formation of pus has been attributed to a kind of fermentation, in which both the solids and fluids were concerned. This doctrine is easily refuted by stating what happens in internal canals which naturally secrete mucus, but frequently form pus, without any loss of substance, or any previous fermenting process. Were we to suppose a fermentation of the solids and fluids the immediate cause of the production of pus, whence could the solids come, which enter into the composition of discharges from the urethra? for the whole penis could not afford matter enough to form the pus, which is discharged in a common gonorrhœa. How also should the fermentation of the solids ever cease? for, there is the same surface secreting its mucus, whenever the formation of pus is discontinued. It may be asked, likewise by what power the first particle of pus in an abscess, or on a sore, is formed, before there is any particle existing, which is capable of dissolving the solids? An abscess may be stationary for months, and at last be absorbed; what becomes of the fermentation all the while the collection of matter continues stationary?

Extravasated blood has been supposed to be capable of being converted into pus. We find, however, that blood, when extravasated, either from violence, or a rupture of a vessel, as in an aneurism, never of itself becomes pus; nor was pus ever formed in these cases, without being preceded by inflammation. Both the blood and matter are also found together in the same cavity, under such circumstances. If the blood had coagulated, which it seldom does in cases of violence, it would be found still coagulated; and if it had not coagulated, the pus would be bloody.—(*Hunter.*)

The modern theory of suppuration is, that the matter is separated from the blood by the secretory power of the vessels of the inflamed part, which now acquire a new mode of action.

The opinion, that suppuration is a process, analogous to glandular secretion, has been hastily rejected by many, who are swayed by the fact, that there is no pus ever found blended with the blood in the circulating system. By this mode of reasoning, however, such thinkers must be led to deny the universally received and undoubted doctrine, that the bile is a secretion: and, yet, it is well known, that nothing like this fluid can be detected in an analysis of the blood, and, indeed, a very small quantity would be sufficient to tinge the whole mass of circu-

lating blood with a yellow colour, the same as we see in cases of jaundice. No one would wish to defend the idea of there being either pus, or bile, actually in the circulation; but, only the matter, or modifications of the matter, which, by the combinations, or whatever changes, we may choose to term them, taking place in the secreting vessels, and by their operations are converted into one of the particular fluids in question.

No suppuration ever takes place without being preceded by inflammation; no pus is ever formed but in consequence of it. In abscesses, a suppuration is an immediate effect of inflammation; and when internal cavities remain exposed, no suppuration comes on, till inflammation has formed the disposition and action.

Violence done to parts is one of the great causes of suppuration; but, simply, violence does not always occasion it. The violence must be followed by a prevention of a cure in a more simple way, viz. by a restoration of the structure, so as to carry on the animal functions of the part. The parts must be kept long enough in that state, into which they were put by the violence. Or, what is somewhat similar to this, the violence must be attended with death in a part, as, in many bruises, all mortifications and all sloughs, in consequence of the application of caustic, which, when the dead parts separate, leaves internal surfaces exposed. (*Hunter.*)

As every violence, committed from without, under the above circumstances, is more or less exposed to the surrounding air, its application to internal surfaces has been assigned as a cause of suppuration; but, certainly, the air has not the least effect on parts, circumstanced as above, for a stimulus would arise from a wound, were it even contained in a vacuum. In circumscribed abscesses, the air cannot possibly get to the parts, so as to have any share in making them suppurate.

In cases of emphysema, when the air is diffused over the whole body, no suppuration is the consequence, unless an exposure, or imperfection of some internal surface should be made, for the purpose of allowing the air to escape. A stronger proof, that it is not the admission of air, which makes parts inflame, is, that the cells in the soft parts of birds, and many of the cells and canals of their bones, communicating with the lungs, and always containing air, never inflame; but if these cells are exposed in an unnatural way, then the stimulus of imperfection is given, these cavities then inflame, and their surfaces either form adhesions together, or produce pus. (*Hunter.*)

QUALITIES OF PUS.

True pus has certain properties, which when taken singly, may belong to other secretions, but which, conjointly, form the peculiar character of this fluid, viz. globules, swimming in a fluid, which is coagulable by a solution of sal ammoniac, which no other animal secretion is, and, at the same time, a consequence of inflammation.

The colour and the consistence of pus are the two qualities which first attract the notice of every, the most superficial observer. The colour arises from the largest portion of this fluid being composed of very small round bodies, very much like those little globules, which, swimming in a fluid, make cream. The fluid, in which the globules of pus swim, we might at first suppose to be the serum of the blood, for it coagulates with heat, like the latter fluid. Pus is also probably mixed with a small quantity of coagulating lymph; as it partly coagulates, after it is secreted.

The fluid part of pus, however, is known to have properties, which serum has not. There being a similarity between pus and milk, experiments have been made to ascertain whether the fluid of pus could be coagulated with the gastric juice of animals; but, no coagulation could be effected in this manner; a solution of sal ammoniac made the fluid part of pus coagulate; but, not any other secretion, or natural fluid; and hence, it was concluded, that whenever globules were found swimming in a fluid, coagulable by sal ammoniac, the matter was to be considered as pus. (*Hunter.*)

The proportion, which the white globules bear to the other parts of pus, depends on the health of the parts producing the discharge. When the globules are very abundant, the matter is thicker and whiter, and is called healthy pus; the meaning of which is, that the solids which produced it, are in good health; for, these appearances in the matter are no more, than the result of certain salutary processes going on in the solids, the effect of which processes is to produce the disposition, on which both suppuration and granulation depend. (*Hunter.*)

Pus is specifically heavier than water, and is probably about as heavy as blood.

Besides the above properties, pus has a sweetish mawkish taste, very different from that of most other secretions, and the same taste takes place, whether it is pus from a sore, or an irritated inflamed surface.

Pus has a smell, in some degree pecu-

liar to itself; but this differs in different cases. Some diseases, it is said, may be known by the smell, as for instance, a gonorrhœa.

Pus sinks in water: mucus floats. Pus communicates to water an uniformly troubled white colour; mucus gives the appearance of stringy portions floating in it. Mucus is said to be more readily dissolved by sulphuric acid, than pus is. It has also been asserted, that if water be added to such solutions, the pus is precipitated to the bottom of the vessel; while the mucus, instead of being completely precipitated, forms swimming flakes. A solution of caustic alkali dissolves both pus and mucus; but, when water is added, the pus is said to become separated, but not the mucus.

Though solutions in chemical menstrua and precipitations, have been thought a test of the distinction, between these two fluids; yet, the method has been thought absurd and unphilosophical. It has been conceived, that all animal substances whatever, when in solution, either in acids or alkalies, would be in the same state, and therefore, that the precipitation would be the same in all. Calcareous earth, when dissolved in muriatic acid, is in that acid in the same state, whether it has been dissolved from chalk, limestone, marble, or calcareous spar, and precipitations from all are the same. Hence, experiments were made on organic, animal matter, such as muscle, tendon, cartilage, liver, and brain; and on inorganic, such as pus and the white of an egg. All these substances were dissolved in sulphuric acid, and precipitated with the vegetable alkali. Each precipitation was examined with such magnifiers, as plainly shewed the forms of the precipitates, all which appeared to be flaky substances. The precipitate by the volatile alkali had exactly the same appearance. The same appearances were seen, when the above kinds of animal matter were dissolved in the vegetable caustic alkali, and precipitated with the muriatic acid. A flaky substance, void of any regular form, composed each precipitate. (Hunter.)

Pus does not irritate the particular surface, which secretes it, though it may be very irritating to any other. Hence, no suppurating surface of any specific kind, can be kept up by its own matter. If this had not been the case, no sore of a specific quality, or producing matter of an irritating kind, could ever have been healed. This is similar to every other secretion of stimulating fluids, as the bile, tears, &c. which fluids do not stimulate their own glands, or ducts, but are ca-

pable of stimulating any other part of the body. (Hunter.)

Whenever a real disease attacks, either the suppurating surface, or the constitution, the production of true pus ceases, and the fluid becomes changed in some measure, in proportion to these morbid alterations. In general it becomes thinner and more transparent, and it partakes more of the nature of the blood, as is the case in most other secretions under similar circumstances. *Sanies* is the term usually applied by surgeons, to pus, in this degenerated state. This unhealthy sort of matter has more of the serum, and, frequently, more of the coagulating lymph in it, and less of the combination, which renders it coagulable by a solution of sal ammoniac. It has also a greater proportion of the extraneous parts of the blood, which are soluble in water, such as salts; and it has a greater tendency, than true pus, to become putrid. Such unhealthy matter may even be irritating to the surface, which produces it.

The discharge, when of an irritating sort, is more stimulating to the adjoining parts, with which it comes in contact, than to its own secreting surface. In this manner, it frequently produces excoriation of the skin, and ulceration. Thus the tears excoriate the skin of the cheek, in consequence of the quantity of salts, which they contain. From this effect, matter has been called corrosive, a quality, which it has not; the only property which it possesses, being that of irritating the parts, which it touches, so as to cause their absorption. (Hunter.)

When the vessels thus lose the power of producing good pus, they also lose more or less the power of forming granulations. This may depend on some deviation from the due structure, and action, which such vessels should possess, in order to be qualified for the performance of these two operations.

Pus, from several circumstances, would appear in general to have a greater tendency to putrefaction, than the natural juices have; but, perhaps, this is not the case with pure pus, which, when first discharged from an abscess, is commonly perfectly sweet. There are, however, some exceptions to this, but these depend on circumstances entirely foreign to the nature of pus itself. Thus, if the abscess had any communication with the air, while the matter was confined in it; or if the collection has been so near the colon, or rectum, as to have been infected by the feces, then we cannot wonder, that the matter should become putrid. When blood is blended with pus; when sloughs are mixed with it; when the parts form-

ing the seat of the abscess, are in a gangrenous state from an erysipelatous affection; the matter has a greater tendency to putrefy, than the pure pus, discharged from sound abscesses, or healing sores. Pure matter, though easily rendered susceptible of change, by extraneous additions, is in its own nature tolerably uniform and immutable. It appears so unchangeable, that we find it retained in an abscess for weeks, without having undergone any alteration. These qualities, however, only belong to perfect pus. If a healthy sore inflames, the matter, now produced from it, though unmixed with extravasated blood, or dead solids, becomes much sooner putrid, and much more irritating, than the discharge, formed before this alteration of the ulcer. (*Hunter.*)

In the preceding paragraph, it is stated, that matter remains very often unchanged in abscesses for weeks. This expression of *Hunter's* is not strictly correct; for, it is well known, that the surfaces of the cavities of abscesses are always absorbing, as well as secreting ones; consequently, there must be a continual mutation going on in the contained matter.

When there are diseased bones, or other extraneous bodies, exciting irritation, sometimes even to so great a degree as to make the vessels bleed, and often wounding the vessels of the part, the matter is always found to be very offensive. This state of the discharge is one mark of a diseased bone.

The discharge of an unhealthy sore blackens silver probes, and preparations of lead. This effect is imputed by *Dr. Crawford* to the sulphurated hydrogen gas, generated in the matter. (*Phil. Trans. vol. 80. Year 1790, p. 385.*)

USE OF PUS.

By some it is supposed to carry off humours from the constitution. Suppuration is sometimes regarded as a constitutional disease, changed into a local one, which constitutional malady is discharged, or thrown out of the body, either in the form of pus, or together with this fluid. Critical abscesses have been thought to be cases of this sort. Suppuration has also been imagined to carry off local complaints from other parts of the body, on the old principle of derivation, or revulsion. For this reason, sores, or issues are made in sound parts before allowing other sores to be dried up. Suppuration is sometimes excited with a view of making parts, such as indurated swellings, dissolved into pus; but, we have endeavoured to shew, that no dissolution of

the solids is concerned in the production of pus.

A secretion of pus is looked upon as a general prevention of many, or of all, the causes of disease. Hence, issues are made to keep off both universal as well as local diseases. However, the use of pus is perhaps unknown; for, it is formed most perfectly from healthy sores, and in healthy constitutions; and large discharges from parts not very essential to life, produce very little change in the constitution, and as little upon being healed up, whatever some may suppose to the contrary. (*Hunter.*)

This is certainly the case with many old ulcers, the suppuration from which seems to have little, or no effect, in impairing the health. Nor is there any real reason to be afraid of healing such ulcers, when possible, lest a worse disease should follow from the stoppage of the discharge, to which the system is supposed to be habituated so much, that the continuance of such discharge is essential to health.

Every one knows, that when there is no interference of art, that is, when the surface of a sore is left uncovered, the thin part of the matter evaporates, and the thick part dries and forms a scab. Nature, therefore, seems to have designed, that one use of pus should be to make a cover, or protection, for ulcerated surfaces. But I cannot agree with what has been asserted (*Hunter,*) that the natural healing of a sore under a scab takes place more quickly, than when surgical dressings are employed.

Among the secondary uses of suppuration, may be mentioned, opening a communication between a disease and the external surface of the body; forming a passage for the exit of extraneous bodies, &c.

TREATMENT WHEN SUPPURATION MUST TAKE PLACE.

In cases of inflammation, arising from accident, but so circumstanced, that we know suppuration cannot be prevented, the indication is to moderate the inflammation, which, if the powers are great, and the injury done considerable, will probably be very violent. If the constitution should also be much affected, certain general means are proper, such as bleeding, purging, and nauseating medicines. While the constitution continues to be disturbed, suppuration cannot take place in the most favourable manner. In these cases, also, such medicines as produce a gentle perspiration greatly relieve the patient, for instance,

the pulv. ipecac. comp.; antimonials; aq. ammon. acet.; saline draughts, &c. Opium may produce a temporary diminution of action; but, this is not always the consequence of this medicine, as there are constitutions, which it renders more irritable, and of course it aggravates the inflammatory action.

The applications to inflammations, which are to suppurate and form an abscess, commonly used, are poultices and fomentations. These, however, appear to be applied without much critical exactness, or discrimination; for, they are applied before suppuration has taken place, and when this event is not desired; and they are also applied after suppuration has taken place. With respect to suppuration itself, abstracted from all other considerations, the indication cannot be the same in every state; but, if poultices and fomentations are found to be of real service in the two stages of the disease, there must be something common to both, for which they are of service, independently of simple suppuration. Poultices are useful, when the inflammation attacks the skin, either in the first instance or after an abscess has approached so near the skin that this becomes secondarily affected. This benefit appears to arise from the skin being kept soft and moist. Such is the use of a poultice in inflammation, either before or after suppuration, until the abscess is opened. But, when poultices and fomentations are applied to inflamed parts, in which we wish to avoid suppuration, reason and principle will not justify the practice, though such applications may be proclaimed by experience to be very proper. (*Hunter.*)

TREATMENT AFTER SUPPURATION HAS TAKEN PLACE.

When suppuration cannot be stopped, or resolved, it is in general to be promoted.

How far suppuration can be increased by medicines, or applications, is doubtful; but attempts are generally made, and, for this purpose, suppurating cataplasms and plasters, composed of the warm gums, seeds, &c. have been recommended. Mr. Hunter doubted, whether such applications had any considerable effect in the way intended; for, if they were put on a sore, they would hardly increase the discharge from it, and, perhaps, even diminish it. However, in many cases, in which the parts are indolent, and hardly admit of true inflammation, in consequence of which a perfect suppuration cannot take place, stimulating the skin brings on a more salutary inflam-

mation, and of course a quicker inflammation.

These applications have been found, however, to bring the matter more quickly to the skin, even in the most rapid suppurations. This effect has been mistaken for an increased formation of pus; but, this consequence can only follow in cases, in which the inner surface of the abscess is within the influence of the skin. The accelerated progress of the matter to the surface of the body arises from another cause, viz. the promotion of ulceration in the parts, between the collection of matter, and the cuticle.

Emollient poultices are commonly applied to inflamed parts, when suppuration is known to have taken place. These can have no effect upon suppuration, except that of lessening the inflammation, or rather making the skin more easy. The inflammation must have reached the skin before poultices can have much effect, for they can only affect that part. The ease of the patient, however, should be considered, and we find, that fomentations and poultices are often beneficial in this way. By keeping the cuticle moist and warm, the sensitive operations of the nerves of the parts are soothed. On the contrary, if the inflamed skin is allowed to dry, the inflammation is increased, and as suppuration is probably not checked by the above treatment, it ought to be put into practice. As warmth excites action, the fomentation should be as warm as the patient can bear, without inconvenience. (*Hunter.*)

OF THE TIME WHEN ABSCESES SHOULD BE OPENED.

As abscesses, wherever formed, must increase that part of their cavity, which is next to the skin, more quickly than the bottom, they must become, in some degree, tapering towards the latter part, with their greatest breadth immediately under the skin. This shape of an abscess, when allowed to take place, is favourable to its healing, for it puts the bottom, which is the seat of the disease, more upon a footing with the mouth of the abscess, than it otherwise could be. As the bottom, or part, where the abscess began, is more or less in a diseased state; and as the parts between the seat of the abscess and the external surface are sound parts, having only allowed a passage for the pus, they, of course, have a stronger disposition to heal, than the bottom has.

To keep the mouth of an abscess from healing before its bottom, the collection of matter should be allowed to break of

itself; for, although abscesses in general only open by a small orifice, more especially when sound, yet, in such cases, the skin over the general cavity of the matter is so thinned, that it has very little tendency to heal, and often ulcerates and makes a free opening. If the latter event should not spontaneously occur, it may now be more easily obtained by the interference of the surgeon.

Abscesses, which are the most disposed to heal favourably, are the quickest in their progress to the skin, and the matter comes to the surface almost at a point; the swelling is not so conical as in other cases, and when it bursts, the orifice is exceedingly small. On the other hand, when there is an indolence in the progress of the abscess, the collection spreads more, or distends the surrounding parts in a greater degree, in consequence of their not being so firmly united by inflammation, in the one as they are in the other instance; nor will ulceration so readily take the lead, and the matter will come to the skin by a broad surface, so as to thin a large portion of the cutis. (*Hunter.*)

It may certainly be set down as a general axiom, that all phlegmonous abscesses should be allowed to break, and not be opened by the surgeon. When punctured unnecessarily, or prematurely, they never heal so favourably as when left to themselves.

Particular cases, however, should be opened, as soon as the existence of matter is ascertained. Abscesses should only be allowed to burst of themselves, when the confinement of the matter can do no mischief. Abscesses in the abdomen, or thorax, under the cranium, in the eye, and joints, should be mostly opened very soon. When suppuration takes place beneath ligamentous expansions, or aponeuroses, which invariably retard the progress of the matter to the surface of the body, an early opening should be made. If this be not done, the matter spreads to a great extent, separating such ligamentous expansions from the muscles, and the muscles from each other, and, as the pus cannot get to the surface of the body, the length of the disorder is of course increased. When matter is so situated, as to be liable to insinuate itself into the chest, or abdomen, or into the capsular ligaments of the joints, it is highly proper to prevent this extension of mischief, by making a timely opening into the abscess.

OF THE PLACE WHERE THE OPENING SHOULD BE MADE.

If a free opening is not required, or

making one is not practicable, it is at least proper to make whatever opening can be made in a depending situation. By this means, the matter will more readily escape, and all pressure arising from the confinement or lodgment of pus, will be prevented. A very small degree of pressure on that side of the abscess which is next to the skin, may produce ulceration there; and although such pressure might not, in many cases, be so great as to produce ulceration at the bottom of the abscess; yet it may be sufficiently great to prevent granulations from forming on that side, and thereby retard the cure, as no union can take place, but by means of granulations. The pressure is always most, and retards the formation of granulations in the greatest degree, at the most depending part of the abscess. Hence, if no opening be made in this situation, the upper part of the abscess readily heals to a small point, which becomes a fistula.

When circumstances forbid making an opening at the most depending part of an abscess, perhaps, nothing more can be done, than to evacuate the matter as often as necessary, and gently to compress the sides of the abscess together, when the situation of the case admits of the practice.

But abscesses are not always to be opened at the most depending part. The distance between the matter and the skin at this part is the common reason against the method. If an abscess is rather deeply situated, and points in a place which is higher than where the collection lies, it is proper to make the opening where the conical eminence, or, as it is termed, the *pointing*, appears. Thus, if an abscess should form in the centre of the breast, and point at the uppermost part, which is often the case, it would be improper to cut through the lower half of the mamma, in order to make a passage for the matter in that direction. If an abscess should form on the upper part of the foot, it would be wrong to make an opening through the sole of the foot to get at the most depending part of the abscess; for, besides cutting such a depth of sound parts, a great many useful ones would be destroyed.

When the abscess does not point in a depending situation, as in the instances just cited, since the place where the matter threatens to open a passage, is likely to be the future opening, and this situation is disadvantageous to the healing of the deep part of the abscess, it is generally best to let the collection of matter first burst of itself, and then dilate the opening as freely as necessary. By

allowing abscesses to burst spontaneously, the opening is not so apt to heal as if made by art, and, therefore, is better in such situations. (*Hunter.*)

In some cases, it is more advantageous even to cut through a certain thickness of parts, for the sake of obtaining a depending opening, than to make an opening, where the pointing appears, as the parts are most attenuated, and the matter nearest the surface. This remark is highly worthy of remembrance, when there is no doubt of the existence of matter at the depending place, and when the parts to be divided are not important ones. Collections of matter beneath the fasciæ of the fore-arm and thigh, particularly demand attention to this direction, as they commonly point where those ligamentous expansions are most attenuated, not where the matter can most readily escape.

Abscesses in the sheath of the rectus abdominis should also be opened in a low situation.

DIFFERENT METHODS OF OPENING ABSCESSSES.

All abscesses will burst of themselves, unless the matter should be absorbed, and, in general, they ought to be allowed to take this course. There are, however, as we have already explained, particular circumstances which require an early opening; but, when the skin over the abscess is very thin, it is not of so much consequence, whether the case be permitted to burst of itself, or it be opened by the surgeon.

When abscesses are large, it is generally necessary to open them by art, whether they have burst of themselves or not; for, the natural opening will seldom be sufficient for the completion of a cure; and, although it may be sufficient for the free discharge of the matter, yet these abscesses will heal much more readily when a free opening is made; for, the thin skin over the cavity granulates but indifferently, and therefore unites but slowly with the parts underneath. (*Hunter.*)

Abscesses may be opened either by an incision, or by making an eschar with caustic. To the latter plan, however, many urge strong objections: the use of caustic is not usually attended with any advantage which may not be obtained by a simple incision; upon a tender inflamed part it gives much more pain; it is more slow in its effects; and the surgeon can never direct the operation of the caustic so accurately as to destroy exactly the parts which he wishes, and no more. If the eschar be not made deeply enough,

the lancet must, after all, be used. Caustic also leaves after its application, a disagreeable scar, a consideration of some importance in opening abscesses about the female neck or face. To these numerous objections we have to add, that the eschar is, very frequently, ten or twelve tedious days in becoming detached.

When there is a redundancy of skin, or when there is a good deal of it thinned, however, an opening made with caustic will answer, perhaps, as well as an incision. The application of a caustic may also sometimes be advantageously resorted to when there is a good deal of indolent hardness around a small abscess.

The *calx viva cum kali puro*, or the *kali purum* alone, is the best caustic for opening abscesses. The part is first to be covered with a piece of adhesive plaster, which has a portion cut out exactly of the same figure and size as the opening intended to be made in the abscess. The best way of making the eschar, is to dip the end of the caustic in water, and to rub it on the part till the skin becomes brown. The active substance is then to be immediately washed off with some wet tow, the plaster is to be removed, and an emollient poultice applied.

In almost all cases, it is better to use the lancet, or double-edged bistoury. Either of these instruments opens the abscess at once, and with less pain, than results from the use of caustic; it occasions no loss of substance, consequently a smaller cicatrix; and, by using it, the opening may be made in the most advantageous direction, and of the exact size required.

DRESSINGS AFTER OPENING ABSCESSSES.

When an abscess has burst of itself, and it is unnecessary to enlarge the opening, all that is requisite is to keep the surrounding parts clean. The continuation of the same kind of poultice, which was before used, is, perhaps, as good an application as any; and when the tenderness, arising from the inflammation, is over, lint and a pledget may be made use of, instead of the poultice.

But, an abscess, opened by a cutting instrument, is both a wound and a sore, and partakes more of the nature of a fresh wound in proportion to the thickness of the parts cut. Hence, it is necessary that something should be put into the opening to keep it from healing by the first intention. If it is lint, it should be dipped in some salve, which will answer better than lint alone, as it will allow of

being taken out sooner. This is advantageous, because such sores should be dressed the next day, or, at latest, on the second day, in order that the pus may be discharged again. When the cut edges of the opening have suppured, which will be in a few days, the future dressings may be as simple as possible, for nature will, in general, complete the cure.

If the abscess has been opened by caustic, and the slough has either been cut out or separated of itself, the case is to be regarded as an entire suppurating sore, and dressed accordingly.

Perhaps, dry lint is as good a dressing as any, till the nature of the sore is known. If it should be of a good kind, the same dressing may be continued; but, if not, then it must be dressed accordingly. Pus, which at first appear to be sound, sometimes assume every species of disease, whether from indolence, from irritability, from scrophulous, and other dispositions. This tendency to disease arises, in some cases, from the nature of the parts affected, as, for instance, bone, ligament, &c. (Hunter.)

It is impossible to refer the reader, in a satisfactory manner, to any particular works for information concerning abscesses and suppuration, because something is to be met with on the subject in almost every surgical book, ancient as well as modern. The author of the article *Abscess* in Rees's Cyclopædia, makes particular mention of the following writers: Severinus, Hildanus, Wiseman, Heister, Van Swieten, Sharp, Pott, B. Bell, and Kirkland. Some curious cases are said also to be related, or referred to, in the *Bibliothèque Choisie de Médecine*, the compilations of Mangetus, Bernstein, and James; the memoirs and transactions of different learned societies (the *Mém. de l'Acad. de Chir.* might be especially mentioned;) and in the works of Bonetus, Forestus, Lusitanus, Tulpus, Morgagni, Horstius, Stalpart, Vander Wiel, &c.

I am rather surprised, that the author of the article above alluded to, should have neglected to notice John Hunter's *Treatise on the Blood, Inflammation, &c.* a work, in which, perhaps, more interesting knowledge, respecting abscesses and suppuration, is contained, than in any other one ever published. The *Traité de la Suppuration* de F. Quesnay, 1749, is also entitled to some attention; so are the *Dissertations on Inflammation* by J. Burns. Richter has written a tolerable chapter on the subject, in his *Anfangsgr. der Wundarzn.* Band. 1. Consult also *Home on Pus*, and *l'Encyclopédie Méthodique*.

SURGERY. (*Chirurgie*; from *χειρ*,

the hand, and *εργον*, labour.) A branch of the science of medicine, having for its principal object the cure of external diseases. The etymological meaning of the word *surgery* reduces this part of the medical profession to a very degraded condition, and, by no means conveys an adequate idea of what it really is at the present day. They who consider surgery merely as the mechanical part of medicine, or as that branch of it which consists entirely in the performance of manual operations, must either be very ignorant, or very prejudiced and illiberal. In order to remove these foolish notions, it is only necessary to ask, by what dexterity of the hand could the surgeon accomplish the cure of the various forms of the venereal disease, and of numerous scrophulous affections? Yet these, and many other disorders, equally incurable by the hand alone, fall to the province of the surgeon, and by him are oftentimes successfully treated.

A modern author observes, that "many people have imagined, that when a man has learnt the art of dressing sores, of applying bandages, and performing operations with a little dexterity, that he must necessarily be an accomplished surgeon. If a conclusion so gross and fallacious had been confined to the vulgar and illiterate, the progress of scientific surgery would have suffered little interruption; but if young minds are directed to these objects, as the only important matters upon which their faculties are to be exercised; if the gross informations of sense constitute the sum of their knowledge, little more can be expected from such a mode of study, than servile imitation, or daring empiricism. Indeed, some people have affected to oppose surgery as an *art* to medicine as a *science*; and if their pretensions were justly founded, the former would certainly be degraded to a mere mechanical occupation. But, it is not very easy to comprehend the grounds of such a distinction. The internal and external parts of the body are governed by the same general laws during a state of health; and, if an internal part be attacked with inflammation, the appearances and effects will bear a great similarity to the same disease situated externally; nor are the indications of cure, in general, materially different. If by science, therefore, be meant "a knowledge of the laws of nature," he who knows what is known of the order and method of nature, in the production, progress, and termination of surgical diseases, merits as justly the title of a scientific practitioner, as the well-educated physician. The practical

parts of physic and surgery are very frequently disunited; but, their theory and principles are indivisible, since they truly constitute one and the same science." (*Pearson's Principles of Surgery, Preface.*)

We shall next introduce a short account of the rise and progress of surgery, as given by Mr. Gooch, in the first volume of his *Chirurgical Works*.

Writers have divided surgery into these six branches: Synthesis; Diæresis; Exæresis; Aphæresis; Prosthesis; and Diorthosis: the first signifies uniting parts divided; the second, dividing parts united; the third, removing, or extracting, extraneous, or other noxious substances, lodged in any part of the body; the fourth, taking away what is superfluous; the fifth, supplying deficiency; the sixth, restoring parts to their proper places.

The daily instances of the relief, which surgery brings the afflicted, under the various circumstances of distress, even delivering them from the jaws of death, sufficiently proclaim its excellence; and it appears to be of much earlier date, than the other parts of the medical art.

We see, by the antediluvian history, that soon after the creation of the world, feuds and animosities, envy and malice, possessed the minds of men, and were productive of rapine and war, which inevitably extended the contending parties to wounds, and other external injuries. Reason, implanted in man for his preservation, as the first principle in nature, directed him, on various occasions, to seek a remedy; and this necessity gave rise to surgery, which, at first, was rude and imperfect, growing, in successive ages, like other ingenious arts and sciences, to a state of perfection.

The inhabitants of the earth, in the primitive ages of the world, lived frugally, upon plain simple food, according to the dictates of nature and right reason; and enjoying a pure serene air and temperate climate, their lives were protracted to a great length, without being so subject as we are to diseases, which have been much increased since that time by luxury and intemperance. They were peculiarly happy in the enjoyment of robust and vigorous constitutions, raised from good original stamina; and, when attacked with diseases, nature wanted little or no assistance from art, to restore their health; consequently, surgery was then looked upon, as almost the only necessary branch of medicine.*

Ancient history informs us, though there may be something fabulous and allegorical in it, that Apollo communicated his skill in this science to his son Esculapius, who then profited under the tuition of Chiron the Centaur; and for his great improvement and knowledge of surgery in particular, he was deified, and had temples dedicated to him in several parts of the world. Many countries contended for the honor of his birth, and, according to the learned, his name signifies a man of the knife, in the Phenician language; whence some writers, conclude he was a native of Phenicia; but this controverted point, whether he was by birth a Phenician, an Egyptian, or a Grecian, is not material to our purpose. In those early days, there were no regular professors of the medical art, the knowledge of which was then conveyed by oral tradition, or recorded upon pillars in the most public places, or on the walls of temples, dedicated to the god of Health; and afterwards registers of cures were kept in those consecrated places for the general good of mankind.

Machaon and Podalirius, the sons of Esculapius, were both medical and military men, and being particularly skilful in surgery, they proved very useful to the soldiers in curing their wounds, in the Trojan war; on which account, when Machaon himself was dangerously wounded with a dart, greater lamentation was made for him than for any other hero.

From the destruction of Troy, to the Peloponnessian war, which was an interval of more than seven hundred years, the Aselepiadæ, descendants of Esculapius, and their disciples were the only noted professors of the healing art.

About the conclusion of this period of time, the immortal Hippocrates began to be famous in the world, who was also of the Esculapian family, and lived between four and five hundred years before our Saviour. He was endowed with the greatest sagacity, excelled all his predecessors and contemporaries, and reduced this science into better order, compiling, and laying down for posterity, rules founded upon his own observations, confirmed by experience, and was deservedly called the father of physic. In his writings he also treats of wounds, ulcers, fractures, &c. interspersing observations and remarks through the whole, to direct the judgment and practice of succeeding

Longam. The great luxury of the Romans in Seneca's time made him say, *Non ad rationem, sed ad similitudinem vivimus.*

* Vid. Dissertat. physico-med. Fred. Hoffmanni de Methodo acquirendi Vitam

ages. He was the ablest surgeon, as well as physician, of his time.

The other Greek physicians, whose writings have been transmitted to us in a more universal language, treating also professedly of surgery, are Oribasius, Alexander, Trallianus, Ætius, and Paulus Ægineta, and the great Galen, who flourished more than a century before Oribasius.*

Among the Romans, Celsus, a man of a sublime and penetrating genius, is the only author we have in his time, though he mentions several; but, there is no other record, or monument of them left. Both he and Galen, who was a practitioner of great repute at Rome, though a native of Pergamus, in Asia Minor, speak of some ancient surgeons, as well in Egypt as in other parts of the world, whose works have perished.

When the knowledge of arts and sciences was transferred from Egypt to Greece, it received great improvements, and Athens was looked upon as the seat of all kinds of learning, till the death of Alexander the Great; after which æra, the Ptolemies ruled in Egypt, and Alexandria, became the most renowned school in the world, for physic, surgery, and anatomy, which flourished near a thousand years; and in those days, physicians boasted of receiving their education in that university. Then the different branches of medicine were practised together, and not separated till the time of Herophilus and Erasistratus, who were educated at Alexandria, and lived in the reign of Seleucus Nicanor, king of Syria, as appears by a memorable incident, in respect to the latter of those illustrious men, who shewed his great penetration in discovering Antiochus's distemper, when fallen desperately in love with his mother-in-law, the young and beautiful Stratonice, Seleucus's second wife, whom he had married in his old age.*

In the year 640 of the Christian æra, the caliph of the Saracens, professed enemies to literature, as well as to the Christians, took Alexandria, destroyed the university, and burnt the library of Ptolemy Philadelphus, which was the great-

est magazine of learning in the world, said to contain 700,000 volumes;* however, some books might be saved out of that lamentable conflagration.

In the same century, that this dreadful catastrophe happened at Alexandria, Europe was over-run with Goths and Vandals, by which calamitous event, the liberal arts and sciences also suffered very much; and undoubtedly medicine shared the same fate.

After the fall of Alexandria, and the irruptions of the above barbarous people, the Arabians having collected libraries, and probably possessed themselves of some books, that were saved out of the flames, Alexandria became more conspicuous and considerable in this science, than any other nation; of which, the most eminent, who blended surgery with their other medical writings, were Rhazes, Avicenna, Avenzoar, Averrhoes, and Albucasis.

Rhazes probably was born in the province of Chorasán in Persia: he was superintendent of an hospital there, and died advanced in years, A. C. 932.

Avicenna was the next writer of note among the Arabians; he was born at Bochara in Chorasán, towards the end of the 9th century. He resided and practised at Ispahan. He was a man of extraordinary talents; but, shortened his days by intemperance and indulgence in pleasures; he was buried at Hamadan.

Avenzoar succeeded Avicenna: if not born, he resided much at Seville, the capital of the Province of Andalusia in Spain, then the seat of the Mahometan caliph. He lived and enjoyed good health to 135 years.

Averrhoes followed Avenzoar; he was a native of Corduba in Spain, and died at Morocco.

Of Albucasis the place and time of nativity do not certainly appear; but he comes after Averrhoes, and was the best acquainted with surgery of any of the Arabians. There is reason to suppose that he lived in the 11th or 12th century of the Christian æra.

These Arabians were favourers of Galen's doctrine, and their authority prevailed unrivalled for many ages.

Afterwards the chemists opposed the Galenists, each of which had zealous partizans, who were bigoted to the opinion of their chiefs, and combated each other's notions with great vehemence, whence a

* Oribasius was a practitioner of great note at Sardis, in Cent. IV. Æ. C. What he has said, de Laqueis et Manchiamen-tis, in his voluminous works, is chiefly taken from Heliódorus. It appears, that Paulus was a more considerable surgeon, having improved upon his predecessors.

† Seleucus began his reign A. C. Mdi. 3684. Erasistratus resided at his court, and was archiater.

* Great part of the Ptolemean library having been burnt in the wars between Cæsar and Pompey, the loss was supplied, as far as possible, by Cleopatra, queen of Egypt, and her successors, at an immense expence.

kind of schism arose in the province of physic; but the wiser moderns have freed themselves from implicit faith, and the embarrassments of hypothesis, and fine speculative systems, more curious than useful, regarding only what is founded upon rational experience, to which theory must be subordinate.

In the 13th century, learning emerged from the dark clouds of ignorance, under which it had long been veiled; and about this period of time, the reformation of surgery was begun in England by Arden,* originally a practitioner of great fame at Newark, and afterwards in London: and it was begun rather earlier in France, by Pitard and Lanfranc.† By a succession of men of genius, learning and application here, such as Gale, Clowes, Woodall, Bannister, Wiseman, and many others; and there, by Vavasseur, Mondeville, Guido de Cauliaco, Paré, Guillemeau, &c. surgery was gradually advanced, in both countries, to its present state of perfection. Pitard was a Parisian by birth; but Lanfranc was a native of Milan, educated at Salernum, the most famous university for physic and surgery in those days, as its motto, *Civitas Hippocratica*, emphatically expresses. He was driven from Italy, with many other learned men, by the dreadful factions of the Guelphs and Gibelins, at the conclusion of the 12th century, and found an asylum at Paris, where he met with a very honourable reception. His acquaintance with Pitard was soon improved into a strict friendship, which was inviolably preserved, for the public good, between these eminent men, who co-operating, supported with great credit and dignity, the college of St. Côme, founded by Lewis the Ninth, who was sainted for engaging in the crusades; and public lectures were appointed to be read, and demonstrations made, in anatomy and surgery, by the royal founder. Pitard having given early proofs of his extraordinary talents and abilities in his profession, was honoured, before he was thirty years of age, with the appointment of first surgeon to the king, and standing in the highest esteem, attended him in his expedition to the Holy Land, where he gathered laurels, and returned loaded with honours.

Our neighbours having had for some ages, better opportunities, from royal patronage, of acquiring knowledge in their profession, than other countries and be-

ing regular in giving lectures, and making demonstrations in anatomy and surgery, they distinguished themselves, and were deservedly extolled throughout Europe; and from every part of it, surgeons used to resort to Paris, to complete their education; which city now can no longer claim the superiority to London.

In the foreign universities, the professors of physic generally adopted surgery; and now at the famous university of Edinburgh, and others, there are professorships appropriated to surgery and anatomy conjointly. Marianus Sanctus, a celebrated lithotomist, was a doctor of Padua. Marcus Aurelius Severinus, Vigo, Fabricius ab Aquapendente, Cæsar Magatus, Marchetti, and many other practical surgeons, that might be enumerated, were doctors of physic. Mons. Le Cat, at Rouen, and Mons. Pouteau, at Lyons, chief surgeons to the great hospitals in those cities, are styled doctors of physic and surgery. The late illustrious M. De La Peyronie, who was first surgeon to the king, and to whom the whole faculty is greatly indebted, was bred, and took a doctor's degree in the university of Montpellier. Some of the physicians to the kings of France were originally surgeons, in which country singular marks of royal favour have, for many ages, been conferred upon surgeons, as we have observed; and by a late edict, upon the establishment of the Royal Academy of Surgery at Paris, no surgeon is allowed to practise, and be master of his company, without having taken a master of arts' degree in some university of that kingdom.*—The great Fabricius Hildanus, who flourished in the 15th century at Bern, in Switzerland, was physician and surgeon in ordinary to that illustrious republic, and to the marquis of Baden. He stands at the head of the first class of observers, and should be in the hands of every practitioner. (*Chirurgical Works of B. Gooch, Vol. I.*)

Perhaps, nothing contributed so materially to the improvement of surgical knowledge, as the establishment of the Royal Academy of Surgery in France; a noble institution, which, for a long while, gave the French infinite advantage over us, in the cultivation of this most useful profession. Indeed, every one, truly interested in the improvement of surgery, cannot fail to regret the discontinuance of a society, in which emulation and talents

* Vid. Opera I. Friend, M. D. de Historia Medicinæ.

† See Histoire de l'Origine & des Progrès de la Chirurgie en France.

* See Histoire de l'Origine & de Progrès de la Chirurgie en France; where great encouragement for the improvement of surgery appears to have been given by royal edicts, in different ages.

were so long united for the benefit of mankind. The various dissertations, published by the illustrious members of the academy, will serve as a perpetual memorial of the spirit, ability, and success, with which the objects of the institution were pursued; and, centuries hence, practitioners shall reap from the pages of its memoirs the most valuable kind of surgical information. Unfortunately, this celebrated establishment, which was overthrown by the agitation of the French revolution, has had only a very inferior substitute in the *Ecole de Santé*.

Were I to name any one thing, which, in my opinion, would have the greatest influence in giving life to the study and cultivation of surgery in this country, I should certainly assign such importance to the establishment of an institution in this metropolis, on the same grand, and encouraged plan, as the late Royal Academy of Surgery in France.

Within the last twenty, or thirty years, most important improvements have certainly been made in almost every branch of surgery; and, it must gratify every Englishman to find, that his own countrymen have acted a very leading part in effecting an object, in which the interests of mankind in general are so deeply concerned.

External aneurisms, which formerly used to prove nearly as fatal as internal ones, are now treated with immense success, by operating upon the plan first suggested by Mr. Hunter, and of late very materially improved by Mr. Abernethy. The doctrines of this disease have also been recently elucidated, with great ability, by Professor Scarpa, of Padua.

The diseases of the eyes, to which affections English surgeons seemed to pay much less attention, than was bestowed by foreign practitioners, seem now to obtain due attention in this country. Although we have generally had some distinguished oculists, our surgeons at large have been wonderfully ignorant of this part of their profession, and, uninformed in the subject, they have given up to professed oculists, and quacks, one of the most lucrative and agreeable branches of practice. However, the able writings of Wenzel and Ware begin now to be familiarly known among practitioners: and the observations of Scarpa, Richter, Wardrop, Saunders, &c. will soon have immense effect in diffusing in the profession a due knowledge of the numerous diseases, to which the organs of vision are liable.

Before Mr. Hunter, our ideas of the venereal disease were surrounded with absurdities; and it is to this luminary that we are in an eminent degree indebted

for the increased discrimination, and reason, which now prevail, both in the doctrines and treatment of the malady.

Strictures in the urethra, an equally common and distressing complaint, were not well treated of, before Mr. Hunter published on the venereal disease; and the infinite advantage of armed bougies, in the treatment, has been subsequently described by Mr. Home.

I must not omit to mention, among the most modern improvements in surgical science and practice, the discoveries of Dr. Jones, relative to the subject of hemorrhage. Very important practical inferences are to be drawn from his experiments.

Ruptures, those common afflictions, in every country, have in modern times received highly interesting elucidations from the labours of Camper, A. Cooper, Hey, Gimbernat, Scarpa, &c.

The treatment of injuries of the head has been materially improved by Quesnay, Le Dran, Pott, Abernethy, &c.

The disease of the vertebrae, which occasions paralysis of the limbs, formerly always baffled the practitioner; but, the method proposed by Mr. Pott, is now frequently found productive of considerable relief, and sometimes of a perfect cure.

The mode of treating lumbar abscesses has been rendered much more successful, than formerly, and, for this change, the world is greatly indebted to Mr. Abernethy.

The almost infallible plan of curing hydroceles, by an injection, in the way described by Sir James Earle, may also be enumerated among the recent improvements.

I shall conclude this article with noticing the increasing aversion to the employment of the gorget in lithotomy, and the many distinguished advocates for the use of a common scalpel in this operation. These latter circumstances I hail as propitious omens of very beneficial changes in this part of surgery.

SUPPURATIVES. (from *suppuro*, to suppurate.) *Suppurantia*. Medicines, or rather applications, which promote the formation of good pus.

SUSPENSORY. (from *suspendeo*, to suspend.) *Suspensor*. A bandage for containing, and supporting the scrotum; a bag-truss. Bandages of this kind are now usually sold at the shops, and seldom made by surgeons themselves; therefore, a particular description of them is not essential in this work. In cases of hernia humoralis, varicocele, cirsocele, some particular ruptures, and several other affections of the testicle, and spermatic chord, a suspensory bandage is of infinite service.

SUTURES. (from *sua*, to sew.) A suture in surgery, means a mode of uniting the edges of a wound, by keeping them in contact with stitches.

Mr. Sharp remarks, that, "when a wound is recent, and the parts of it are divided by a sharp instrument, without any further violence, and, in such manner, that they may be made to approach each other, by being returned with the hands, they will, if held in close contact for some time, reunite by inosculation, and cement, like one branch of a tree ingrafted on another. To maintain them in this situation, several sorts of sutures have been invented, and formerly practised, but the number of them has, of late, been very much reduced. Those now chiefly described are the *interrupted*, the *glover's*, the *quilled*, the *twisted*, and the *dry*, sutures: but, the interrupted and twisted are almost the only useful ones, for the quilled suture is never preferable to the interrupted; the dry suture is ridiculous in terms, since it is only a piece of plaster, applied in many different ways, to reunite the lips of a wound; and the *glover's*, or uninterrupted stitch, which is recommended in superficial wounds, to prevent the deformity of a scar, does rather, by the frequency of the stitches, occasion it, and is therefore to be rejected, in favour of a compress and sticking plaster." (*Oper. of Surgery*.) The twisted suture is described in speaking of the *hare-lip*; and *gastroraphie*, which also properly belongs to the present subject, forms a distinct article in this Dictionary.

INTERRUPTED SUTURE.

The wound being cleansed from all clots of blood, and its lips being brought evenly into contact, the needle, armed with a ligature, is to be carefully carried from without, inwards to the bottom, and so on from within outwards. Care must be taken to make the puncture far enough from the edge of the wound, lest the ligature should tear quite through the skin and flesh. This distance, according to Mr. Sharp, may be three, or four-tenths of an inch. The other stitches required are only repetitions of the same process. The threads having been all passed, you are in general to begin tying them in the middle of the wound; though, if the lips be held carefully together, (says Mr. Sharp,) it will not be of great consequence, which stitch is tied first. (See *Operations of Surgery*, Chap. 1.)

Surgical writers in general state, that the number of stitches must, in a great measure, depend upon the extent of the wound. The common rule is, that one

suture is sufficient for every inch of the wound; but, that, in some instances, a stitch must be more frequently made, particularly when a wound gapes very much, in consequence of a transverse division of muscles. As we have already explained, it is necessary to pierce the skin, at a sufficient distance from the sides of the wound, lest the thread should cut through the flesh in a short time: but, though Mr. Sharp lays down the necessary distance, in general, as three, or four-tenths of an inch, and others advise the needle to be always carried through the deepest part of the wound, we must receive these directions, particularly the last, as subject to numerous exceptions. When a wound is very deep, it would be conspicuously absurd, and even, in many instances, dangerous, to drive the needle through a vast thickness of parts. Other wounds, of considerable length, might not be, in some places, four-tenths of an inch deep; though it is true, sutures could never be requisite at such points.

The needles for making the interrupted suture will pass, with the greatest facility, when their shape corresponds exactly with the segment of a circle, and they should always form a track, of sufficient size, to allow the ligatures, which they draw after them, to pass through the flesh with the utmost ease.

The interrupted suture obviously receives its name from the interspaces between the stitches; and it is the one most frequently employed. Its action is always to be assisted, and supported, either with the uniting bandage, (see *Bandage*), or with strips of adhesive plaster, compresses, &c.

QUILLED SUTURE.

As Mr. John Bell has observed: "when the wound was deep among the muscular flesh, the old surgeons imagined, that so large a wound could not be commanded by the common interrupted suture, however deep the stitches might be driven among the flesh; they were, besides, fearful of using the continued (*glover's*) suture in deep gashes, lest the wound should be made to adhere superficially, while it was still open within, forming perhaps a suppuration, or deep collection of matter. They believed, that a deep muscular wound could not be safely healed, without a degree of suppuration; while they wished to bring it together at the bottom, they were afraid to close it very exactly at the mouth, lest the matter should be collected in the deeper parts of the wound; it was for this purpose (says Mr. John Bell) that they used, what they called the *com-*

pound, or quilled suture. It is merely the interrupted suture, with this difference, that the ligatures are not tied over the face of the wound, but over two quills, or rolls of plaster, or bougies, which are laid along the sides of the wound. In performing this suture, we make first two, three, or four stitches, of the interrupted suture very deep, and then, all the ligatures being put in, we lay two bougies along the sides of the wound, then slip one bougie into the loop of the ligatures on one side, drawing all the ligatures from the other side, (Mr. Bell should rather have said towards the other side,) till that bougie is firmly braced down. Next we lay the other bougie, and make the knots of each ligature over it, and draw it also pretty firm; and thus the ligatures in form of an arch, go deep into the bottom of the wound, and hold it close, while the bougies, or quills, keep the middle of the wound, and lips of it pressed together, with moderate closeness, and prevent any strain upon the threads, or any coarse and painful tying across the face of the wound." In a note Mr. J. Bell says, that Dionis violently reprobates the quilled suture; but, that De la Faye (the annotator on Dionis) says, it is good for deep muscular wounds. The quilled suture is now scarcely ever employed; nor has it any advantages, except, perhaps, in some wounds of the belly. (See *Principles of Surgery*, Vol. 1, p. 50.)

I think the reader will more easily comprehend the manner of making the quilled suture, by directing it to be done as follows: Take as many needles, as stitches intended to be made; arm them with a double ligature, or one capable of being readily split into two; introduce the ligatures through the wound; cut off the needles; lay a piece of bougie along one side of the wound, and tie the ends of the ligatures over it. Next draw the other extremities of the ligatures, so as to bring the first piece of bougie into close contact with the flesh; lay the second piece of bougie along the opposite side of the wound, and tie the other ends of the ligatures over it, with sufficient tightness.

GLOVER'S SUTURE.

This had also the name of the continued suture. It was executed by introducing the needle first into one lip of the wound, from within outwards, then into the other in the same way; and, in this manner the whole track of the wound was sewed up.

The glover's suture has long been rejected by all good surgeons, as improper to be employed in cases of common wounds. It was not, however, till very

lately, that this suture was totally abandoned; for, Mr. Sharp, and several eminent writers, since his time, have advised its adoption in wounds of the stomach and intestines. From what we have said in the articles *Abdomen*, and *Hernia*, the reader will perceive, that even in such particular instances, the glover's suture would not be advisable; so that it may, in every point of view, be now considered as totally disused in every case of surgery, which can possibly present itself. When we remember, in making this suture, how many stitches are unavoidable; how unevenly, and in what a puckered state, the suture drags the edges of the skin together; and what irritation it must produce; we can no longer be surprised, at its now being never practised on the living subject. It is commonly employed for sewing up dead bodies; a purpose for which it is well fitted; but, for the honour of surgery, and the sake of mankind, it is to be hoped, that it will never again be adopted in practice.

FALSE OR DRY SUTURE.

This term signifies the retaining of the edges of wounds in contact, by means of sticking plaster, in various manners, and the expression, as Mr. Sharp has justly remarked, is highly ridiculous, as no kind of sewing is concerned with the method. The proper plan of dressing wounds with adhesive plaster, is detailed in describing the treatment of incised wounds. (See *Wounds*.) Besides the common way of using strips of sticking plaster, some surgeons have been partial to little particularities. M. Petit used adhesive plasters, which had in the middle, one, or two holes, or even more, according to the extent of the wound. Such openings enabled the surgeon not only to see, whether the edges of the wound were in accurate contact, but also in what state they were; and the apertures afforded an opportunity for applying to the wound such remedies, as were deemed expedient. However, as when common strips of adhesive plaster are properly applied, there should generally be left a certain uncovered interspace, between every two. Petit's plan had no particular advantage in this respect.

Another method was to take two pieces of adhesive plaster, of a breadth and length proportioned to the extent and depth of the wound. Three, or four ligatures, or tapes, were then fastened to one of the edges of each piece of plaster. Both pieces were then warmed, and put on the skin, along the sides of the wound. Then the edges of the cut were evenly brought

into contact, and held so by an assistant, until the surgeons confined them permanently in this position, by tying each two corresponding ligatures, or tapes. A pledget was next applied over the wound, and a longitudinal compress over each plaster. Over these, a large square compress was put, and the whole of the dressings were covered, and supported with a bandage. The following day, it was usual to inspect the wound, and if the ligatures seemed lax, they were tightened; but, if in a proper condition, they were not meddled with. Sometimes, when much inflammation and swelling had come on, the ligatures were loosened; and, when these symptoms had abated, the ligatures were tightened again, if necessary.

REMARKS ON THE EMPLOYMENT OF SUTURES.

Sutures, by which I mean such as were made with a needle and ligature, were much more frequently employed by the old surgeons, than they are by the moderns. All the best practitioners of the present day, never resort to this method of holding the sides of a wound in contact, except in cases, in which there is a real necessity for it, and other modes will not suffice.

There were, indeed, certain instances, in which the employment of sutures was long ago forbidden. Of this kind were envenomed wounds, in which accidents, the destruction of the poison always formed a principal indication in the treatment.—Wounds, accompanied with considerable inflammation, were not deemed proper for the use of sutures, as the stitches had a tendency to increase the inflammatory symptoms. Also, as contused wounds necessarily suppurated, and, consequently, could not be united, sutures were not recommended for them; nor were they judged expedient for wounds, attended with such a loss of substance, as prevented their lips from being placed in apposition. Wounds, penetrating the chest, were not united by sutures; nor were those, in which large blood-vessels were injured; at least, until all danger of hemorrhage was removed by such vessels being tied.

Dionis believed, with several other authors, that wounds should not be united, when bones were exposed, on account of the exfoliations, which might be expected. This precept is no longer valid; for, when bones are neither altered, nor diseased, and are only simply denuded, or divided with a cutting instrument, no exfoliations will commonly follow, if the surgeon take care to replace the fresh cut

soft parts, so as to cover the exposed portion of the bone. The practicableness of uniting wounds, attended with the division of a bone, is confirmed, by numerous facts. M. de la Peyronie communicated to the Academy of Surgery, in France, a case, which is very conclusive on this point. A man was wounded with a cutting instrument, in an oblique direction, on the external and middle part of the arm. The bone was completely cut through, together with the integuments and muscles; in such a manner, that the arm only hung by an undivided portion of the skin, about an inch wide, under which were the large vessels. M. de la Peyronie tried to unite the parts, being convinced, that it would be time enough to amputate afterwards, if the case should require it. He placed the two extremities of the divided bone in their natural situation; made several sutures for promoting the union of the soft parts; and applied a bandage to the fracture. In this bandage, there were slits, or apertures, over the wound, to allow the dressings to be applied. Spirit of wine, containing a little sal ammoniac, was used as a topical application, and the fore arm, and hand, which were cold, livid, and insensible, were also fomented with the same. By these means, the natural warmth was restored, and the wound was dressed. In a week, the dressings were removed, through the opening in the bandage; in a fortnight, they were changed, a second time, and the wound seemed disposed to heal. On the eighteenth day, the healing had made progress; the part had a natural appearance; and the beating of the pulse was very perceptible. M. de la Peyronie now substituted a common roller, for the preceding kind of bandage. Care was taken to change the dressings, every ten days. In about seven weeks, all applications were left off, and, at the end of two months, the patient was quite well, with the exception of a little numbness in the part. This case is one of the most important in all the records of surgery; for, it displays, in a most striking manner, what very bad wounds it is the duty of the surgeon to attempt to unite; and, above all, it shews the propriety of attempting to save many compound fractures, which, judged of only from first appearances, would lead almost any one to resort to amputation. When the divided parts, in such cases, have been put into contact, the appearances are quite altered.

From what has been already stated, it appears, that surgeons, a considerable time back, did not at once sew up every sort of wound. The best modern practi-

tioners employ sutures much less frequently, than their predecessors. M. Pibrac's dissertation on the abuse of sutures, inserted in the third volume of the *Memoirs of the Academy of Surgery*, has had considerable effect in producing this change, and I may safely add, this improvement in practice. This judicious, and enlightened practitioner opposed the method of uniting wounds by means of sutures, which he contended, ought never to be adopted in practice, except in certain cases, in which it was absolutely impossible to keep the sides of the wound in contact, by the adoption of a proper posture, and the aid of a methodical bandage. Such circumstances M. Pibrac represents, as exceedingly rare, if they can occur at all. He speaks of sutures, as very seldom fulfilling the intention of the surgeon, who, in the majority of cases, in which he employs them, finds himself necessitated to remove them, before they have accomplished the wished-for end. M. Pibrac believes, that sutures are generally more hurtful to, than promotive of, the union of wounds; and, that when they succeed, they do not effect a cure more speedily, than a proper bandage. He cites numerous cases of very extensive wounds of the abdomen, neck, &c. for the cure of which a bandage proved effectual, and this even in many instances, in which sutures had previously failed, and cut their way through the flesh. M. Louis adopted the opinions of M. Pibrac, and published, in the fourth volume of *Mem. de l'Acad. de Chirurgie*, a dissertation, in which he endeavours to shew, that the hare-lip can be better united, by means of the uniting bandage, than when sutures are used for the purpose.

As far as I can judge, the fair statement of the matter is, that sutures are, by no means, requisite in the generality of wounds; but, that there are particular cases, in which, either their greater convenience, or superior efficacy, still makes them approved, and employed, by all the most eminent practitioners of the present day. Since sutures cannot be practised, without making additional wounds, and occasioning pain, and since the ligatures always act as extraneous bodies in the parts, in which they are introduced, exciting more or less inflammation, and suppuration round them; there can be no doubt, that their employment is invariably wrong, whenever the sides of a wound can be maintained in contact by means less irritating. For, what is it which generally counteracts the wishes of the surgeon in such cases, and makes his attempts, to make the opposite surface of wounds grow together, prove una-

vailing? Is not the general cause too high a degree of inflammation, which necessarily ends in suppuration? Are not sutures means exceedingly likely to augment inflammation, both by the additional wounds of the needles, and the still more pernicious irritation of the threads, which always act as foreign bodies, sometimes producing not merely an increase of inflammation, and suppuration in their track; but, frequently, such ulceration as enables them to cut their way out, or else sloughing of the parts; or, in particular constitutions, a very extensive erysipelatous redness round the wound.

By the ulcerative process, just mentioned, sutures very often cease to have the power of any longer keeping the edges of wounds in contact; as the observations of M. Pibrac, and, indeed, what every man may daily remark in practice, fully testify. The violent inflammatory symptoms, which they excite, frequently obliges the surgeon to cut them, and withdraw them altogether.

But, even admitting, that, in the general adoption of sutures, some wounds would be united, which would not be so, were this means of accomplishing an union (generally speaking) abandoned, still it must be allowed, on the other hand, that the cause of some wounds not uniting, is entirely ascribable to the irritation, occasioned by the sutures themselves. Hence, if it be only computed, that as many wounds are prevented from uniting by the irritation of sutures, as other wounds, which are united by their means, and could be united by no other methods, we must perceive, that mankind would be no sufferers, and surgery undergo no deterioration, were sutures altogether rejected from practice. I believe, however, that every man, who has had opportunities of observation, and has made use of them, with an unprejudiced mind, will feel persuaded, that more wounds are hindered from uniting by sutures, than such as are healed by them, and, *could not be united by other means.*

But, prudent practitioners are not obliged, either to condemn or praise, the use of sutures, in every instance, without exception. Men of independent principles will always adopt the line of conduct, which truth points out to them as that which is right; nor will they obstinately side with M. Pibrac and M. Louis, in contending that sutures are always improper and disadvantageous, nor, with other bigoted persons, who may use sutures in every kind of wound whatever.

Sutures are, perhaps, still rather too much employed, and in all probability, will long be so. It will be difficult en-

tirely to eradicate the prejudices, on which their too frequent use is founded; as long as we see, what may be called, the *Maitres de l'Art*, holding up the practice for imitation, in every principal hospital in the kingdom. Such surgeons, however, as are ready to imbibe fair and candid sentiments on the subject, and to qualify themselves for practising this part of surgery, with judgment, should by no means, neglect to read, both what M. Pibrac and M. Louis, have written on the subject. I know, that the latter authors are a little too sanguine, in their representations; but, as I have already remarked, sutures are still rather too much used, and something is yet necessary to do away a certain unwarranted habit of having recourse to them in several particular cases. Nothing will tend to produce this desirable change so much, as the perusal of every argument against the employment of sutures.

I am decidedly of opinion, not from what I have read, but what I have actually seen, that the sides of the generality of wounds are capable of being effectually kept in contact, by means of a proper position of the part, the aid of strips of adhesive plaster, and that of compresses, and bandages. I believe, that such success can be obtained, with every advantage, which can be urged in favour of sutures, and without their disadvantages; such as greater pain, inflammation, &c. I even think, with M. Louis, that the hare-lip could in general be united very well, by means of a bandage; but, still, I am of opinion, that the twisted suture is attended with least trouble, is most suited for universal practice, and, that, unless such pains were taken, as many practitioners would not, and others could never take, the method by bandage would frequently fail.

I find it exceedingly difficult to lay down any fixed principles for the guidance of the surgeon, in respect to when he ought, and when he ought not, to use sutures.

Perhaps, sutures, should be made use of, for all cuts and wounds, which occur in parts, which are subject to an unusual degree of motion, such as would be apt to derange the operation of bandages, sticking plaster and compresses. Hence, the propriety of using the twisted suture for the hare-lip.

Sutures are probably, for the most part, advantageous, in all wounds of the abdomen, of a certain length, and attended with hazard of the viscera making a protrusion. In this situation, the continual motion and action of the abdominal muscles, in carrying on respiration, besides the tendency of the viscera to pro-

trude, may be a reason in favour of the use of sutures.

When two fresh-cut surfaces positively cannot be brought into contact, by sticking plaster, bandages, the observance of a proper posture, &c. there can be no doubt of the advantage of using sutures, if they will answer the purpose. Some wounds of the trachea; some wounds made for the cure of certain fistulous communications between the vagina and bladder; or others for the cure of similar affections in the perinaeum; afford instances of cases, to which I allude.

I observe, that many of the best operators in this metropolis, use sutures for bringing the sides of the wound together after several operations; such as that of removing a diseased breast; castration and operations for strangulated hernia. The reason for using sutures in the scrotum, I suppose, arises from the difficulty of keeping the edges of the wound in contact, owing to the great quantity, and looseness of the part. I cannot pretend to determine, whether, in this case, sutures are really necessary, or not: but, after the amputation of the breast, I have no hesitation, in pronouncing their employment wrong and injudicious.

I shall conclude with referring to what M. Pibrac and M. Louis have written on the above subjects, in *Mem. de l'Acad. de Chir. tom. 3 & 4.* Sharp, Dionis, Gooch, Le Dran, Bertrandi, Sabatier, B. Bell, and J. Bell, have all treated of sutures.

SYCOMA. (from *συκη*, a fig.) A wart, or excrescence, resembling a fig.

SYCOSIS. The same.

SYMPATHETIC BUBO. (See *Bubo*.)

SYNCHYSIS, (from *συνχυσω*, to confound.) Saint-Yves, and Maitre-Jan, signify by this term a conversion of the vitreous and crystalline humours of the eye into a viscid, purulent matter, which, in the course of time, assumes the appearance of a yellowish serum. Since the time of the preceding oculists, the term *synchysis* has been used to denote the confusion of the humours of the eye, occasioned by blows, and attended with a rupture of the internal membranes, and capsules. (See *Encyclopédie Méthodique; Part. Chir. Art. Synchyse*.)

SYNCOPE. (from *συνκοπτω*, to cut down.) A sudden prostration of the vital powers; a fainting fit.

SYNOVIA. (A term of no radical meaning, and invented by Paracelsus.) The fluid, secreted in joints, for the purpose of lubricating the articular surfaces.

SYNTASIS. (from *συντείνω*, to extend.) A distention of parts by swelling.

SYNTHESIS. (from *συν*, together, and

σις, position, situation.) A generic term, formerly much used in the schools of surgery, and comprehending every operation, by which parts, which had been divided, were reunited.

SYNTHETISMUS. (from *συνθεω*, to concur.) The reduction of a fracture.

SYNULOTICA. (from *συνελοω*, to cicatrise.) Medicines or applications which promote the cicatrization of wounds.

SYPHILIS. (is fabulously said to be derived from the name of a shepherd, who fed the flocks of King Alcinous, and who from pride insulted the Sun, whence the disease was sent on earth as a punishment.) *Lues Venerea.* The venereal

disease; others write *Siphilis*, and derive the term from *σιφλος*, filthy. (See *Venereal Disease*.)

SYRINGOTOMUM. (from *συριγξ*, a fistula, and *τεμνω*, to cut. A kind of concealed knife, for dividing fistulæ, and sinuses. Figures of it may be seen in Scultetus, and Fabricius ab Aquapendente. It was constructed in various ways; but, as it is not at present employed by surgeons, it would be a waste of time to introduce a description of its different forms.

SYSTOLE. (from *συστellaω*, to contract.) The contractile motion of the heart and arteries.

T.

T BANDAGE. A Bandage so named from its figure. It is principally used for supporting the dressings after the operation for the fistula in ano, in diseases of the perinæum, and those of the groins, anus, &c. It is composed of two longitudinal pieces of cloth, of greater or lesser breadth, according as occasion requires. The transverse piece of cloth serves to go round the body above the hips; the perpendicular piece is sewed, at one of its ends, to the middle of the latter; and, in general, its other extremity is slit into two portions, or tails, about six or eight inches long. The perpendicular piece of the T bandage applies itself between the glutæi muscles, and to the perinæum; while its two ends, just described, are to be carried between the thighs, and the pudenda, to the right and left, and fastened to the transverse piece, surrounding the body. Besides the common T bandage, there is another one named *double*, which has two perpendicular pieces, sewed to the transverse one, about four inches apart. The double T bandage is said to be more particularly applicable after lithotomy, and for the diseases of the perinæum; because, one may make the two perpendicular pieces cross each other on the part affected, and leave the anus uncovered: an advantage, which the simple T bandage certainly has not. The T bandage may be used in some other ways, as we have noticed, in making mention of it in the article *Bandage*.

TABES. (from *tabeo*, to consume.) A

wasting of the body, attended with extreme debility and hectic fever.

TALPA. (a mole.) A tumour, which creeps under the skin, as a mole under the surface of the ground. Such is the etymology. It is often applied to an encysted tumour, which forms on the head, and contains a paplike matter. (See *Atheroma* and *Tumours, Encysted*.)

TALPARIA. The same.

TAPPING. See *Paracentesis*.

TARAXIS. (from *ταρασσω*, to disturb.) A slight ophthalmy, or inflammation of the eye.

TAXIS. (from *τασσω*, to put in order.) The operation of reducing a hernia with the hand. (See *Hernia*.)

TELEPHIUM. In surgery means a malignant, dangerous ulcer, difficult of cure. The word is derived from Telephus, who received a mortal wound from Achilles, which injury, it is said, became, before death, a disease of the above description.

TENDO ACHILLIS. See *Achilles, Tendon of*.

TENESMUS. (from *τεινω*, to stretch.) A painful, ineffectual, and repeated effort to go to stool.

TENT. A roll of lint for dilating openings, sinuses, &c. (See *Spongia Præparata*.)

TEREBELLA. (dim. of *terebræ*, a perforating instrument.) A trepan, or instrument for sawing out circular portions of the skull. A trephine.

TEREBRA. (from *τερεω*, to bore.) A

trepan, or trephine. Also an instrument called a perforator, such as is contained, in the generality of cases of trephining instruments, and is used for making a hole, in which the centre pin of the trephine is to work.

TERETRUM. The same.

TERMINTHUS. (from *τερμινθος*, a pine-nut.) A large tumour, or painful pustule on the skin, resembling a pine-nut.

TESTICLE, DISEASES OF. For an account of many of these affections, I must refer the reader to distinct articles in this Dictionary; for instance, *Cirsocele*, *Hernia Humoralis*, *Hæmatocele*, *Hydrocele*, &c. I shall next insert Mr. Pott's account of *Sarcocele*; but, before I do so, it seems proper to observe, that, when this author uses the epithet *scirrhus*, he frequently seems to attach no other signification to it, than *indurated*. Indeed, any one, in the least acquainted with the subject, would readily discern, that Mr. Pott could not always mean the *malignant* tumour, or hardness, which is often named the occult cancer.

SARCOCELE.

"This (says Pott,) is a disease of the body of the testicle; and, as the term implies, consists, in general, in such an alteration, made in the structure of it, as produces a resemblance to a hard fleshy substance, instead of that fine, soft, vascular texture, of which it is, in a natural and healthy state, composed.

"The ancient writers have made a great number of distinctions of the different kinds of this disease, according to its different appearances, and according to the mildness or malignity of the symptoms, with which it may chance to be attended. Thus, the *sarcocele*, the *hydro-sarcocele*, the *scirrhus*, the *cancer*, the *caro adnata ad testem*, and the *caro adnata ad vasa*, which are really little more than descriptions of different states and circumstances of the same disease, are reckoned as so many different complaints, requiring a variety of treatment, and deriving their origin from a variety of different humours.

"Every species of *sarcocele* consists primarily in an enlargement, induration and obstruction of the vascular part of the testicle; but, this alteration is, in different people, attended with such a variety of circumstances, as to produce several different appearances; and to occasion the many distinctions which have been made.

"If the body of the testicle, though, enlarged and indurated to some degree, be perfectly equal in its surface, void of

pain, has no appearance of fluid in its tunica vaginalis, and produces very little uneasiness, except what is occasioned by its mere weight, it is usually called a *simple sarcocele* or an *indolent scirrhus*. If, at the same time that the testis is enlarged and hardened, there be a palpable accumulation of fluid in the vaginal coat, the disease has by many been named a *hydro-sarcocele*. If the lower part of the spermatic vessels and the epididymis were enlarged, hard, and knotty, they supposed it to be a fungous or morbid accretion, and called it the *caro adnata ad vasa*: if the testicle itself was unequal in its surface, but at the same time not painful, they distinguished it by the title of *caro adnata ad testem*: if it was tolerably equal, not very painful, nor frequently so, but at the same time hard, and large, they gave it the appellation of an *occult* or *benign cancer*: if it was ulcerated, subject to frequent acute pain, to hemorrhage, &c. it was known by that of a *malignant* or *confirmed cancer*. These different appearances, though distinguished by different titles, are really no more than so many stages (as it were) of the same kind of disease: and depend a great deal on several accidental circumstances; such as age, habit, manner of living, &c. It is true, that many people pass several years with this disease, under its most favourable appearances, and without encountering any of its worst: but on the other hand, there are many, who, in a very short space of time, run through all its stages. They who are most conversant with it, know how very convertible its mildest symptoms are into its most dreadful ones; and how very short a space of time often intervenes between the one and the other.

"There is hardly any disease, affecting the human body, which is subject to more variety than this is, both with regard to its first manner of appearance, and the changes which it may undergo.

"Sometimes the first appearance is a mere simple enlargement and induration of the body of the testicle; void of pain, without inequality of surface, and producing no uneasiness, nor inconvenience, except what is occasioned by its mere weight. And some few people are so fortunate, as to have it remain in this state for a very considerable length of time, without visible or material alteration. On the other hand, it sometimes happens, that, very soon after its appearance in this mild manner, it suddenly becomes unequal, and knotty, and is attended with very acute pains, darting up to the loins and back; but still remaining entire, that is, not bursting through the integuments. Sometimes the fury of the disease brooks

no restraint; but making its way through all the membranes which envelope the testicle, it either produces a large, foul, stinking, phagedenic ulcer with hard edges; or it thrusts forth a painful gleet-ing fungus, subject to frequent hemorrhage.

" Sometimes (as I have already observed) an accumulation of water is made in the tunica vaginalis, producing that mixed appearance, called the hydro-sarcocele.

" Sometimes there is no fluid at all in the cavity of the tunica vaginalis; but the body of the testicle itself is formed into cells, containing either a turbid kind of water, a bloody sanies, or a purulent, fetid matter.

" Sometimes the disorder seems to be merely local, that is, confined to the testicle, not proceeding from a tainted habit, nor accompanied with diseased viscera; the patient having all the general appearances and circumstances of health, and deriving his local mischief from an external injury. At other times, a pallid, leaden countenance, indigestion, frequent nausea, colic pain, sudden purgings, &c. sufficiently indicate a vitiated habit, and diseased viscera; which diseased viscera may also sometimes be discovered and felt.

" The progress also which it makes from the testis upward, toward the process, is very uncertain; the disease occupying the testicle only, without affecting the spermatic process, in some subjects, for a great length of time; while in others, it totally spoils the testicle very soon; and almost as soon seizes on the spermatic cord.*

" These, and some other circumstances to be mentioned hereafter, are materially necessary to be observed; as they characterise the disease, point out its particular nature and disposition, and serve as marks whereon to found our judgment and prognostic of the most probable event,

* This is the common language, and therefore I use it; but I would not be understood to mean, that the progress of the disease is always and invariably upward, from the testis into the process. I have seen the spermatic process truly cancerous, when the testicle has been free from disease; and am well satisfied from experience, that a diseased state of the vessels within the abdomen, or of the parts in connexion with those vessels, may produce a morbid state of the process, proceeding downwards from thence: but the other is by much the most frequent.—(Pott.)

as well as the most proper method of treatment. Various have been the causes, to which the theoretic and whimsical people have assigned this disease; but as a recital of conjectures can convey no instruction, or useful information, I shall pass them over; and only take notice, that among the great number which have been mentioned, there are two which, though equally groundless with the rest, have yet obtained a degree of credit, that may mislead; these two are the hernia humoralis, and the hydrocele of the vaginal tunic.

" The hernia humoralis (continues Pott) is a defluxion of the inflammatory kind, proceeding most frequently from an irritation in that part of the urethra, where the vasa deferentia, or vesiculae seminales terminate.* It is attended with pain and heat, and most frequently fever: during the first, or inflamed state of the disease, the whole compages of the testicle is enlarged; but when by rest, evacuation, and proper applications, that inflammation is calmed, there seldom or never remains, either fulness, hardness, or any other mark of disease in the glandular part of the testis. The epididymis indeed seldom escapes so well; that often continues enlarged and indurated for a considerable space of time, but without producing either pain or inconvenience; and without occasioning any alteration in the figure or structure of what is called the body of the testicle; whereas the true sarcocele, or hernia carnosae, most commonly† begins by an indolent induration of that part of the testis, and affects the epididymis secondarily; or after it has already spoiled the vascular part of the gland.

" I would not be understood to mean, (says Pott) that a sarcocele never follows a hernia humoralis; there is no reason in nature why it should not; a hernia humoralis does not, nor can prevent the testicle, in any future time, from becoming scirrhus: I only say, that it does not, at any time, necessarily cause or produce it. So also with regard to the epididymis, I do not mean to say, that it never is the primary and original seat of a scirrhus: I know that it is, and shall produce some instances of it; neither do I intend to say that a scirrhus never attacks an epididymis, which has been previously hardened by a hernia humoralis; there can be no reason why it should not: I only mean to signify, that it is my opi-

* This may be doubted.—S. C.

† I say most commonly, because it is neither necessarily, nor always.

nion, that the induration caused by a venereal hernia humoralis does not, at any time, necessarily produce a scirrhus. A scirrhus indeed may fall on that part, after it has been so diseased; but it would as certainly have attacked it, if there had been no preceding affection of it.

"There is also a venereal affection of the testicle, independent of a gonorrhœa, or of any disease of the urethra.

"This is seldom an early symptom; and I do not remember (observes Pott) ever to have seen an instance, in which it was not either immediately preceded, or accompanied, by some other appearance, plainly venereal. It has neither the inequality, nor darting pains of the scirrhus, and always gives way to a mercurial process properly conducted.

"A quantity of water is frequently collected in the vaginal coat of a truly scirrhus testis. This has given rise to the supposition, that the testicle often becomes diseased, from its being surrounded by, or swimming in the same fluid: a supposition entirely groundless.

"That scirrhus and cancerous testes very frequently are found to have a quantity of fluid accumulated in the tunica vaginalis of them, is beyond all doubt; but that such testicles become diseased, in consequence of being surrounded by such fluid, or, in other words, that a simple hydrocele may produce a scirrhus testicle, is by no means true.

"The simple hydrocele is a collection of water in the tunica vaginalis: this fluid, in a natural and healthy state of the parts, is small in quantity, and, by being constantly absorbed, does not distend the cavity of the tunic, but only serves to keep that membrane from contracting any unnatural cohesion with the tunica albuginea. The regular absorption of this fluid being by some means prevented, the quantity soon becomes considerable, and distending its containing bag, constitutes the disease called a hydrocele; but makes no morbid alteration in the structure of the testicle.* (See *Hydrocele*.)

"When the testicle becomes enlarged in size, hardened in texture, craggy and unequal in its surface, painful upon or after having been handled, attended with irregular pains shooting up the groin to-

ward the back, and this without any previous inflammation, disease, or injury from external violence, it is said to be affected with a scirrhus. This, as I have already remarked, is of different kinds and degrees, and appears under different forms; but, although the appearances, which the disease makes, are various, according to the alteration produced by it in the testicle; yet, every such morbid alteration may obstruct or prevent the regular absorption of the fluid deposited in the vaginal tunic, and occasion a species of hydrocele; that is, a tumour from water.

"This is that kind of disease, which by Fabricius ab Aquapendente, is called hydro-sarcocele; but which is so very unlike to a simple hydrocele, that whoever mistakes the one for the other, will commit an error, which may prove very mischievous to his patient, and very detrimental to himself.

"In the true, simple hydrocele, the testis, though somewhat loosened in its texture, and a little enlarged, yet preserves very nearly its natural form; the collection is made without pain or uneasiness, and very soon becomes sufficient to hide, or conceal, the testicle; nor is the examination of such tumour attended with any pain: but the increased size, and hardened state, of the scirrhus testis, renders it discoverable, through a much larger quantity of fluid than will totally conceal the former. When felt, it will be found to be hard, and generally somewhat unequal, and not unfrequently attended with irregular shooting pains, especially after having been examined.

"In the simple hydrocele, the fluid distends the tunica vaginalis so equally, that, although it does not surround the testicle, (nor indeed can) yet it seems so to do: whereas in the hydro-sarcocele, though the anterior part of the tumour may, in some measure, bear the appearance of a simple hydrocele; yet, an examination of its posterior part will always discover the true nature of the case: to which may be added, that, under the same apparent magnitude, the latter will always be found to be considerably heavier than the former.

"In short, the name of this species of disease (hydro-sarcocele) is undoubtedly a very proper one, and capable of conveying a very just idea of its true nature, viz. an accumulation or collection of water in the vaginal coat of a scirrhus or diseased testicle; but the majority of writers have, by supposing the water to be the cause, instead of the consequence of the diseased state of the testis, committed a very material blunder, and

* That is, no such alteration as renders it painful, or incapable of executing its office; and consequently, no such alteration as can ever require extirpation or any other chirurgical operation on the testicle itself.

endeavoured to establish and authorise a very prejudicial and destructive method of practice. For, by conceiving, that the noxious quality of the fluid produces a fungous or fleshy excrescence on the surface of the testicle, they have supposed, that, after having discharged the said fluid from its containing bag, they could, either by establishing a suppuration, or by using escharotic medicines, waste or destroy the said excrescence, and obtain a radical cure of the whole disease. Now the scirrhus of the testicle being the original disease, and the extravasation a mere accident, such treatment can never do any material good, and may often be the cause of very essential evil.

"Fabricius ab Aquapendente has given a particular description of this method, which he recommends from having practised it with success: his words are; *"Modus singularis est quando hernia aquosa cum carnosâ mista est; tunc enim primum incide, et fac foramen in parte scroti quæ non sit declivis, neque in fundo scroti, sed circa medium; nec fac admodum latum: et extractâ aquâ, turundam impone quàm longissimam, medicamento, pus moventi infectam, ut resina terebinthinæ, cum thure, ovi vitello, et butyro; empiastrum emolliens, et pus movens applica, ut diachylon cum gummi, et axungrâ porci: genitum autem pus, non evacuetur per foramen, sed datâ operâ intus servetur, ut contactu suo, carnem sensim putrefaciat. Neque innovanda medicamenta, nisi tota caro fuerit in pus conversâ; id quod longo fit tempore."*

"Now, to pass over the absurdity of the doctrine of removing or dissolving a fungous excrescence, by means of the putrefying quality of matter: as well as the great disturbance, which must be the consequence of confining it within the tunica vaginalis; it is very clear from these, and from every other circumstance attending the disease in question, that the cases, which Fabricius had successfully made his experiment upon, must have been mere simple hydroceles, attended with a small degree of enlargement; but without any diseased state of the testicle.

"This is one method of procuring a radical cure of the said disease; a me-

thod in use, before Fabricius practised it; and still in some measure employed: a method, which, in some instances, has always been successful; and which may, in general, be tried on any simple hydrocele, in a young and healthy subject. The cure (when it affects one) is not brought about by the destruction of an excrescence from the testicle, or the dissolution of its supposed induration; but merely by exciting such an inflammation, as shall occasion an adhesion of the tunica vaginalis to the tunica albuginea; by which means the cavity of the former is obliterated; the testicle remaining, as to size and consistence, just as it was before such operation was performed. But this, though practicable, and sometimes successful in the hydrocele, is not to be thought of in the diseased or scirrhus testicle. The operation, as described by Aquapendente, consists of two points; first to let out the water, and then to cause a plentiful suppuration. When the testicle is really and primarily diseased, and the extravasation is a consequence of such disease, the discharge of the water from the cavity of the tunica vaginalis, whether by puncture, or by incision, can contribute nothing material toward a cure of the principal complaint, and is therefore useless; but it may, in many cases, do harm, by creating a disturbance in parts, whose state requires the most perfect quietude; and is therefore wrong. When the disease is a mere simple-hydrocele, the palliative cure, as it is called, by puncture, is right and necessary; it renders the life of the patient easy; rids him, every now and then, of a very troublesome burden; is perfectly safe; may be performed and repeated occasionally, at any time of the patient's life, or in almost any state of the disease: but the introduction of tents or setons, or the endeavour by any means to excite inflammation, or to establish suppuration within the tunica vaginalis, requires (even in the simple hydrocele, where the testicle is unaffected) some little consideration, and ought not to be hastily or unadvisedly put in practice.

"In some ages, habits, &c. the symptoms will rise very high, and occasion both trouble and hazard; and if this be the case, when the testis is not at all diseased, and when there is no malignity, either in the local complaint, or in the habit of the patient; what have we not to fear where there is both? where the parts are already spoiled by disease, and where irritation and inflammation may (and do) excite the most fatiguing symptoms, and the most direful consequences?

"Beside the hydro-sarcocele, or limpid

* "Si carnosâ, et aquosa sit hernia, ego talem adhibeo curam: Seco cutem, et incisionem facio exiguam, et in loco, potius altiore, quam in fundo: inde turunda imposita cum digestivo et pus movente medicamento diutius procedo, neque unquam pus extraho, sed perpetuò bonam partem intus relinquo; quod sensim carnem corrodit, et ita sanat."

extravasation of fluid in the cavity of the vaginal coat (and which must therefore always be external to the testicle) scirrhus and cancerous testes are liable to collections of fluid, within the substance of them, under the tunica albuginea. These are sometimes large, and in one cavity; sometimes small, and in several distinct ones. They are also very different in nature, in different cases; sometimes serous, sometimes sanious; sometimes purulent, sometimes bloody. These are very apt to impose on the inadvertent and injudicious; (especially if they be attended with some degree of inflammation in the skin;) and to induce an opinion of an abscess, or imposthumation, which may be relieved or cured by an opening;—but *caveat operator*. These collections will be found to bear a much smaller proportion to the general size of the tumour, than they who are not conversant with them are inclined to apprehend; the subsidence, after the opening has been made, will also be much smaller than was expected; and instead of relief and ease, all the symptoms of pain, swelling, inflammation, &c. will be increased and aggravated; and if the opening be considerable, it not unfrequently happens, that an ill-natured fungus is thrust forth; which, by bleeding, gleet-ing, and being horribly painful, disappoints the surgeon, and renders the state of the patient much more deplorable than it was before: neither is this sensation, which is thought, like the fluctuation of a fluid within the testicle, to be at all times depended upon as implying that there is any fluid at all there. The touch, in this case, is subject to great deception; and I have seen a loosened texture of the whole vascular structure, or body of the testicle, produce a sensation so like to the fluctuation of a fluid lying deep, as has imposed on persons of good judgment, and great caution.

“Many of the most esteemed writers on this part of surgery, either not being practitioners, or being afraid to differ from those who have written before them, have lazily and servilely copied each other, and have thereby fallen into an obscure jargon concerning this disease, which neither themselves nor their readers have understood. They have talked of the scirrhus testicle, the *caro adnata ad testem*, and the *caro adnata ad spermatica vasa*, as so many different diseases, requiring different methods of treatment.

“The melancholia, the atra bilis, and a certain inexplicable adust state of humours, are said to be the causes of these different appearances; and the fleshy substance arising from, or adhering to,

the spermatic vessels, is said to be more benign, than either the fungus arising from the testicle, or the true scirrhus. For the first, they have described an operation, which is coarse, cruel, painful, and (notwithstanding all that they have said about it) unsuccessful; all which they must have known, if they had practised it. I therefore am much inclined to believe, that this is one of the many parts of ancient surgery, which having been devised by some one bold, hardy operator, and by him described as practicable, has been related by many of his successors, as practised. The second, the *caro adnata ad testem*, they allow to be attended with more difficulty, as well as hazard, and seldom to be attended with success.

“They, who are under the necessity of forming their opinions principally from books, and who have not frequent opportunities of knowing from experience how very little they are (in many cases) to be depended upon, may be inclined to think that all these distinctions really exist; and that these operations by fire and sword, by knives and cauteries, so exactly described, must be sometimes necessary; but having never seen the particular cases requiring such treatment, have a very imperfect idea, either of them, or of the operations; and are, to the last degree, alarmed and intimidated, when any thing, which they think is like to it, occurs to them in practice. To such, it may not be amiss to explain this matter in as few words as I can; begging pardon of the more intelligent reader for the digression.

“In the short anatomical account which I have given of these parts, I have taken no notice, that the spermatic vessels terminate in the testicle: and that, after the semen has been secreted from the blood, it passes from that gland into a body, which seems superadded to, although it be really continuous with it. This body is, therefore, called the epididymis, and is so placed, with regard to the testis, that a heedless or uninformed observer, may suppose, that the spermatic vessels terminate in it: especially if it be enlarged by disease. It takes its rise from the testicle, by a number of vessels, called, from their office, *vasa efferentia*: these soon become one tube, which, being convoluted and contorted in a most wonderful manner, forms the greater part of the said body: and at last, ceasing to be so convoluted, it ends in one firm canal, called the *vas deferens*; by which, the secreted semen is conveyed from the testicle to the *vesiculæ seminales*.

“Whoever will attentively consider the epididymis in its natural position, with

regard to the testicle, and the spermatic vessels, will see, that if it be enlarged beyond its proper size, it will extend itself upward, in such a manner as to seem to be closely connected with them, and to bear the resemblance of a diseased body, springing from them.

"This is the case called the *caro adnata ad vasa spermatica*; and is really and truly nothing more, than an enlargement of the epididymis; a circumstance which occurs not unfrequently, but does not imply any malignity, either in the part, or in the patient's habit; and can never require such a horrid operation as our forefathers have directed us to perform upon it; nor indeed any at all.

"The epididymis is frequently enlarged, in venereal cases, either separately, as in the remains of a *hernia humoralis*, or together with the testicle, in that affection of it, which I have called the venereal *sarcocele*; and sometimes from mere relaxation of its natural texture, without any disease at all. But in none of these can it require, or even admit any manual operation of any kind. Indeed, whoever will consider the epididymis as it really is, as the medium by and through which the semen is conveyed from the testicle to the *vas deferens*, must immediately be sensible of the glaring absurdity of removing any part of it.

"The *scirrhus* and cancer do not very often begin in this part; they most frequently make the first attack on the body of the testis: and, though the epididymis is often cancerous, yet it most frequently becomes so secondarily, or after the testicle is spoiled; so that the removal of it, if practicable, could serve no good purpose; it would not remove the disease; for that has, before-hand, most commonly taken possession of the testicle; and the cutting off any part of a scirrhus or cancerous tumour of any kind, is what no man, who has the least knowledge of what he is about, will ever think of.

"In short, these two cases, which by the inattention and misrepresentation of our ancestors, have created such perplexity in the minds of their readers, are either a simple enlargement of the epididymis, without any morbid alteration in its structure; or a diseased (that is, a scirrhus) state of the same part; or else, a scirrhus or cancerous testicle, with inequality of surface. The first of these requires no manual operation of any kind; and the two last will admit of none: the first is no disease at all; and the two last are such diseases, that every attempt made on them by knife, or caustic (unless for total extirpation, must render them worse, and more intractable.

"The manner of treating a *sarcocele*, or *hernia carnosae*, depends entirely on the particular nature and state of each individual case. In some, it will admit of palliation only; in others, the disease may be eradicated by the extirpation of the part: so that, under the article of method of cure, we have only to consider, and point out, as clearly as the nature of the disease will permit, what states and circumstances, both of it, and of the patient labouring under it, forbid the operation, and what render it advisable.

"On this head, a great variety of opinions will be found among writers; so great, that a man, who is under a necessity of forming his judgment from them will find himself under some difficulty how to act; and so great, that I cannot help thinking it to be clear, that the majority have not written from practice, but from mere conjecture, or from the works of those, who have gone before them.

"Some have given it as their opinion that while the testicle is perfectly indolent, (let the alteration in its structure, form, or consistence, be what it may,) it is better to suffer it to remain, than to remove it. In support of this opinion, they say, that although the disease has plainly taken possession of the part, yet, while it causes no pain, the constitution receives no damage from it; nor is the health of the patient impaired by it; whereas, by removing the testicle, the same virus may seize on some part of more consequence to life. This method of reasoning takes for granted two things, which do not appear to be strictly or constantly true, viz. that this disease is never perfectly local; and that a scirrhus testicle, though free from pain, will not in time produce any evil to the general habit of the patient. Others advise us to stay until the tumour becomes painful, and manifestly increases in size, or acquires a sensible inequality of surface; that is (in other words) until it begins to alter from a quiet state, to a malignant one; which advice, as well as the preceding, supposes, that the hazard of the mere operation of castration is too great to render it an advisable thing, until the patient is pressed by bad symptoms; and that a scirrhus testicle, which has been quiet and free from pain for some time, may be as successfully extirpated after it has become painful, and has acquired a malignant and threatening state, as at any time before such alteration. The latter of these will hardly be admitted (I believe) by those who form their opinions from experience: and with regard to the former, I can, with great truth, affirm, that I never saw the mere operation of castration, when performed

in time, and on a proper subject, prove fatal.

"Many people have I known, who have lived several years, their whole lives perfectly free from disease, after the removal of quiet, indolent, scirrhus testicles; and several have I known, who, having deferred the operation until they were urged by pain, increase of size, and inequality of the tumour, have, from the sore becoming cancerous, not been able to obtain a cure. That I have seen the same thing happen, after the removal of a testicle, circumstanced in the best manner, is beyond all doubt; but not near so frequently, as in those cases, in which the operation has been deferred, until the symptoms became alarming, and the disease had changed its appearance, from a benign quiet one, to one that was malignant and painful. Indeed, were we capable

knowing with certainty which those scirrhi were, that would remain quiet and inoffensive through life, or for a great length of time, and which would not, we should then be enabled to advise or dissuade the operation upon much better (that is, much surer) grounds, than at present we are able to do. We have no such degree of knowledge; all our judgment is formed upon the mere recollection of what has happened to others in nearly similar circumstances; and experience, though the best general guide, is, in these cases, more fallacious than in many others.

"A few people there certainly have been, who have been so fortunate as to carry a scirrhus testicle through many years, with little or no pain or trouble: but the number of those, in whom time (and that frequently a short space,) change of constitution, external accidental injury, &c. do not make such an alteration in this disease, as to render the operation less likely to be successful, than it would have been at first, and under more favourable circumstances, is so small, that I think early castration (that is, as soon as the disease is fairly formed and characterized) may be recommended and practised by every honest and judicious surgeon.

"Indeed, the circumstances of frequent pain, and manifest tendency to an increase of size, are by some people looked on as such marks of a malignant disposition, that they have been by them reckoned as dissuasives from the operation.

"But these gentlemen carry their fears and apprehensions much too far the other way. Pain and a quick increase of size are certainly no favourable symptoms; they shew a disposition to mischief; but, they are not such positive

proofs of a cancerous habit, as to render all hope of a cure, from the removal of the diseased part, vain: there are many instances to the contrary: and though no honest or judicious man will venture to promise success, even in the most favourable of these cases, yet it is well known, that they which have had very unpromising appearances, not only from the state of the testicle, but from that of the spermatic chord, have succeeded often enough, to make the chance of a cure, by the operation, by no means a desperate one. The state of a man left to his fate in these circumstances, that is, to the fury and progress of the disease, is so truly miserable, that nothing should be left unattempted, which carries with it any probability of being serviceable: and a practitioner is vindicable, in pressing what he has known to be successful; though, at the same time, he ought to make a guarded kind of prognostic.

"Upon the whole, I think it may justly be said, that the man who has the misfortune to be afflicted with a truly scirrhus testicle, has very little chance (notwithstanding all that has been said and written about specifics) to get rid of it by any means, but by extirpation: and all the time the operation is deferred, he carries about him a part not only useless and burthensome, but which is every day liable, from many circumstances (both external and internal) to become worse, and more unfit for such operation.

"While the testicle is small, and free from acute or frequent pain, the vessels from which it is dependent, are most frequently soft, and free from disease; whereas, when the testis has been suffered to attain a considerable size, the case is frequently otherwise; the spermatic vessels are often large and varicose; and the cellular membrane investing them sometimes becomes thick, and contracts such connexions and adhesions, which, though they may not amount to an absolute prohibition of the operation, do yet render it tedious, troublesome, and more hazardous than it would be in other circumstances. Every addition to the original complaint in the body of the gland is against the patient; and if any of these are the consequence of not having removed it in time, it will follow, that the sooner it is removed, the better. If we wait for what some call indications of the necessity of operating, we shall often stay until it will do no good. Many a one have I seen lose a very probable chance of a cure by delay: but I do not remember ever to have seen a testicle removed, by a man of judgment, which testicle did not, upon examination, fully vindicate

the extirpation. If we were possessed of any medicines, either external or internal, which had been known now and then to have dissolved scirrhi, it would always be right to recommend the trial of them previous to an operation; and it would always be right to defer operating until such trial had been made. But the truth is, we know no such medicine. The credulous on the one hand, and the designing on the other, have told us many strange stories of cures effected by such applications and remedies; and I do most sincerely wish, that what each of them have said was true: but repeated, faithful experience has proved, that it is not; and that they who have placed their confidence in them, or laid out their money on them, have been disappointed and cheated.

"Some circumstances there are now and then attending this disease, which are out of our sight and out of our knowledge, and which will render all our pains abortive: such are tubercles, indurations, and other diseased appearances, in the cellular membrane enveloping the spermatic vessels within the abdomen; scirrhus viscera, &c. If any of these can be known, they constitute a good reason for not attempting the cure by the operation; but the mere possibility that such may exist, is certainly no reason for abstaining from it: the apparent evil, that is, the diseased testis, is certain; the other may or may not be the case: the one, if left to itself, is most likely to destroy the patient in a most miserable and tedious manner; and the other, the suspected mischief, may possibly not exist.

"But though the timely and proper removal of a scirrhus or cancerous testicle does frequently secure to the patient life, health, and ease, which, in such circumstances, are not attainable by any other means; yet it must be remarked, that the improper and untimely performance of the operation is not only not attended with such happy and salutary event, but generally brings on high symptoms; and quick destruction. It therefore behoves every practitioner to be perfectly well acquainted, not only with such circumstances as render castration practicable and advisable, but with those which prohibit such attempt.

"These are of two kinds, and relate either to the general habit of the patient, and the disorders and indispositions of some of the viscera, or to the state of the testicle, and spermatic chord.

"A pale, sallow complexion, in those who used to look otherwise; a wan countenance, and loss of appetite and flesh, without any acute disorder; a fever of the hectic kind; and frequent pain in the

back and bowels, are, in those who are afflicted with a scirrhus testicle, such circumstances as would induce a suspicion of some latent mischief, and incline one to suppose that the same kind of virus, which had apparently spoiled the testis, may also have exerted its malign influence on some of the viscera; in which case, success from the mere removal of the testicle is not to be expected. They, whose constitutions are spoiled by debauchery and intemperance, previous to their being attacked with this disease; who have hard livers, and anasarcaous limbs, are not proper subjects for such an operation. Hard tumours within the abdomen in the regions of the liver, spleen, kidneys, or mesentery, implying a diseased state of the said viscera, are very material objections to the removal of the local evil in the scrotum. In short, whenever there are manifest appearances, or symptoms of a truly diseased state of any of the principal viscera, the success of the operation becomes very doubtful; more especially, if such symptoms and appearances, upon being properly treated, resist in such manner, as to make it most probable, that a cancerous virus is the real cause of them. When none of these require our attention, the object of consideration is the testicle and its spermatic vessels. The state of the mere testis can hardly ever be any objection to the operation; the sole consideration is the spermatic chord: if this be in a natural state, and free from disease, the operation not only may, but ought to be performed, let the condition of the testicle be what it may; if the spermatic chord be really diseased, the operation ought not to be attempted. For although, on the one hand, a probability of success will vindicate an attempt, even though it should fail; yet, on the other, where there is no such probability, an operation, though performed in the most dexterous manner, will prove only a more ingenious method of tormenting.

"This, therefore, (the state of the spermatic chord) is a matter, which may require our most serious consideration since, on this it is (when the disease appears to be local) that we must found our judgment; and by this must form our resolution, either to leave a man to the truly miserable fate of being slowly, though certainly, destroyed, by a cruelly painful, and frequently very offensive disease; or endeavour to save, and preserve him in health and ease, by means, which have so often proved successful, as truly to deserve the appellation of *probable*.

"All writers on this subject, agree in saying, that if the spermatic process has

partaken of the diseased state of the testicle, that is, has become enlarged and hardened, and such enlargement and induration extends itself quite up to the abdominal muscle, that the operation of castration ought not to be performed, because it will not only prove successful, but will hasten the death of the patient. And this is, in some degree, most certainly true; but not without some limitation. A truly and absolutely diseased state of the spermatic chord, in any part of it, is certainly a very material objection to the operation, as it most commonly proves a bar to the success of it: and a morbid state of the same chord quite as high as the abdominal muscle, that is, of all that part of it, which is external to the cavity of the belly, is a just and full prohibition against such attempt. But, on the other hand, it must be observed, that every apparently morbid alteration of the spermatic chord is not really such; and, therefore, that every enlargement, induration, fulness, &c. which seems to alter the spermatic vessels from that state, which is called a healthy and natural one, is not to be regarded as a disease; at least, not as such a disease as is sufficient to prohibit the attempt to obtain a cure by extirpation.

"The difference between these, it is the duty of every practitioner to become perfectly acquainted with, as it is from a consideration of these, that he ought to determine, whether he may, with that firmness and assurance, which the probable expectation of success will give him, propose and advise castration; or find himself obliged in conscience to dissuade, or refuse, the performance of it.

"When the spermatic vessels are not only turgid and full, but firm and hard; when the membrane, which invests and connects them, has lost its natural softness and cellular texture, and has contracted such a state, and such adhesions, as not only greatly to exceed its natural size, but to become unequal, knotty, and painful, upon being handled, and this state has possessed all that part of the chord, which is between the opening in the oblique muscle and the testicle, no prudent, judicious, or humane man, will attempt the operation; because he will, most certainly, not only do no good to his patient, but will bring on such symptoms as will most rapidly, as well as painfully, destroy him. Of this, there are so many proofs, that the truth of it is incontestible.

"In some modern French books, we have indeed, miraculous accounts of operations of this kind, performed by divid-

ing the tendon of the oblique muscle, by tracing the diseased spermatic vessels within the cavity of the belly, and there making the ligature and excision: but these are operations, which make a figure in books only, and are performed only by visionary writers; or, if ever they have been practised, serve to shew the rashness and insensibility of the operators, much more than their judgment, or humanity. Whoever (notwithstanding these tales) performs the operation in the circumstances above-mentioned, will prove himself much more hardy than judicious; and will destroy his patient, without having the satisfaction of thinking that his attempt, though successful, was yet vindicable;—the only circumstance which can, in such events, give comfort to a man who thinks rightly.

"On the other hand, as I have already said, every enlargement of the spermatic chord is not of this kind, nor by any means sufficient to prohibit or prevent the operation.

"These alterations, or enlargements, arise from two causes, viz. a varicose dilatation of the spermatic vein, and a collection, or collections, of fluid in the membrane investing and enveloping the said vessels. In the first place, as there is no reason in nature why a testicle, whose vessels have previously (for some time perhaps) been in a varicose state, should not become scirrhus; so it is also clear, that the scirrhusity seizing such testicle will by no means remove, or even lessen such varicose dilatation of the vessels from which it is dependent; on the contrary, will, most probably, and indeed does most frequently, increase such distention: but such mere varicose enlargement of the vessels, whether it be previous or consequential to the morbid state of the testis, does not, nor ought to prevent the removal of it, if otherwise fit and right. It is, indeed, an objection to the doctrine of Mr. Le Dran, and a few other writers, who make no ligature on the chord, and trust to a slight contusion of it between the finger and thumb for a suppression of the hemorrhage; but is none to the rest of the operation, as I can, from experience, testify.

"In the next place, the diseased state of a truly scirrhus testicle, its weight, and the alteration that must be made in the due and proper circulation of the blood, through both it and the vessels from which it is dependent, may and do concur in inducing a varicose dilatation of the spermatic vein, without producing that knotty, morbid alteration and hardness, which forbid our attempts. Be-

tween these, a judicious and experienced examiner will generally be able to distinguish.

"In the former (the truly diseased state,) the chord is not only enlarged, but feels unequally hard and knotty; the parts of which it is composed are undistinguishably blended together; it is either immediately painful to the touch, or becomes so, soon after being examined; the patient complains of frequent pains shooting up through his groin into his back; and from the diseased state of the membrane composing the tunica communis, such adhesions and connexions are sometimes contracted, as either fix the process in the groin, or render it difficult to get the finger and thumb quite round it.

"In the other (the mere varicose distention,) the vessels, though considerably enlarged and dilated, are nevertheless smooth, soft, and compressible; the whole process is loose and free, and will easily permit the fingers of an examiner to go quite round it, and to distinguish the parts of which it is composed; it is not painful to the touch; nor does the examination of it produce, or occasion, those darting pains, which almost always attend handling a process malignantly indurated.

"I do not say that the distinction between these two states is always and invariably to be made; but that it often may, I know from repeated experience: and that the operation may safely be attempted, and successfully be performed, I know from the same experience. The state of a man, left to the mercy of a malignant scirrhus, is so truly deplorable, that we cannot be too attentive in examining the precise nature of each individual case, and in embracing every opportunity of giving him that relief, which it may at one time be in our power to give, and which, the lucky opportunity missed, it may never be in his power again to receive.

"The other circumstance, which I have mentioned as capable of deceiving an operator, and inducing him to believe, that the spermatic chord is much more diseased than it really is, and thereby deterring him from the performance of an operation, which might prove successful, is the extravasation, or collection of fluid in the cellular membrane enveloping the spermatic vessels, between the abdominal opening and the testis.

"In the cellular membrane, leading to a diseased testicle, it is no very uncommon thing to find collections of extravasated fluid. These, as they add considerably to the bulk, and apparent size

of the process, make the complaint appear more terrible; and, as I have just said, less likely to admit relief.

"When the extravasation is general, through all the cells of the investing membrane, and the spermatic vessels themselves are hardened, knotty and diseased, the case is without remedy; for, although a puncture, or an incision, will undoubtedly give discharge to some, or even the greatest part of the fluid; yet this extravasation is so small, and so insignificant a circumstance of the disease, that the parts, in this state, are so little capable of bearing irritation, that an attempt of this kind must be ineffectual, and may prove mischievous.

"But, on the other hand, collections of water are sometimes made in the same membrane, from an obstruction to the proper circulation through the numerous lymphatics in the spermatic process, while the vessels themselves are really not diseased, and therefore very capable of permitting the operation. In this case, the fluid is generally in the cyst, or bag, like to an encysted hydrocele, and the spermatic chord, cyst and all, are easily moveable from side to side; contrary to the preceding state, in which the general load in the membrane fixes the whole process, and renders it almost immoveable.

"A discharge of the fluid will, in this case, enable the operator to examine the true state of the process, and, as I have twice or thrice seen, put it into his power to free his patient from one of the most terrible calamities which can befall a man.

"There is one more circumstance relative to the scirrhus testicle, which appears to me to be worth attending to, as I cannot help thinking that it has misled many, who have not had sufficient opportunity of comparing theory with practice.

"It has been confidently asserted, and is generally believed, that a scirrhus testicle never begins in the epididymis of the said testicle. The consequence of this doctrine is, that when a disease, which affects a testicle, by enlarging and hardening it, makes its first attack on the epididymis only, such disease is not allowed to be a scirrhus, nor permitted to be treated as such.

"That inflammatory kind of tumour, which in the virulent gonorrhea, siezes the testicle, and is called the hernia humoralis, affects the epididymis; and, even under the best care, sometimes leaves it too large, and too hard. This is said never to end in, or produce a scirrhus; and, I do not recollect, that I

have ever known it to do so. The disease, which consists in an induration and enlargement of the whole testicle, in the more confirmed lues, affects the epididymis also, as well as the glandular part of the testicle; and I do not remember to have seen it, either become cancerous, or not yield to mercury, properly administered. But that a true scirrhus, or cancer, sometimes makes its first attack on the epididymis, which it alters and spoils, before it at all affects the testicle, is a truth, of which I have not the least doubt. Among others, I formerly believed the contrary doctrine; and, in the first edition of this book, have given it as my opinion: but I am, from experience, so perfectly convinced of the truth of what I have now asserted, that I think myself obliged to declare it. The mistake, I suppose to have been made by the first propagators of this opinion, thus: The hernia humoralis, and the venereal sarcocele, always enlarge the epididymis, and generally leave it somewhat too hard: both these have, by adventurous and unknowing people, been mistaken for scirrhi; but it being found, by experience, that these alterations in the epididymis, were either totally removed by medicine, or, if any part remained, it continued harmless through life; an inference was drawn, that as true scirrhi are not often either removed by medicine, or continue harmless, therefore an original affection of the epididymis could never be a true scirrhus: a deduction, which the premises do not by any means authorise; and which I am satisfied, is not true." (*Extract from Pott's Treatise on the Hydrocele, &c.*)

In the preceding remarks, we find, that Pott considered sarcocele and cancer of the testicle, only as different stages of the same disease; but, I am of opinion, that the only reason for this doctrine must have been built on the fact now so well established, that every kind of swelling is liable to be eventually converted into cancer. The observations of Mr. Home, particularly illustrate the truth of the latter remark.

SCIRRHUS AND CANCER OF THE TESTICLE.

Dr. Baillie has noticed, that the testicle is often found much enlarged in its size, and changed into a hard mass, of a brownish colour, which is generally more or less intersected by membrane. In this disease, there is no vestige of the natural structure; but, cells are frequently observable in it, containing a sanious fluid; and sometimes, there is a mixture of cartilage. Dr. Baillie con-

siders this state as the true scirrhus testicle; and, according to the progress of the disease, the epididymis, and spermatic chord, are more or less, or not at all affected. A foul deep ulcer is, at length, frequently formed, or else a fungus is thrown out, when it is called, the true cancer of the testicle. This affection is characterized, in the living subject, by its great hardness; the frequent pain in the part darting from it along the spermatic chord to the loins. The chord itself, at last, becomes diseased, and the health impaired. The ulcer and fungus form additional symptoms. (See *Baillie's Morbid Anatomy.*)

SOFT CANCER OF THE TESTICLE.

This part is very subject to a disease, which, though of a very malignant and incurable nature, is very different from the true cancer, already described. It has been particularly noticed by Mr. Abernethy, under the name of *Medullary Sarcoma*. In most of the instances, which this gentleman has seen, the tumour, when examined after removal, has appeared to be of a whitish colour, resembling, on a general and distant inspection, the appearance of the brain, and having a pulpy consistence. Mr. Abernethy has also often seen it of a brownish red appearance. The following case is related, to illustrate the nature and progress of the disease.

"A tall, thin, healthy-looking man, of about forty years of age, had, about fifteen years before, a swelled testicle from a gonorrhœa; the epididymis remained indurated. Six years afterwards it became enlarged, and a hydrocele at the same time formed. Half a pint of water was discharged by a puncture, but inflammation succeeded the operation, and this testis became very large. An abscess formed, and burst in the front of the scrotum, and the testis subsided in some degree. Mercury was employed to reduce it, but without effect. The part, however, was indolent, and gave the patient no trouble but from its bulk.

"About a year afterwards, a gland enlarged in the left groin (the same side as the testis:) another then became swollen in the right groin, and, in the course of two years, several glands in each groin had obtained a very considerable magnitude. At this period, he was admitted into St. Bartholomew's Hospital, under the care of Mr. Long. The testis was, at this time, between four or five inches in length, and about three in breadth; it resembled its natural form, and was indolent in its disposition. The

spermatic chord was thickened, but not much indurated. Four or five glands were enlarged in the groin on both sides; each of which was of the size of a very large orange; and when observed together, they formed a tumour of very uncommon shape and magnitude.

"They gradually increased in size for several months, till at last the skin appeared as if unable to contain them any longer. It became thin, inflamed, and ulcerated, first in the left groin, and thus exposed one of the most prominent tumours. The exposed tumour inflamed and sloughed progressively, till it entirely came away. As the sloughing exposed its vessels, which were large, they bled profusely, insomuch that the students endeavoured, but in vain, to secure them by ligatures: for the substance of the tumour was cut through, and torn away in the attempt. Pressure by the finger, continued for some time, was the only effectual mode of restraining this hemorrhage.

"The loss of one gland relieved the distended skin, which had only ulcerated on the most prominent part of the tumour, and had not become diseased. It now lost its inflamed aspect: granulations formed, and a cicatrix took place. In the opposite groin a similar occurrence happened. One gland, exposed by the ulceration of the skin, sloughed out, being attended by the circumstances just recited. However, before the skin was cicatrized, ulceration had again taken place in the right groin, in consequence of the great distention of the skin from the growth of the tumour; and sloughing had begun in the tumour, when the patient, whose vital powers had long been greatly exhausted, died." (See *Surgical Observations*, &c. 1804. by J. Abernethy, F. R. S., &c.)

SCROPEULA OF THE TESTICLE.

This part is sometimes converted into a truly scrophulous mass. It is usually enlarged, and when cut into, a white, or yellowish-white, curdly substance is seen, which is sometimes, more or less, mixed with pus. This affection may be distinguished from a scirrhus testicle by its greater softness, by the little pain felt in it, and by its not affecting the health so much. (See *Baillie's Morbid Anatomy*.)

Mr. Pott has regarded every kind of sarcocele as demanding an early performance of castration; and the observations which I have had opportunities of making, lead me to agree with this celebrated writer, in the general truth of the remark. But (setting out of consideration the

swelling and hardness arising from the common hernia humoralis) there are a few diseased enlargements of the testicle, which certainly do frequently diminish and remain in a state which does not at all impair the health, after taking cicuta, and other alterative medicines, wearing a suspensory, and rubbing mercurial ointment on the scrotum. Many of such cases I have suspected to be scrophulous diseases.

Dr. Baillie has noticed some other affections of the testicles, in which it becomes bony, cartilaginous, &c.; but, on these it is not necessary for us to dwell in this dictionary. The preceding observations may be considered as relating expressly to the diseases for which castration is generally performed. (See *Castration*.)

FUNGUS OF THE TESTICLE.

In a former work, I described "a particular affection of the testicle, in which a fungus grows from the glandular substance of this body, and, in some instances, from the surface of the tunica albuginea. This excrescence is usually preceded by an enlargement of the testicle, in consequence of a bruise, or some species of external violence. A small abscess takes place, and bursts, and from the ulcerated opening the fungus gradually protrudes." I then proceeded to represent how unnecessary and improper it was to extirpate the testicle, on account of this affection, if, after the subsidence of the inflammation, the part should not seem much enlarged and indurated. I recommended the fungus to be cut off, or else destroyed with caustics; and I founded my advice on a successful attempt of the first kind, which was made in St. Bartholomew's Hospital, by Sir James Earle, a little while before my book was published. (See *First Lines of the Practice of Surgery*, p. 399.)

Since this period, an interesting little paper has been written on the subject, by my friend Mr. Lawrence, who has favoured the public with a more particular account, and nine cases illustrative of the causes, symptoms, and progress of the disorder. According to Mr. Lawrence, the patient generally assigns some blow, or other injury, as the causes of the complaint; in other instances, it originates in consequence of the hernia humoralis from gonorrhœa, and sometimes appears spontaneously. A painful swelling of the gland, particularly characterized by its hardness, is the first appearance of the disease. After a certain length of time, the scrotum, growing gradually thinner,

ulcerates; but, the opening, which is thus formed, instead of discharging matter, gives issue to a firm, and generally insensible fungus. The surrounding integuments and cellular substance, are thickened and indurated by the complaint, so that there appears to be altogether a considerable mass of disease. The pain abates, and the swelling subsides considerably, when the scrotum has given way. In this state, the disorder appears very indolent; but if the fungus be destroyed by any means, the integuments come together, and a cicatrix ensues, which is inseparably connected with the testicle. Mr. Lawrence next informs us, that if the part be examined while the fungus still remains, the excrescence is found to have its origin in the glandular substance of the testicle itself; that the coats of the part are destroyed to a certain extent; and that a protrusion of the tubuli seminiferi, takes place through the aperture thus formed. Mr. Lawrence says, he has often ascertained the continuity of the excrescences with the pulpy substance of the testicle, of which more or less remains, according to the difference in the period of the disorder. The same gentleman thinks, that the glandular part of the testicle experiences an inflammatory affection in the first instance, in consequence of the violence inflicted on it; and that the confinement of the swollen substance, by the dense and unyielding tunica albuginea, sufficiently explains the peculiar hardness of the tumour, and the pain which is always attendant on this stage of the disorder. The absorption of the coats of the testis, and of the scrotum, obviates the tension of the parts, and, thereby, restores ease to the patient, at the same time that the fungus makes its appearance externally.

With regard to the treatment, Mr. Lawrence is of opinion, that, if the complaint were entirely left to itself, the swelling would probably subside, the fungus shrink, and a complete cure ensue, without any professional assistance; but, he adds, that the disorder is so indolent in this stage, that a spontaneous cure would not be accomplished till after much time. He says, that the excrescence may be removed with a knife, or, if the nature of its attachment permit, with a ligature, or that it may be destroyed with escharotic applications. Mr. Lawrence very judiciously gives the preference to removing the tumour to a level with the scrotum, by means of the knife, as the most expeditious and effectual mode of treatment. He can discern no ground whatever for proposing castration in this malady, since, in no part of its progress,

nor in any of its possible consequences and effects, can it expose the patient to the slightest risk.

Mr. Lawrence also mentions the possibility of there being other kinds of funguses, which may be met with, growing from the testicle, and quotes an instance, in which Mr. Macartney found a fungus, of a firm and dense structure, growing from the tunica albuginea, while all the substance of the testicle itself was sound. Mr. Macartney was so kind as to shew me the preparation, affording a clear specimen of the second kind of fungus. The cases drawn up by Mr. Lawrence are, in my opinion, highly interesting, and may be read in the *Edinb. Med. and Surgical Journal for July, 1808.*

TETANUS. (from *τείνω*, to stretch.)

Tetanus is defined by all authors to be a more or less violent, and more or less extensive, contraction of the muscles, attended with tension and rigidity of the parts affected.

It presents itself in four different states.

When its effects are confined to the muscles of the jaw and throat, it is called *trismus* or *locked-jaw*; when all the body is affected and becomes rigid, but retains its ordinary straightness, the case is named *tetanus*. When the body is bent forwards, the disease is termed *emprosthotonos*; and *opisthotonos*, when the curvature is backward.

To these four forms, some writers have added a fifth, which they denominate *pleurosthotonos*, and which is characterized by the body being drawn to one side. It is the *tetanus lateralis* of Sauvages.

Each of these states is strikingly different: the two first often prevail at the same time, forming what may be termed *complete tetanus*.

As M. Larrey also observes, tetanus may likewise be divided into the *acute* and *chronic*, according to its greater, or lesser intensity.

The first is exceedingly dangerous, and usually fatal.

Chronic tetanus is less intense, and, on account of the more gradual progress of the symptoms, affords more opportunity of being successfully treated. (*Larrey, in Mém. de Chirurgie Militaire, Tom. 1. p. 235, 236.*)

Tetanus may also be distinguished into the *traumatic*, or that arising from wounds, being the case with which surgeons have principally to deal; and into the *idiopathic*, or that proceeding from a variety of other causes.

This disorder, which may be excited by different causes, is much more common in warm climates than our own.

However, it sometimes occurs among us, especially in consequence of wounds, and, more particularly, after such injuries of tendinous and ligamentous parts. It is one of the most fatal symptoms, which can possibly arise in cases of wounds, and, therefore, demands the most assiduous attention of the surgeon.

M. Larrey observed, that gunshot wounds in the course of the nerves, and such injuries of the joints, often produce tetanus in the climate of Egypt, particularly when the weather, or temperature, passed from one extreme to the other, in damp situations, and in those which were adjacent to the Nile, or the sea. What he terms dry and irritable temperaments, were the most subject to the disorder, the event of which was found to be almost always fatal. (*Larrey, Op. et. Loc. cit.*)

Dr. Cullen remarks, that "tetanic complaints may, from certain causes, occur in every climate that we are acquainted with; but they occur most frequently in the warmest climates, and, most commonly in the warmest seasons of such climates. These complaints affect all ages, sexes, temperaments, and complexions. The causes from whence they commonly proceed, are cold and moisture applied to the body while it is very warm, and especially the sudden vicissitudes of heat and cold. Or, the disease is produced by punctures, lacerations, or other lesions of nerves in any part of the body. There are, probably, some other causes of this disease; but, they are neither distinctly known nor well ascertained. Though the causes mentioned do, upon occasion, affect all sorts of persons, they seem however, to attack persons of middle age, more frequently than the older or younger, the male sex more frequently than the female, and the robust and vigorous more frequently than the weaker.

"If the disease proceed from cold, it commonly comes on in a few days after the application of such cold; but, if it arise from a puncture, or other lesion of a nerve, the disease does not commonly come on for many days after the lesion has happened, very often when there is neither pain nor uneasiness, remaining in the wounded, or hurt part, and, very frequently, when the wound has been entirely healed up.

"The disease sometimes comes on suddenly to a violent degree; but, more generally, it approaches by slow degrees to its violent state. In this case, it comes on with a sense of stiffness in the back part of the neck, which, gradually increasing, renders the motion of the head

difficult and painful. As the rigidity of the neck comes on, and increases, there is commonly, at the same time, a sense of uneasiness felt about the root of the tongue; which, by degrees, becomes a difficulty of swallowing, and, at length, an entire interruption of it. While the rigidity of the neck goes on increasing, there arises a pain, often violent, at the lower end of the sternum, and from thence shooting into the back. When this pain arises, all the muscles of the neck, and particularly those of the back part of it, are immediately affected with spasm, pulling the head strongly backwards. At the same time, the muscles that pull up the lower jaw, which, upon the first approaches of the disease, were affected with some spastic rigidity, are, now generally affected with more violent spasm, and set the teeth so closely together, that they do not admit of the smallest opening.

"This is what has been named the *locked jaw* (*Trismus*), and is often the principal part of the disease. When the disease has advanced thus far, the pain at the bottom of the sternum returns very frequently, and with it, the spasms of the hind-neck and lower jaw, are renewed, with violence and much pain. As the disease thus proceeds, a greater number of muscles come to be affected with spasms. After those of the neck, those along the whole of the spine become affected, bending the trunk of the body strongly backwards; and this is what has been named the *Opisthotonos*.

"In the lower extremities, both the flexor and extensor muscles are commonly at the same time affected, and keep the limbs rigidly extended. Though the extensors of the head and back are usually the most strongly affected, yet the flexors, or those muscles of the neck that pull the head forward, and the muscles that should pull down the lower jaw, are often at the same time strongly affected with spasm. During the whole of the disease, the abdominal muscles are violently affected with spasm, so that the belly is strongly retracted, and feels as hard as a piece of board.

"At length, the flexors of the head and trunk become so strongly affected as to balance the extensors, and to keep the head and trunk straight, and rigidly extended, incapable of being moved in any way; and, it is to this state the term of *Tetanus* has been strictly applied. At the same time, the arms little affected before, are now rigidly extended; the whole of the muscles belonging to them being affected with spasms, except those that move the fingers, which often to the

last retain some mobility. The tongue also long retains its mobility; but, at length, it also becomes affected with spasms, which, attacking certain of its muscles only, often thrust it violently out between the teeth.

"At the height of the disease, every organ of voluntary motion seems to be affected, and, amongst the rest, the muscles of the face. The forehead is drawn up into furrows; the eyes, sometimes distorted, are commonly rigid and immoveable in their sockets; the nose is drawn up, and the cheeks are drawn backwards towards the ears, so that the whole countenance expresses the most violent grinning. Under these universal spasms, a violent convulsion comes on, and puts an end to life.

"The spasms are every where attended with most violent pains. The utmost violence of spasm is, however, not constant; but after subsisting for a minute or two, the muscles admit of some remission of their contraction, although of no such relaxation, as can allow the action of their antagonists. This remission of contraction gives also some remission of pain; but neither is of long duration. From time to time, the violent contractions and pains are renewed, sometimes every ten, or fifteen minutes, and that often without any evident exciting cause. But, such exciting causes frequently occur; for almost every attempt at motion, as attempting a change of posture, endeavouring to swallow, and even to speak, sometimes gives occasion to a renewal of the spasms over the whole body.

"The attacks of this disease are seldom attended with any fever. When the spasms are general and violent, the pulse is contracted, hurried, and irregular; and the respiration is affected in like manner; but, during the remission, both the pulse and respiration usually return to their natural state. The heat of the body is commonly not increased; frequently the face is pale, with a cold sweat upon it; and, very often, the extremities are cold, with a cold sweat over the whole body. When, however, the spasms are frequent and violent, the pulse is sometimes more full and frequent, than natural; the face is flushed, and a warm sweat is forced out over the whole body.

"Although fever be not a constant attendant of this disease, especially when arising from a lesion of nerves; yet, in those cases, proceeding from cold, a fever sometime has supervened, and is said to have been attended with inflammatory symptoms. Blood has often been

drawn in this disease; but, it never exhibits any inflammatory crust; and all accounts seem to agree, that the blood drawn seems to be of a looser texture, than ordinary, and that it does not coagulate in the usual manner.

"In this disease, the head is seldom affected with delirium, or even confusion of thought, till the last stage of it; when, by the repeated shocks of a violent distemper, every function of the system is greatly disordered.

"It is no less extraordinary, that, in this violent disease, the natural functions are not either immediately, or considerably affected. Vomitings sometimes appear early in the disease; but commonly they are not continued; and it is usual enough for the appetite of hunger to remain through the whole course of the disease; and what food happens to be taken down, seems to be regularly enough digested. The excretions are sometimes affected, but not always. The urine is sometimes suppressed, or is voided with difficulty and pain. The belly is costive; but, as we have hardly any accounts, excepting of those cases, in which opiates have been largely employed, it is uncertain, whether the costiveness has been the effect of the opiates or of the disease. In several instances of this disease, a miliary eruption has appeared upon the skin, but whether this be a symptom of the disease, or the effect of a certain treatment of it, is undetermined. In the mean while, it has not been observed to denote either safety or danger, or to have any effect in changing the course of the distemper." —(*First Lines of the Practice of Physic*, vol. 2.)

According to M. Larrey, the opisothotonos, is more seldom observed, than the emprosthotonos, and the experience of this gentleman taught, that the former was the most rapidly fatal. It appears, says he, that the violent extension of the vertebræ of the neck, and the manner, in which the head is thrown back, cause strong compression of the spinal marrow, and a permanent contraction of the larynx and pharynx. —(*Larrey, in Mém. de Chirurgie Militaire*, Tom. 1. p. 240.)

This experienced writer notices how much the nerves of the neck and throat seem generally to be affected on the invasion of this disease, and the consequent contraction of the muscles of these parts, which is soon attended with difficulty of deglutition and respiration. The patients then experience, if not a dread of liquids, at least a great aversion to them, which often prevents the administration of internal remedies; and if the wound

is out of reach of the interference of art, the patient is doomed to undergo the train of suffering attendant on this cruel and terrible disorder. Nothing can surmount the obstacles, which present themselves in the œsophagus. The introduction of an elastic gum catheter into this canal, through the nostrils, is followed by convulsions and suffocation. "I have tried this means (says Larrey) on the person of M. Navaillh, a surgeon of the second class, who died of a locked jaw, brought on by a wound of the face, accompanied with a comminuted fracture of the bones of the nose, and part of the left orbit.

"In the examination of the bodies of persons dead of tetanus, I have found the pharynx and œsophagus much contracted, and their internal membrane red, inflamed, and covered with a viscid reddish mucus.

"Hydrophobia, hysteria, and several other nervous diseases, likewise produce their chief effects upon these organs, and the result appears to be the same. So, I have just remarked, when tetanus is arrived at its worst degree, the patients have a great aversion to liquids, and, if they are forced to swallow them, immediate convulsions are excited. This circumstance was particularly observed in M. Navaillh."—(*Mém. de Chirurgie Militaire*, Tom. 1. p. 247, 248.)

Hippocrates has taken notice of tetanic affections, in several parts of his works, and he seems to regard the disorder only as a consequence of other diseases, or of wounds or ulcers of the nervous or tendinous parts, of which symptomatic kind of opisthotonos he gives three remarkable cases in lib. 5. § 7. *de Morb. Vulg.* and repeats them in another place; but some of the symptoms, which he relates, are said not to be now observed. Galen, Cœlius Aurelianus, Aretæus, &c. seem only to have copied Hippocrates, with the addition of some suppositious symptoms, which really do not appear. The account given by Bontius is also deemed very defective. Dr. Lionel Chalmers, of Charles Town, South Carolina, states, that when the disease forms very quickly, and invades the unfortunate person with the whole train of its mischievous symptoms, in a few hours, the danger is proportioned to the rapidity of the attack, and that patients thus seized, generally die in 24, 36, or 48 hours, and very rarely survive the third day. But, when the disease is less acute, few are lost after the ninth, or eleventh. However, perhaps, this gentleman's descriptions of the disease in South Carolina may not be altogether applicable to it in our

climate. (See *Med. Obs. and Inq.* vol. 1. p. 92, 93.)

Tetanus was generally considered by the ancients as a mortal disease; but, we are now aware, that, until of late years, medical practitioners had no just notions concerning the proper treatment, and that since more judicious methods have been practised, many persons, afflicted with tetanus, have recovered. Although the treatment, which has succeeded in some instances, has not been found successful in others, yet, the degree of success proves, that the affection is not invariably incurable, and more modern experience has pointed out additional plans, the efficacy of which entitles them to trial.

When tetanus is evidently dependent on the particular state of a wound, practitioners in general agree, that the wounded part should be completely removed, whenever such an operation is practicable; or that, at least, all communication between the injured place and the brain, should be done away either by making a complete division of the nerves of the part, or destroying them with caustics. Some writers, however, remonstrate against this practice, and adduce reasons of the following kind. One of the principal grounds of objection is, that greater success does not attend the treatment of tetanus, when the wounded part is amputated or destroyed, than when no operation of this kind is performed. Any man who will take the trouble to consult the cases of tetanus on record, will find this to be a matter of fact; and, though hypothesis may sanction the trial of the plan, experience is not at all in favour of it, when it is judged of, as it ought to be, by the results of numerous cases compared together. No practitioner could justifiably amputate, or destroy the wounded part, no one would ever think of such a thing, before the symptoms had, at least, decidedly evinced the nature of the disorder. Could it be known beforehand, that tetanus, which in this country is not a frequent affection, would certainly follow any particular appearances of a wound, then the amputation, or destruction of it, with caustic, would undoubtedly be proper, and promise to be an effectual preventive. But, experience has now fully proved, that such an operation, after tetanus has commenced, does no good whatever, since at least as many have died, when so treated, as others, who have not submitted to the method. If the operation do no good, it must be hurtful, and increase the number of deaths; because limbs must frequently be removed, and a certain proportion of

persons, on whom amputation is performed, on any account, always perish. However, the wounds, which most commonly occasion tetanus, are those of the fingers and toes, and the removal and loss of one of these parts is a matter of less importance.

The valuable observations of M. Larrey, in favour of amputation, will be found towards the conclusion of the present article, as well as his other interesting remarks upon the various modes of treating tetanus.

Experience has shewn, that opium has sometimes been a very efficacious remedy, in cases of tetanus; but, from the same source of knowledge, we also learn, that it can only become a means of cure, when exhibited in very powerful doses, such, indeed, as would be exceedingly dangerous in any other instances. The common plan has been to give the medicine, at first, in moderate doses, and repeat them, every two, or three hours, or, at longer intervals, according to circumstances. In this manner, twenty, thirty, forty grains, and even more, have frequently been administered in the space of four and twenty hours, without any other effect, than that of diminishing a little the spasms and pain; the patient having neither sleep, nor drowsiness, nor any of the other effects, usually resulting from this medicine, even when exhibited in much smaller quantities. It is, for such reasons, that the doses may be boldly augmented, in proportion as the violence of the symptoms seem to demand. Opium, however, does not fail to have sometimes inconveniences, which prevent its being exhibited as freely as one might wish, under other circumstances. The functions of the stomach and bowels have been known to be so seriously impaired, in consequence of the medicine, that its exhibition could be no longer continued, but was left off, before any salutary effects had been produced.

Another circumstance, which deserves particular attention, is, that although the first doses of opium may produce some abatement of the symptoms, the benefit is not of long continuance, and fresh doses of the medicine must be administered, some time before the operation of the previous one ceases. This plan must be persevered in, as long as the symptoms have any tendency to reappear; and it is not, till some time after they have seemed to be subdued, and to have left the patient in a long and uninterrupted interval of ease, that one should venture to diminish either the quantity, or number of the doses of the medicine.

Opium is sometimes prevented from

being taken, in an effectual manner, by the difficulty of swallowing, which is a common symptom of this disease, and occurs particularly often, when the disorder is in an advanced stage. I once conceived, that medicines might, under such circumstances, be introduced into the stomach, by means of a hollow bougie, passed, from one of the nostrils, down the œsophagus. I have lately been informed, however, that using a bougie in this way brings on very insupportable fits of spasm; and the truth of this objection is fully confirmed by M. Larrey. The occurrence of a difficulty of swallowing medicines, when the disease has made some progress, is, at all events, an urgent reason, for having recourse, without delay, to such remedies, as have obtained repute, and of these, opium is undoubtedly one of the principal. Should it be found to be impracticable to convey opium into the stomach, after the difficulty of swallowing comes on, authors advise the medicine to be exhibited in glysters, in such doses as the violence of the disorder demands. The costiveness, which opium usually brings on, may commonly be obviated by emollient glysters, and laxative medicines, as occasion requires.

Analogous reasoning has led to the supposition, that the efficacy of opium might be increased, by employing some other medicines of the antispasmodic class, and, with this view, musk and camphor have been given, as being justly regarded as among the most powerful remedies of this kind. But, although some practitioners have thought, that they have seen good effects result from musk, yet the majority of practitioners, who have made trial of both this and camphor, in cases of tetanus, have found no reason to recommend these medicines. Possibly, this may be owing, in some instances, to sufficient doses not having been exhibited, or to the musk not being of a good quality. One hundred and fifty grains of musk, however, have been given in the space of twelve hours, to a young girl, thirteen years old, affected with an incipient tetanus; but, no salutary effect on the disorder was produced.

Analogy has also led to the employment of the warm bath, as a plan, which seemed to promise great benefit, by producing a relaxation of the contracted muscles. But, notwithstanding this means has appeared, in a few instances, to occasion some little relief, particularly when the practitioner has been content with mere fomentations, it generally fails, and, often, has even done mischief. This may perhaps be, in some measure, ascrib-

able to the disturbance and motion, which the patient must necessarily undergo, in order to get into the bath; for, it is very well known, that every exertion, on the part of the patient, is very apt to excite most violent paroxysms of spasm. The author of the article Tetanus, in the *Encyclopédie Méthodique*, mentions his having seen the warm bath do harm, in two or three cases, in which it was expected to do good. Though numerous writers have recommended the trial of the plan, it would be difficult to trace, in their accounts, any facts, which decidedly shew, that its adoption has ever been followed by unequivocal benefit. Dr. Hillary, who practised, a long while, in the warm climate of America, where tetanus is very common, disapproves of this method of treatment. He observes, that although the use of the warm bath may appear to be very rational, and promise to be useful, he has always found it much less serviceable, than emollient and antispasmodic fomentations; and, he also mentions, that he has sometimes seen patients die, the very moment, when they came out of the bath, notwithstanding they had not been in it more than twenty minutes, the temperature of the water being likewise not higher than 29 or 30 of Reaumur's thermometer. (See *Hillary on the Air and Diseases of Barbadoes*.)

De Haen also relates a similar fact of a patient dying, the instant he was taken out of the warm bath.

It was, in all probability, the bad effects of the warm bath, which induced practitioners to try what might be effected by the cold one. Of all the remedies, which have been employed in cases of tetanus, the cold bath seems to be that, which has been attended with the greatest success. Dr. Wright has published, in the *Medical Observations and Enquiries*, Vol. 6, a paper, in which may be found a narrative of the first trials of this method, which were all successful. The plan is said to be at present preferred throughout all the West Indies. The way adopted consists in plunging the patient in cold water, and in that of the sea, when at hand, in preference to any other; or else in throwing from a certain height, several pailfuls of cold water over his body. After this has been done, he is to be very carefully dried with a towel, and put to bed, where he should only be lightly covered with clothes, and take twenty or thirty drops of laudanum. The symptoms usually seem to give way, in a certain degree, but, the relief, which the patient experiences, is not of long duration, and it is necessary to repeat the same measures, at the end of three, or four hours. They are to be

repeated in this manner; that is to say, at such intervals, until those of freedom from the attacks of the disorder increase in length. This desirable event generally soon follows, and ends in a perfect cure. Wine and bark were sometimes conjoined with the foregoing means, and seemed to co-operate in the production of the good effects. Dr. Wright concludes the account with the following remark, sent to him with a case, by Mr. Drummond, of Jamaica.—“I am of opinion, that opiates and the cold bath will answer every intention in the tetanus and such like diseases; for, whilst the opium diminishes the irritability, and gives a truce from the violent symptoms, the cold bath produces that wonderful tonic effect, so observable in this, and some other cases. Perhaps, the bark, joined with these, would render the cure more certain. May we not then have failed in many cases, by using opiates alone in large doses, or what probably is worse, with the warm bath, instead of the cold bath? And have we not reason to suspect that the increased doses of opium, that seemed requisite, when the warm bath was used, may have proved pernicious?” (*Vol. 6, p. 161.*)

Another remedy, which is said to have frequently effected a cure in tetanus, is mercury. It has been employed in France with the greatest success, as may be seen by referring to the forty-fifth volume of the *Journal de Médecine*. This remedy, however, should be resorted to, in an early period of the disorder. Mercurial frictions are preferred, and these are to be put in practice so as to bring on a quick affection of the mouth; taking care, however, not to render the soreness and salivation too violent. Some contend, that it matters not, whether mercury be rubbed into the body, or given internally. It is generally allowed, that opium may be advantageously exhibited at the same time.

Dr. Cullen mentions his having been informed, that the Barbadoes tar (*Piseseleum Barbadoense*) had cured tetanus in all its different degrees.

It was an opinion, entertained by this celebrated physician, that the cold bathing had neither been so frequently employed, nor found so commonly successful, in cases of tetanus from wounds, as in those from the application of cold.

Unctuous, balsamic, and spirituous embrocations; bleedings; and the application of blisters; which many practitioners have recommended, are not only useless remedies in the majority of cases, but even hurtful. Hence, none of the best physicians or surgeons, of the present day, ever advise them to be adopted.

The trial of strong shocks of electricity,

in cases of tetanus, has been suggested. We have no fact, however, on record, of the method having done good in this disorder. (*Latta's System of Surgery*, Vol. 3. p. 61.)

It has also been proposed to exhibit, in cases of tetanus, some other very strong stimulants, besides opium, musk, and camphor; for instance, the fixed and volatile alkalies, ardent spirits, spices, &c.

Mr. Latta's sentiments are against the employment of opiates and the warm bath, and the great object, which he seems to be desirous of bringing about, are, a certain degree of inflammation and suppuration in the wounded part, and a general inflammatory diathesis. The measures, which he advises, with these views, will be fully understood by the following extract.

"Some cases (says this author) have been related, where a cure was evidently effected by opium; yet, from the numbers, who have suffered, under this management, we may freely say, that the cures are only in the proportion of one to eight, or nine. There are some cases, related by authors, where the patients have indeed recovered from the tetanus, but have soon after been attacked by complaints in their stomach, which quickly put an end to their life. Upon opening their bodies, the stomach was always found in a high state of inflammation, and sometimes actually mortified. Notwithstanding, therefore, it appears that the disease has sometimes been cured by opiates, I am clearly of opinion, that, in cases of tetanus, they ought almost to be entirely given up. The warm bath, I am likewise of opinion, ought not to be used; and indeed, I must recommend a course almost directly opposite to that hitherto recommended and practised. Instead of putting the patient into a warm bath, I would plunge him into a tub of cold water, rendered still colder by the addition of vinegar. This ought to be repeated as often as the patient could bear it; and, in the mean time he ought to take the bark in very large doses, not less than two ounces in twenty-four hours, washing down every dose with a gill of port wine. Thus, a degree of inflammatory diathesis might be produced in the system, without the danger of exciting a local inflammation and mortification in the stomach, which arises from immense doses of opium. I am not, however, for rejecting opiates entirely. A large dose may be given at first, and still farther augmented, if the first has no effect to mitigate the symptoms, until we have an opportunity of pushing the bark to its full extent. Besides this, we ought to endeavour to excite a local inflamma-

tion in the wounded part itself, and to raise this inflammation as high as is consistent with a resolution afterwards. We certainly know, that nothing promotes a general phlogistic diathesis through the system, more than a wound attended with an high degree of inflammation. In all relaxed habits we find, that, even in this climate, wounds are attended with less topical inflammation in summer than in winter; and, from perusing the best authors that have lately written upon this subject, I find that, in wounds productive of tetanus, there is an absolute want of this inflammation, so necessary to the cure and well-being of the patient. Nay, I myself know, from gentlemen of undoubted abilities in their profession, both in America and the East Indies, that, if inflammation and suppuration takes place even in these climates, immediately after an injury that might be suspected of inducing a tetanus, such as, slight wounds or scratches on the fingers, or a splinter driven in below the nail, nothing of the kind takes place. Hence, it is evident, or, at least, very probable, that if in a wound threatening to produce a tetanus, we could induce this inflammation, the disease would certainly be prevented. Our first care, therefore, should be, in warm climates, or in cases where we have reason to fear a tetanus, to dress the wound in such a manner as to bring on the requisite inflammation; and nothing can do this more effectually, than to enlarge it considerably, and apply a pledget dipped in warm oil of turpentine.

"It must be observed, however, that though dressings of this kind applied to the wound *before* a tetanus has come on, may very probably prevent it, yet we have no reason to believe, that they will remove it after it has come on. It is even doubtful, whether, after this dreadful disease has appeared, any application to the wounded part would raise the desired inflammation. In this case, we must do the best we can, instantly to remove, or at least palliate, the violence of the spasms; and, while we do so, an incision made above the original wound, and dressing this incision with warm oil of turpentine, might possibly be of service. The misfortune is, that now we have not time to wait for the effect of any ordinary medicine. The disease makes such rapid progress, that we are under a necessity of using violent remedies, even though we thereby run the risk of destroying our patients afterwards, as has been remarked of opiates. Mercury has been much recommended in the tetanus, as well as the hydrophobia, but has not often been attended with success in either. It is evi-

dently too slow in its operation; but indeed, if we can give it in such quantities as to produce symptoms of salivation in a day or two at most, it has a chance of being useful; for, while it is producing a salivation quickly, it brings on a diathesis phlogistica; but I believe that, when it acts slowly, or after a salivation is thoroughly produced, it rather has a contrary effect, viz. that of relaxing the body, and thus tending to bring on the disease, if the wound be not healed before this happen. To avoid this, we ought to begin the unction with mercury as soon as the disease begins to shew itself; to rub in a very considerable quantity at once, and to stop as soon as the breath begins to turn fetid, or the gums to swell, lest a salivation should be excited, which would be contrary to the intention with which the medicine was exhibited." (*Latta, Vol. 3, p. 70, &c.*)

This gentleman is an advocate for cold bathing, which, he observes, should, like other remedies in tetanus, be pushed to its utmost extent. He recommends placing the patient in a tub, about two feet and a half high, and three feet in diameter, and pouring repeatedly over his head and shoulders, buckets of water, as cold as can be procured. This plan is to be "repeated, according to the urgency of the symptoms; but, not less, than four times, in four and twenty hours. During this time, the patient should be made to drink half a gill of the best brandy every hour, with two scruples of the powder of bark put into it; and, if his stomach can bear it, from two to three ounces of bark, with a bottle and an half of port-wine in twenty-four hours. If, by these means, the strength of the system increases, every symptom of the disease will decrease. I have already given my opinion with regard to opiates. The smallest dose that can be given, provided it will have any effect in relieving the spasms, ought to be adhered to; and, if they can be kept under without opium, so much the better; but, if not, no doubt we must give it in large quantities. The dose, indeed, cannot be ascertained; but, we must always remember, that, after the stimulant power of opium is gone, it has a very remarkable sedative effect, which, in persons not accustomed to it, is productive of something similar to downright intoxication, and a very great degree of debility consequent thereto. We must, therefore, be as careful as possible not to give immoderate doses of opium after the spasms are removed; or, at any time more than is absolutely necessary to keep them under. The strength of the system cannot be ultimately restored by medicines, which act

only for a short time, and then lose their effect. It is evident that these are to be used only with a view to others, which act more permanently, though slowly.

"The sedative qualities of one dose of opium may indeed be prevented, by giving another before they have time to manifest themselves; but this would require an endless succession of doses. By far the best method seems to be to counteract them, by giving large quantities of the most nutritious food, as soon as the spasms are mitigated to such a degree as to allow the patient to swallow. This is conformable to the doctrines delivered by the late Dr. Brown, who, after a dose of opium or laudanum, always ordered his patients to be supplied with some strong and solid food, to prevent the debility, which would otherwise take place." (*Latta, Vol. 3, p. 75.*)

Dr. Rush, professor of medicine in Philadelphia, has lately published, in the Transactions of the American Philosophical Society, Vol. 2. a paper, intitled, "*Observations on the Cause and Cure of Tetanus.*" Dr. Rush, considers tetanus, as a disease occasioned by a relaxation, and, consequently, recommends for its cure, such medicines, as are calculated to remove this relaxation, and to restore tone to the system. Hence, he advises the liberal use of wine, and Peruvian bark; and states, that he has put this plan in practice with success. When the disorder is the consequence of a wound, Dr. Rush recommends stimulants to the part affected: the wound is to be dilated, and filled with oil of turpentine.

In Spain, however, a very opposite mode is said to be adopted with great success; practitioners there advise the use of mild emollient applications to the wounded part, and, they, in particular recommend it to be immersed, for an hour in tepid oil, and to repeat this plan, at short intervals. In this manner, many cases are said to have been relieved, after very alarming appearances had taken place.

I shall now insert the truly valuable observations of the experienced M. Larrey upon the treatment of this disorder.

"Experience has proved (says this author) that when tetanus is altogether abandoned to the resources of nature, the individuals quickly perish. The practitioner, therefore, should hasten to fulfil, as much as possible, the indications, which this disease presents; the principal are, to remove the causes of irritation, and re-establish the suppressed excretions.

"The first is fulfilled by suitable incisions made in the wound before the symptoms of inflammation have come on; for,

if this has made progress, the incisions would be useless and even dangerous. They should comprehend, as much as possible, all the nervous filaments, and membranous parts, which have suffered injury; but, incisions in the joints are pernicious, and appear, in all cases, to accelerate the symptoms of tetanus, as I have seen instances of.

"The application of caustics to the wound may be practised with advantage, on the first attack of the symptoms, the same precept being observed as in making incisions, these operations may be followed by bleeding, if necessary, and the use of topical emollients and anodynes, though their effect is generally very feeble.

"Internal remedies, whatever may be their properties, are almost always useless, because the patient, soon after the invasion of tetanus, falls into a state of strangulation; but, if such state only comes on towards the latter stage, and gradually, such remedies as have obtained the greatest confidence of practitioners may be employed, as, for instance, opium, camphor, musk, castoreum, and other antispasmodics, in strong doses, which are to be gradually increased. These means were used with some advantage for the patients, who were the subject of the annexed observations.

"A mameluke of Mourad-bey, named Mustapha, 27 years of age, and of a dry bilious constitution, received, the 19th of April, 1800, a gunshot injury, by which the first phalanges of the fingers of his right hand, and the corresponding metacarpal bones, were broken in pieces, and the thumb shot away at the articulation with the trapezium: many tendons and ligaments were also torn and lacerated.

"Mourad-bey had every possible care taken of him; but, as the remedies were administered, without the cause of the disease being understood, they could not fulfil the indication, which presented itself. It may therefore be said, that this individual continued without assistance, till the 18th of May, at which period Mourad-bey, seeing the bad state of the patient, sent him to the French surgeons, with a recommendation to General Donzelot. M. Cellière, surgeon, of the second class at the hospital of Syout, was directed by the general to take care of this mameluke.

"All the symptoms of tetanus had prevailed for three days; the suppuration of the wound was serous and in small quantity; its edges were red and puffed up; the muscles of the arm already contracted and in a state of convulsion; the jaws closed; deglutition attended with diffi-

culty; and the patient constipated and restless.

"The first attention of M. Cellière was to dilate the wound, and carefully extract the loose splinters of bone: he applied emollient dressings, and gave the patient six grains of opium, joined with four of camphor. A few hours afterwards some relief was experienced, and the following night was less severe. The sleep, however, was interrupted by spasms in the wounded member, and the acute pains, which accompanied them; a perspiration took place in the upper half of the body; and the lower extremities continued in their ordinary state. This melioration induced the surgeon to go on with the same remedies, the doses of which were gradually increased. The symptoms by degrees diminished until the 24th of May, at which period the patient was moved from Syout to Minyet: the obstacles to deglutition were removed, and the excretions partly re-established. The burning heat of the day, and the journey had fatigued him; and this circumstance, perhaps, together with the coolness of the night, to which he exposed himself in lying upon the terrace of the hospital, contributed to the reproduction of the symptoms of tetanus. The same means were continued, without keeping the disorder from advancing with its usual rapidity. Warm bathing was tried: the second bath produced a general amendment, which enabled the patient to swallow the half of a potion, composed of eight grains of camphor, as much musk, and twenty grains of opium, dissolved in an emulsion: the other half was taken in the course of the day. Very soon afterwards, the pain diminished, the jaws became relaxed, and the sleep was tranquil. On the morning of the 19th of May, there was great improvement; the suppuration of the wound was re-established; the organs by degrees resumed their functions, and a few days sufficed to bring this mameluke into the way of getting well, and the cure was completed by the most assiduous attention, and the varied use of remedies specified. Lastly, on the 29th of June, he was restored in perfect health to the General Mourad-bey.

"At the battle of Aboukir, the general of division, Lannes, received a ball, which passed through the lower half of the leg, between the two bones. During the five first days, he was treated in his tent; but he was afterwards conveyed to Alexandria. Although he was carried in a covered carriage on springs, the journey was uneasy and extremely painful.

"On his arrival, he sent for me. I found him restless, and agitated, express-

ing the greatest apprehension of the consequences of his wound. The leg was swelled, and the wound dry and painful; he had spasms, the whole limb was affected with violent starting, and the foot was numbed. The voice was hoarse; the jaws much closed; the eyes haggard; and a good deal of fever prevailed.

"At his request, I left him alone, for some time, in order that he might sleep; but, he was soon roused by pain and general indisposition. I applied emollient dressings, and ordered cooling beverages, strict quietude, and a low diet.

"On my second visit, three hours afterwards, I found all the symptoms worse. I immediately had him bled in the arm, and prescribed for him emulsions, to which were added the nitrate of purified potassa, alcoholized sulphuric æther, some sirop of diacodium, and orange flower water, in suitable proportions, a glassful to be taken every quarter of an hour. The topical emollients were continued.

"The patient passed a bad night, and the next day he was in the same state, with the leg highly inflamed; he swallowed with difficulty, and the jaws were constantly closed. The bleeding was repeated, and I continued the same medicines, with the addition of antispasmodics.

"The following night was easy; the fever abated; and all the other symptoms diminished: the wound and the leg were relieved by an oozing of bloody matter; the spasms totally ceased; a healthy and copious suppuration took place; the excretions resumed their course, and, at the period, when I set off for Cairo, the patient was in a convalescent state. Soon afterwards, he was well enough to return to France with the general in chief Buonaparte.

"In consequence of such a wound, M. Croisier, aid-de-camp to the commander in chief, had perished of tetanus, in the deserts of Qatych, on our return from Syria.

"M. Estève, director-general of the public revenue in Egypt, was seized with a slight inflammatory quinsy, occasioned by the presence of a piece of fish-bone, which had lodged in one of the sinuses of the fauces: its smallness concealed it, notwithstanding every examination.

"On the 13th day after the accident, and the 3d from the time, when inflammation began, the symptoms of tetanus came on, such as a contraction of the jaws, convulsive motions of the muscles of the face, accompanied with violent pain, and rigidity of all the muscles of the throat; the pulse was nervous and accelerated;

frequent catchings occurred in the upper extremities; the stools were suppressed; and there was considerable difficulty of speech and deglutition.

"The rapid progress of the symptoms made me tremble for the life of my friend; his death would have deprived us of an officer, whose talents and qualities all the army appreciated, and whom it regarded as a man of the highest integrity.

"I immediately prescribed for the patient a sweetened emulsion, to which I added the extract of opium, castoreum, camphor, the nitrate of purified potassa, and alcoholized sulphuric æther, in very strong but graduated doses, which were taken by glassfuls every quarter of an hour. The weak state of the pulse did not allow me to employ bleeding. I applied resolvent poultices to the forepart of the neck; I ordered the feet to be bathed in warm water; emollient clysters; the throat to be exposed to the vapour of a strong decoction of hyoscyamus, poppies, and marshmallows; dry frictions over the whole body; and I recommended the avoidance of every thing, which could tend to disturb the patient's rest. I observed regularly all the successive phenomena of the disease. The following night was attended with great agitation; the pain was violent; deglutition interrupted; the saliva flowed out of the mouth; and the jaw strongly closed. The patient suffered painful and incessant agitation; he fell for a short time into a comatose state, attended with slight attacks of delirium; in short, every thing portended the most imminent danger. About four in the morning, however, a copious perspiration over the chest and abdomen, succeeded this violent paroxysm; the patient became easy, and was able to swallow some of the above emulsion. The second dose increased the perspiration, and relaxation of parts, and I was therefore led to think favourably of the effects of the medicine; for, when the perspiration is symptomatic, it begins upon the head and extremities; while, when it is critical, it occurs over the chest and abdomen. The next day, the jaws were quite relaxed, the deglutition was easy, and the contraction of the muscles materially diminished. I substituted for the resolvent cataplasms, volatile liniments, and for the emulsion, a bitter laxative mixture, in order to unload the bowels, and re-establish the tone of the stomach. A few days afterwards, M. Estève was quite cured.

"The fish-bone seemed to have been moved away by a slight suppuration, that took place in the fauces.

"I have remarked, that patients have

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less aversion to swallowing emulsions, than any other liquid. They are smoother and more agreeable, and facilitate the effect of the remedies, with which they are combined.

Frictions with oily liniments, as recommended by some authors, were tried at the hospital, No. 2, in Cairo; but, they produced no change in the state of the disease.

"Mercurial frictions have appeared to me to aggravate the symptoms in the patients, upon whom they were tried. In Egypt, the employment of this means, even for venereal complaints, requires the utmost precaution; for, when administered in this climate, as in Europe, it has occasioned the most afflicting consequences, idiotism, hepatic diseases, &c.

"Poultices, made of the leaves of tobacco, and applied to the wounds of persons labouring under tetanus, have been followed by no advantageous effect. The alkalies have also been tried in several tetanic cases, without success.

"The application of blisters to the throat, in cases of trismus, and especially in that of M. Navailh, have failed in arresting the symptoms.

"The moxa and actual cautery, recommended by the Father of Medicine, have been equally unavailing. The moxa was employed at Jaffa upon three wounded men; the disease notwithstanding followed its usual course, and terminated fatally.

"I have cited a striking instance of the inefficacy of the second method, in a case of opisthotonos.

"Although large wounds, like those which are produced by the amputation of a limb, or wounds with loss of substance, may be sometimes followed by tetanus, this does not prove, that amputation, which I propose for the relief of this disease, is dangerous, nor that it cannot have beneficial effects; especially, as it is easy for an attentive surgeon to prevent the cold damp air from coming into contact with the wound, as well as prevent the irritation arising from the presence of foreign bodies, and the suppression of the purulent discharge, which are (says M. Larrey) the common causes of tetanus, particularly in warm climates.

"This end may be accomplished by keeping the patient, as much as possible, in a very warm and equal temperature; by taking care to extract without delay all foreign substances, dress the wound tenderly, cover it immediately with fine linen, having slits cut in it, and not dress recent wounds until suppuration is well established. Lastly, a regimen, and quietude are to be enjoined.

"When tetanus is caused by the suppression of the discharge, blisters, applied as near as possible to the wound, or to the wound itself, re-excite suppuration, and put an end to the effects of this accident. I proceed to detail some instances of such success.

"Pierre Bonnet, of the 85th demi-brigade, aged 20 years, of a bilious and irritable constitution, lingered in the hospitals at Cairo, ever since the campaign in Syria, with a fistulous ulcer, attended with caries of the bones, which constitute the right ankle joint. In a clinical consultation, it was determined, in consideration of the diseased state of the foot, and the marasmus to which the patient was reduced, that amputation was the only means of saving his life. It was done on the 21st of September, by M. Valet, surgeon of the first class, who had the particular care of this patient.

"The success of the operation was interrupted by no accident. Suppuration occurred at the usual period, and the wound looked well. Ten days afterwards, the cicatrix began to form at the circumference, and gradually extend towards the centre.

"When the patient was just on the point of being well, (it was the 24th day from the operation) he was suddenly seized with symptoms of tetanus, which no doubt were excited by the suppression of the discharge.

"Perspiration was also obstructed, in consequence of the patient's imprudence in walking in the night-time. Diaphoretics, strong doses of opium, and dry frictions over the whole body, were employed, by my advice. The symptoms, however, advanced with their wonted rapidity.

"The patient experienced strange pains in the epigastrium, and intolerable dragging sensations in the amputated member. Respiration was laborious; deglutition difficult; the jaws were closed; the head bent upon the chest; the trunk curved; and emprosthotonos prevailed in the highest degree.

"Opiates not passing any longer, anodyne and antispasmodic emulsions were given, through a vacuity, left by the loss of two of the incisor teeth: and these medicines at first relieved the pain about the stomach. A large blister, applied to the whole circumference of the stump, reproduced suppuration in 24 hours, and occasioned a miliary eruption on the face and chest. From this moment, the patient was a great deal better; all the symptoms of tetanus gradually diminished; the functions were re-established, and, on the 50th day from the operation,

this soldier was discharged from the hospital perfectly cured."

Monsieur Larrey next details a case, which is materially the same as the preceding, and I shall therefore omit it in this work.

"The equally unexpected and entire success (continues M. Larrey,) obtained, by the amputation of the injured limb, in the person of an officer, attacked with chronic tetanus, leads me to propose the question, *whether, in this disorder, occasioned by a wound of some part of the extremities, it would not be better to amputate the injured limb immediately the symptoms of tetanus commence, rather than expect from the resources of nature, and from very uncertain remedies, a cure, which so seldom happens?*

"If tetanus is chronic, as is sometimes observed, amputation may be done at every period of the disorder, provided a choice be made of the time, when there is an intermission of the symptoms. The operation would not answer so well in acute tetanus, if the disease were advanced, and the muscles to be divided were strongly contracted and rigid, as I have observed at the siege of Acre in a soldier, who was seized with tetanus, in consequence of a gun-shot wound of the left elbow.

"When I saw the patient, who makes the subject of this last observation, the symptoms were already advanced. However, I made the experiment of amputating the arm. The operation was followed by considerable ease, so that I had some hope of its success; but, not being able to shelter the patient from the coolness of the nights, and the tetanus having made too much progress, and being exceedingly acute, the symptoms recurred in a few hours afterwards, and the patient fell a victim on the third day from the operation.

"Without presuming to settle the important question, which has been proposed, I shall endeavour to offer some reasons, which appear to be in favour of amputation.

"When it is clear, that tetanus arises from the wound, we should not hesitate to amputate on the first access of the symptoms. We may certify ourselves, that the case is traumatic, by the nature of the wound, the progress of the early symptoms, and the period of their attack, which, at latest, is between the fifth and fifteenth day. When suppuration is established, the stupor quickly diminishes, the vessels unload themselves, the sloughs are detached, and the nerves enter into a state of perfect liberty. Then their sensibility is extreme, and from the slightest impressions, they are susceptible of a most

violent irritation, which is rapidly propagated throughout the whole nervous system. If, in this circumstance, the wound is affected by a cold damp air, or if there should be present any foreign bodies, pricking the nervous parts now separated from the sloughs, tetanus is inevitable, especially, in warm climates. We must then expect to see the disorder make rapid advances, so that in a very short time, every part of the member is affected, and all the nerves suffering irritation. The effects of this first cause, may also be complicated with a bad habit, or with worms in the bowels, as I have seen an example of at Nice; but, by paying careful attention to the phenomena of tetanus, we may readily distinguish the symptoms, which characterize these slight complications, and combat them with the proper remedies.

"The section of the member, performed on the first access of the symptoms, interrupts all communication between the source of the disorder and the rest of the body. This division unloads the vessels, relieves the tension of the nerves, and puts an end to the convulsive motion of the muscles. These first effects are followed by a general relaxation, which promotes the excretions, and sleep, and re-establishes the equilibrium in every part of the body.

"The aggregate of the temporary pains, caused by the operation, cannot increase the existing irritation: besides, the sufferings of tetanus render those of the operation more supportable, and lessen their intensity, especially, when the principal nerves of the limb are strongly compressed.

"M. Bonichon, lieutenant in the 1st battalion of the 21st demi-brigade of light infantry, was admitted into the hospital, No. 1, October 7, 1798, for a gun-shot wound of the left foot, that he met with at the battle of Sediment.

"The direction of the wound was obliquely from behind forwards, crossing the tarsus, several bones of which were broken; and the short extensor muscle of the toes, and the corresponding articular ligaments, lacerated. On his arrival at the hospital, however, the case did not have any unfavourable appearance; the first dressings were methodically applied; the wound was dilated, and some splinters extracted.

"The same evening, the patient became uneasy; his sleep was painful; he experienced in the wound acute pains, which continued to increase until he was visited in the morning; the edges of the wound appeared puffed up, and surrounded with a reddish circle; the discharge

was suppressed; and the application of the dressings, though executed with tenderness, was exceedingly painful. The patient, in short, was affected with general indisposition.

"Cooling anodyne beverages, and the application of emollients to the wound, had no effect.

"On the 19th of October, the closure of the jaws began, and, by the 29th, all the symptoms of tetanus were manifest. The muscles of the injured limb were in a state of convulsive contraction; the abdominal parietes were drawn in; the deglutition obstructed; and the patient constipated.

"These symptoms continued regularly to increase, but, in a slow and gradual manner, as the tetanus became chronic. A dilatation of the wound was made, without delay, for the purpose of extracting some moveable splinters, which had escaped the first examinations. Opium was prescribed in suitable doses. This means appeared at first to lessen the symptoms, which subsided and recurred alternately; but these alterations were of short duration; and on November 2, 1798, the disease was at its highest pitch.

"All the muscles were in a state of convulsive contraction; the legs were stiff, and strongly bent upon the thighs; and these upon the pelvis. The parietes of the abdomen were drawn close against the vertebral column; the head bent upon the chest; the arm and forearm in a state of flexion; the jaws closed; and deglutition attended with difficulty. The pulse was small and nervous; the patient was reduced to a degree of extreme emaciation; his body was constantly covered with perspiration; and he suffered incessantly such violent pain, that he prayed for death as a desirable thing.

"After having in vain tried all the means, which the healing art offers in this sort of case, such as opiates in every form, even united with camphor and bark; lotions of cold water; solutions of opium to the wound; emollient cataplasms, and afterwards those of tobacco; after having, I say, tried all these remedies, I thought of amputating the limb. The despair of this unfortunate man, and the certain death, that awaited him, induced me, contrary to the advice of several military surgeons, who were consulted, to employ immediately this last resource. Advantage was taken of an interval of ease, which occurred the same day. The operation was dexterously performed in my presence, and before all the surgeons consulted, by M. Asalini, surgeon of the first class. The patient

who was desirous of having it done, behaved courageously, and without betraying signs of great suffering. A slight syncope, which happened very soon after the operation, was the forerunner of the cessation of the symptoms. In short, a general melioration occurred, which allowed the patient to swallow some liquids. The following night was easy, and the patient had three hours of sound sleep. The next day, I found his pulse stronger, the limbs less rigid, the jaws relaxed; and some stools had already come away, with the aid of clysters. At the ordinary period, suppuration took place, and all the symptoms gradually subsided. The stump, however, was affected, for several days, with violent spasms, which were increased by the slightest touch of any thing externally, and, particularly, on applying the dressings, notwithstanding every care taken not to irritate the parts. I succeeded in assuaging these spasms by making an exact compression along the course of the sciatic nerve.

"The strength returned very quickly; but, the digestive organs were a long time affected with atony, (as M. Larrey thinks) by reason of the pressure, which the parietes of the abdomen had made upon them.

"Towards the end of the following December, however, this officer left the hospital quite well, beginning to walk about on his wooden leg. Soon afterwards, he returned to France, with some discharged blind soldiers, and he must be at the Hotel des Invalides at Paris.

"The battle of the 21st of March, 1801, gave me occasion to amputate a soldier's leg, for an injury similar to that of M. Bonichon. Although tetanus had begun, and was of the acute kind, the operation stopped all the symptoms as it were, by enchantment; and doubtless, if it had not been for the dampness of the ward, where the patient lay, and the want of proper means for keeping him from the coolness of the nights, this operation would have been equally successful. He passed about twelve hours in perfect ease; but, the coldness of the following night, (which was greater than usual) reproduced the symptoms. These resisted all the proper remedies, and the patient died on the third day from the operation.

"The general of division, Destaing, received in the same battle a ball, which went through the middle internal and back part of his right arm. A portion of the biceps, coraco-brachialis, and the radial and internal cutaneous nerves, were divided. Between the two openings, there was an intervening mass of soft parts, consist-

ing of integuments, cellular substance, and some muscular fibres. The first effects of this injury were, the fall of the sabre from the general's hand, paralysis of the arm, and a painful trembling, which immediately affected the whole limb, attended with anguish, general debility, and oppression of the organs of respiration.

"It was with difficulty, that the general was conveyed to Alexandria, where he first received the succour of one of my colleagues. I was not consulted till the 8th day, at which time his pains were beginning to be extremely acute. Although suppuration had taken place, the patient's appetite was disordered, his sleep broken, and in the evening febrile symptoms came on. I immediately saw the necessity of dividing the parts between the two orifices where there were some filaments of the internal cutaneous nerve; but, as the patient would not consent to this slight operation, I was obliged to be content with applying emollients, and prescribing proper internal remedies. I dressed the wound daily, and continued to do so till the cure was finished. The next day, the local pains were more acute. There were convulsive motions in the hand and forearm, heat all over the body, and a closure of the jaws. The patient was very restless and in continual agitation. The rapid progress of the symptoms led me to divide the parts between the two orifices, and to make an incision through the bottom of the wound, where some nervous and aponeurotic fibres lay.

"This operation was painful; but, two hours afterwards, the patient felt much relieved. With the assistance of anodyne emulsions, emollient clysters, rest, and diet, all the symptoms subsided in the course of two days. The suppuration became healthy, the wound put on a clean appearance, the swelling of the edges disappeared, and, at the conclusion of the siege of Alexandria, the cicatrization was completed.

"This wound left the forearm and hand affected with paralysis: the two last fingers also continued senseless for a long while.

"Although (says M. Larrey) I have to regret not having more examples of cures effected by amputation, I have a sufficiency to conclude:

"1. That of all the remedies, advised by skilful practitioners, experience has convinced me, that the extract of opium, combined with camphor, and the nitrate of purified potassa, dissolved in a small quantity of emulsion, made with sweet almonds, and given in doses more or less strong, acts the most favourably, since patients, who have an

aversion to other fluids, take with pleasure this mixture, the effects of which must be promoted by bleeding, if indicated, and blisters under the circumstances, which have been specified.

"2. That amputation, done at a proper time, is the most certain means of arresting and destroying the effects of tetanus, when it depends upon a wound situated in the extremities." (See *Larrey's Mémoires de Chirurgie Militaire*, Tom. 1, sur le tetanus traumatique, p. 235, &c.)

Having now touched upon all the different modes of treating tetanus, it only remains for me to remark, that, among such diversity of practice, it is difficult to pronounce, in positive terms, which method claims the preference. Comparative trials, faithfully and impartially made, can alone enable us to form an accurate judgment. As the disease is not common in this country, the experience of individuals, concerning it, cannot be extensive enough for this purpose. Medical practitioners, in our settlements abroad, have the best opportunities of undertaking the investigation. From all, that I have read, I conceive, that facts prevail in favour of the following plans, in the order set down. 1. Removal of the wounded part and exhibition of opium, camphor, musk, castoreum, and other antispasmodics in large doses. 2. Cold bathing and opium. 3. Cold bathing, and strong stimulants, such as volatile alkali, brandy, wine, and spices, with bark. 4. Mercurial frictions, practised so as quickly to induce a salivation.

The reader may find some cases, or interesting matter, in *Hippocrates de Morb. Popularibus*, lib. 5 et 7. *Aretæi et Galeni Opera*. *Cælius Aurelianus de Morbis Acutis*. *Med. Obs. and Inq.* Vol. 1, p. 1. and 87; Vol. 6, p. 143; and in *Hillary on the Air and Diseases of Barbadoes*. *Edinburgh Physical and Literary Essays*, Vol. 3. In this last work, Dr. D. Monro describes the mode of cure by salivation, as successfully practised by a gentleman in Jamaica. In *Medical Transactions*, Dr. Carter relates a case, which yielded to a blister, applied between the shoulders the whole length of the spine, rubbing the jaw with the *oleum lateritium*, and repeating the following purge, at intervals of three, or four days: *℞. Tinct. Sacæ ʒij. Tinct. Jalap, ʒj. Syr. è spinâ Cerv. ʒss. M. fiat haust. purg.* On the intermediate days, the *oleum succini*, the fetid gum, and *ol. amygdal.* were exhibited. Of the first, the patient took thirty drops; of the gum twenty grains; and of the *ol. amygdal.* four ounces; in twenty-four hours. Dr. Cochrane first represented the advantages of the cold bath in the *Edinburgh Medical*

Commentaries; a plan, which was afterwards more fully explained by Dr. Wright, in the *Medical Observations and Inquiries*, Vol. 6. Dr. Currie, of Liverpool, used the cold bath with success, and his name should not be omitted, in favour of what seems one of the most efficacious measures in tetanus.

The reader should also consult *Cullen's First Lines of the Practice of Physic*, Vol. 3. *Rush's Observations on the Cause and Cure of Tetanus*, in the second volume of the *Transactions of the American Philosophical Society*. *Latta's System of Surgery*, Vol. 3. *Larrey*, in *Mémoires de Chirurgie Militaire*, Tom. 1, p. 235, &c. and Tom. 3, p. 286, &c.

THERIOMA. (from *θηρίον*, to rage, like a wild beast.) A malignant ulcer.

THERMÆ. (from *θερμός*, warm.) Mineral warm baths.

THORAX. (*The Chest*.) The term, *thorax*, is said to be derived from the Greek verb, *θωρεω*, to leap, because the heart leaps, or pulsates in it.

In the language of anatomy, the thorax implies the upper part of the trunk, or that portion of the body, which is surrounded by the sternum, the ribs, and the dorsal vertebræ.

The chest is subject to different kinds of injuries, produced by external causes, and the important nature of the organs, which it contains, renders the consideration of such cases of the highest consequence to the practitioner. In speaking of *Fractures of the Ribs*, *Emphysema*, *Paracentesis of the Thorax*, &c. an account has already been offered, of some affections of the thorax, which are very essential to be known by every surgeon. In the present article, we intend to treat of the subject of wounds, interesting this part of the body; but, before beginning what we have to say, concerning these cases, it seems proper to remind the reader of some anatomical circumstances, relative to the thoracic viscera.

The thorax is a very large cavity, of an irregularly oval figure, bounded in front by the sternum, laterally by the ribs, posteriorly by the vertebræ of the back, above by the clavicles, and below by the diaphragm, a very powerful muscle, which forms a kind of partition between the cavity of the thorax, and that of the abdomen.

The diaphragm is not stretched across, in a straight direction, from one side of the chest to the other; but, on the contrary, descends much further in some places, than in others. If the cavity of the thorax be opened, by a transverse section, about the middle of the sternum, the diaphragm appears, on examination,

to be very prominent and convex towards its centre, while it sinks downward at its edges, towards all the points, to which the muscle is attached. At its anterior, and most elevated part, it is fixed to the ensiform cartilage, whence, descending obliquely to the right and left, it is inserted, on both sides, into the seventh rib, to all the lower ribs, and, lastly, to the lower dorsal vertebræ. According to this description, it is obvious, that the cavity of the thorax has much greater depth and capacity behind, than before; a circumstance, which surgeons ought to be well aware of, or else they will be very apt to give most erroneous opinions, concerning such wounds as happen to the chest. For instance, a practitioner, deficient in anatomical knowledge, might imagine, that a weapon struck from above downward, into the front of the chest, could never reach the lungs, after having penetrated the cavity of the abdomen. It is a fact, however, that no instrument could be pushed in this direction, even some inches below the highest part of the abdomen, without entering into the cavity of the chest.

The whole cavity of the thorax is lined by a membrane, named the pleura, which is every where adherent to the bones, which form the parietes of this cavity, and to the diaphragm. Each side of the thorax has a distinct pleura. The two membranes meet in the middle of the chest, and extend from the sternum to the vertebræ. In this manner, two cavities are formed, which have no sort of communication with each other. The way, in which the two pleuræ touch, and lie against each other, forms a middle partition, which is called the mediastinum. These two membranes are intimately adherent to each other, in front, the whole length of the sternum; but, behind, where they approach the vertebræ, they separate from each other, so as to leave room for the passage of the aorta, œsophagus, &c. The heart, enclosed in its pericardium, occupies a considerable space on the left of the mediastinum, all the rest of the cavity of the chest being filled with the lungs, except behind, where the large blood-vessels, nerves, thoracic duct, and œsophagus, are situated. In the perfectly healthy state, the lungs do not adhere to the pleura; but, in this climate, at least, the majority of subjects, which are examined after death, are found to have such adhesions in different places. The disease may probably be occasioned by a very slight inflammation in the chest; and, as the surface of the lungs is naturally destined to be always in close contact with the pleura, and patients are frequently not suspected to have any thing wrong in the

thorax, this morbid change being often accidentally discovered after death, in looking for something else; we may conclude, that it does not occasion any inconveniences.

The thorax is subject to all kinds of wounds; but, the importance of these injuries most particularly depends on the depth, to which they extend. Such as do not reach beyond the integuments, do not differ from common wounds, and, when properly treated, are seldom followed by any bad consequences. On the contrary, those which penetrate the cavity of the pleura, even by the slightest opening, are apt to occasion, in some circumstances, the most alarming symptoms. Lastly, such wounds, as injure any of the thoracic viscera, are always to be considered, as placing the patient in a state of considerable danger.

From what has been said, it appears, that wounds of the thorax are very properly divisible into three kinds: viz. 1. such as only affect the skin, and muscles; 2. such as enter the cavity of the chest, but injure none of the viscera; 3. others, which injure the lungs, or some other viscus.

SUPERFICIAL WOUNDS OF THE THORAX.

Immediately a surgeon is called to a recent wound of the chest, his first care should be to endeavour to ascertain, whether the weapon has penetrated the chest, or not. An opinion may be formed on this subject, by attending to several circumstances. 1. Surgical writers recommend, for this purpose, placing the wounded person in the same posture, in which he was, when he received the wound, and then carefully examining with a finger, or probe, the direction, and depth of the wound. 2. We are also advised, if possible, to get the weapon, with which the injury was inflicted, and, by the bloody part, judge how far it has penetrated. 3. We are advised to inject some liquid into the orifice of the wound, and to observe, whether it regurgitates immediately, or lodges in the part. 4. The colour and quantity of the blood, emitted from the wound, are to be noticed, and whether any is coughed up. 5. We are to examine, whether the circumference of the wound becomes emphysematous, or any air escapes from its orifice in respiration. 6. Lastly, the state of the pulse and breathing is to be attended to.

It is a general precept, that, in order to examine a wound in the best manner, the patient should be put, as nearly as possible, in the same posture, as he was in at the moment of meeting with the accident;

but, it is very essential, that this precaution should not be neglected, in examining a wound of the chest. The great number of muscles, which surround this part, and the continual motion of the ribs, may make a wound appear, in one position of the body, quite superficial, while, in another posture, it shall be found to extend to a great depth. For, should any part of a rib, or even any of the cellular substance, in consequence of the patient's posture, become situated in the track of the wound, neither the finger, the probe, nor an injection, will pass with sufficient ease to make a proper examination.

Sometimes, the orifice of the wound is so large, that one can easily distinguish with the eye, whether the injury penetrates into the cavity of the thorax, or not; or, one can introduce a finger, which, when this can be used, without bruising, or tearing the parts, is always preferable to any probe. But, when the smallness of the opening prohibits the employment of the finger, we are necessitated to make use of a probe; and the best instrument, of this kind, is in this case a bougie, which is not so apt as a silver probe, to pierce parts, which have not been wounded. However, a prudent, and experienced, practitioner will seldom do any mischief of this sort, whether he uses one instrument, or the other.

In treating of wounds of the abdomen, I have cautioned surgeons against being too officious in probing such injuries, merely, for the sake of gratifying their own curiosity. The same advice is equally applicable to the present cases. Surgical authors have, perhaps, dwelt too much on the subject of probing wounds of the abdomen, and thorax, and their readers imbibe an opinion, that, until they have traced the wound, with their finger, or probe, to its very bottom, and termination, they are not qualified to put in practice any kind of measures. The only advantage of knowing, that a wound penetrates the chest, is that the practitioner immediately feels himself justified in having recourse to bleeding and other antiphlogistic means, and thus averts inflammation of the pleura, and lungs, which affection, when it has made progress, often proves fatal. However, there can be little doubt, that if the nature and depth of the wound cannot be readily detected, with the eye, the finger, or a probe, it is much safer to bleed the patient, than to put him to useless pain, irritate the injury with the introduction of instruments, and waste opportunities of doing good, which can often never be recalled. In short, it is better, and more advantage-

ous, for all patients, that some of them should lose blood, perhaps, unnecessarily, than that any of them should die, in consequence of the evacuation being omitted, or delayed.

Almost all the writers, who have taken pains in directing, how wounds of the thorax should be probed, conclude with remarking, that, however advantageous a knowledge of the direction and depth of the wound may be, much harm has frequently been done by pushing the attempts to gain such information too far. It is, perhaps, of greater importance to ascertain, by some kind of examination, the extent of a wound, which does not reach beyond the integuments, or intercostals, than to know, whether the wound extends into the cavity of the chest. For, even when the pleura is found to be divided, if the wound is attended with no urgent symptoms, the information is of no practical use, if we make it a rule to adopt, without the least delay, a strict antiphlogistic plan of treatment, in all cases, in which there is any doubt, or chance of the parts, within the chest, being wounded, and likely to inflame. Besides, very frequently, the symptoms are more urgent and alarming, than they could be, were only parts on the outside of the thorax injured; and, in these instances, it is obvious, that the employment of a probe cannot be necessary for discovering, that the wound extends into the chest.

We have above adverted to inspecting the weapon, with which the wound was inflicted, as a mode of gaining some information, concerning the probable depth of the wound. Enquiry may also be made, in what direction it was pushed: and, sometimes, the blood on the instrument will denote how deeply it penetrated. It is clear, however, that though information of this kind may be obtained, in a few instances, in general, it is otherwise.

When, by any of the above means, it cannot be learnt, whether the wound penetrates the chest, or not, various authors recommend the injection of luke-warm water. If the water regurgitates at once, they conclude, that the injury is only superficial; but, when the fluid, either wholly, or in part, continues in the wound, without producing any external swelling, they infer with certainty, that an opening has been made in the pleura. This plan of examining the state of parts, however, is much more objectionable, than the employment of a probe; for, if the liquid be propelled, with a certain degree of force, for the purpose of driving it to the bottom of the wound, parts, which were not before hurt, will in this manner become in-

jured. The fluid may also be injected into the cavities of the cellular substance, and may seem to be passing through the track of the wound into the chest, while, in reality, not a drop does so. Besides, is it a warrantable proceeding to try to insinuate any quantity, or kind, of liquid, whatever, between the pleura and lungs, into a situation, in which it must necessarily obstruct the important function of respiration, and cause serious inconvenience?

When air issues from the wound in expiration, there is ground for suspecting, that the lungs are wounded. But, authors have erred in setting down this circumstance, as an infallible criterion of the nature of the accident; for, the same symptom may happen, when there is only an opening made into the chest, without any injury of the lungs whatever. The air, which is expelled in expiration, has previously got into the bag of the pleura through the wound, in inspiration. In such cases, the external air insinuates itself, through the opening into the chest, between the pleura and lungs, and, it will be seen to escape, during expiration, although the lungs may not be at all wounded. In order to remove all doubt upon this subject, the patient should be requested to expire, as strongly as he can, so as to force out whatever air may have accumulated in the chest. At the end of each expiration of this kind, care must be taken to bring the skin closely over the orifice of the wound, and to keep it thus applied, during each following inspiration, for the purpose of preventing the external air from entering. In this way, if there be no wound of the lung, all the air will soon be expelled; but, when some still continues to come out in expiration, we may conclude, with certainty, that the lungs are wounded.

Sometimes, an emphysematous swelling takes place round wounds of the thorax, in consequence of a quantity of air diffusing itself in the cellular substance. This symptom is very uncommon in wounds, which are straight, and ample; but, it is by no means, unfrequent, in wounds caused by narrow stabs, more especially oblique ones, and by the points of broken ribs (See *Emphysema*.) When a considerable quantity of blood flows from a wound of the chest, there is great cause for conjecturing, not only, that it has penetrated the cavity of the thorax, but, also, that some of the thoracic viscera are injured. Excepting the intercostal arteries, which run along the lower edges of the ribs, and the trunk of the thoracic arteries, all the other vessels, on the outside of the chest, a very inconsiderable

A proper compression will soon shew, whether the blood escapes from an artery on the outside of the cavity of the pleura. The situation, and direction of wounds very frequently denote at once, that the hemorrhage cannot proceed from any of the trunks of the thoracic arteries.

Even the appearance of the blood, which comes from the wound, may lead to some conjectures, concerning the depth of the injury. The blood, which flows from wounds of the lungs, is of a brighter scarlet colour, and more frothy, than that which is emitted from any other part.

There can be no doubt of the lungs being wounded, when the patient is observed to spit up blood; but, the absence of this symptom is, by no means, to be regarded as a proof of the contrary.

The state of the pulse, and that of respiration, ought to be particularly attended to by the practitioner. Neither one, nor the other, seems altered, at least at first, when wounds do not reach more deeply, than the integuments; but, those, which penetrate the cavity of the thorax, and, especially, such as injure any of the viscera, may frequently be distinguished, from the very first moment of their occurrence, by their effects on the sanguiferous system, and the function of respiration. When the lungs happen to be wounded, at a place where they have contracted an adhesion to the pleura, the wound may extend to a great depth, and yet no air may be diffused in the cavity of the thorax, nor the functions of these organs be at all disturbed. But, when either air, or blood, has insinuated itself between the lungs and the pleura, the lungs become immediately oppressed, the breathing is attended with difficulty, the pulse is weak, contracted, and intermittent; and no doubt can be entertained, concerning the nature of the injury.

Having said enough, relative to the diagnosis of wounds of the thorax, we shall next consider their treatment.

Wounds of the thorax, which only injure the integuments, are not generally attended with any danger; they heal with the same readiness, and by the same means, as common, superficial, wounds in any other part of the body.

But, when the surgeon has to treat a punctured, or a gun-shot wound, it is too frequently directed, by writers on surgery, to lay open the track of the injury, from one end to the other with a knife, if its course should not be too extensive, and then to dress the cavity down to the bottom. Such authors also add, that when the track of the wound is so extensive, as not to admit of this plan, it is better to introduce a seton through it.

Their object, in employing these methods, is to prevent the outer part of the wound from healing too soon, and thus give time for the whole of it to heal in an equal degree. Afterwards, they advise the silk of the seton to be gradually diminished, and when, at length, the whole of it is removed, a slight degree of compression, kept up for a few days, is deemed sufficient for the completion of the cure.

The French surgeons have the discredit of bringing setons into fashion in this branch of surgery, and I am particularly glad, that an able modern writer has exposed the absurdity of the practice. "We find (says Mr. John Bell) the history of it, to be plainly this: that as Guy de Chauliac, Paré, and all the older surgeons, did not know how to dilate gun-shot wounds, they found these same setons useful in bringing the eschar sooner away, and in preserving an open wound; and, as they believed the wounds to be poisoned, they took the opportunity of conducting, by these setons, whatever acrid medicines might, according to the prevailing doctrines of that time, have any chance of correcting the poison." Mr. J. Bell notices, how surprising it is to see the cruelty, and perseverance, with which some modern practitioners, particularly, French, draw these cords through wounded limbs; and when the roughness of such a cord, or the acrimony of the drugs conveyed by it, produces a copious suppuration, these men are delighted with such proofs of their success. The setons have been introduced by the French surgeons, across the thickest parts of the limbs, along the whole length of the forearm, and, at the same time, frequently through the wrist-joint. The setons have also been covered with stimulating applications. Profuse suppurations, and dreadful swellings of course ensued; still, as Mr. J. Bell has remarked, these cruelties were continued, till the wound healed almost in spite of the pain; or till the coming on of very dreadful pain, great suppurations, convulsions, &c. made the surgeon discontinue the method, or even amputate the limb. The French have become so familiarized to setons, that they do not restrict their use to flesh wounds, they pass them quite across the thorax, across the abdomen, and even through wounds of the knee-joint.

When we wish to excite inflammation, in the cavity of the tunica vaginalis, for the purpose of radically curing a hydrocele, we either pass a seton through the part; lay it open with an extensive incision; cram a tent into it; or inject some irritating fluid into it. While the animal machine continues the same, says Mr.

John Bell, the same stimuli will produce the same effects, and a seton, injection, or long tent, if they produce pain and inflammation in the scrotum, will not be easy in the chest; and, unless we can use them in the chest, with the same intentions, with which we use them in the hydrocele, (in other words) unless we are justified in inflaming the chest, and causing an adhesion of all the parts, we cannot use them, with any consistency, or good sense.

With regard to the cases, which the French adduce in confirmation of the good effects of their plans, I am entirely of opinion with Mr. J. Bell, that the facts only prove, that *the patients recovered in spite of the setons*. "It is like (adds this author) what happened to a surgeon, who was dabbling in the thorax with a piece of caustic, which fell directly into the cavity of the chest, where it caused very large suppurations, and yet the patient was saved. The patient recovered, in spite of the caustic, just as M. Guerin's patient, and many other poor unhappy souls, who lived in spite of the setons. One would think, that people took a pleasure in passing setons across the eye-ball, the chest, the knee-joint, &c. merely to make fools stare, when the business might be as effectually done with an abscess lancet."

Mr. John Bell, in his usual lively style, makes the employment of tents, in wounds of the chest, seem equally ridiculous and improper. Indeed, he says, *he knows of no occasion in all surgery, in which tents can be useful, except in the single one of a narrow opening, which we desire to dilate, in order to get at the bottom of the wound; and where either, on account of some great artery, or the fearful temper of our patient we dare not use the knife. (See J. Bell on Wounds. Discourse 2, Vol. 2.)*

Having hitherto been engaged, rather in pointing out, what ought not to be done, than what ought, I shall next make some remarks on the line of conduct, which should be adopted, in cases of wounds of the parietes of the chest.

When the wound is a common cut, the sides of the division are to be brought into contact, and maintained in this position, by the aid of strips of adhesive plaster, compresses, and a bandage, until they have grown together. There will very seldom be any occasion to employ sutures in these instances, if the surgeon only observe to relax such muscles as happen to be cut, or to be situated immediately under the wound of the integuments.

As cut wounds seldom, or never penetrate the chest, and there is generally no

reason, why they should not unite by the first intention, without being followed by extensive inflammation and abscesses, only a moderate use of antiphlogistic means will usually be necessary. Bleeding will not often be requisite. The grand objects are, to keep the patient in a quiet state, on rather low diet, and to hinder him from taking wine, porter, spirits, or any stimulating beverages.

If the wound, instead of healing favourably, should inflame, the treatment should be regulated by the principles laid down in the article *Inflammation*. If it should suppurate over its whole surface, still the sides should generally be kept approximated by one, or two strips of sticking plaster; for, in this way, the cavity, which must now be filled up by granulations, will be rendered much smaller, than it otherwise would be. The softest particles of lint may be laid in the cavity of the wound, which the sticking plaster does not entirely remove, and over the whole a pledget of some mild, unirritating ointment. No pressure is now proper, until the inflammation diminishes; and if the matter should be very copious, attended with much surrounding inflammation, the best application would then be an emollient poultice. The patient should also be bled, and leeches should be applied, as often as necessary, round the wounded part.

When the case is a stab, or punctured wound, the fibres of the divided parts are not simply cut, they are also considerably stretched, bruised, and otherwise injured. Hence, they cannot, in general, be expected to admit so readily of being united, as the sides of a clean incision, made with a sharp instrument. However, the possibility of uniting the opposite sides of punctured wounds must depend very much on the shape of the weapon, and the suddenness, roughness, and violence, with which it was driven into the part. A prick with a needle is a punctured wound; so is that so often made by surgeons with their lancets; yet, these injuries do not so frequently bring on violent inflammation, and abscesses, as those wounds often do, which are inflicted with bayonets, and pikes.

Let us suppose a man has received a thrust of a bayonet, which has run into the skin and muscles, covering one side of the thorax; what plan can the surgeon follow, with the greatest advantage to his patient?

Instead of laying open the whole track of such a wound with a knife, as is barbarously recommended in many of the principal works on surgery; instead of drawing a seton through its whole course,

or of cramming into the part, a hard, irritating tent; the practitioner should take whatever chance there is of uniting the wound without suppuration. For this purpose, he should recollect, that the great degree of violence, done to the parts in punctured wounds, is the reason, why they are so apt to inflame and suppurate. Hence, the expected inflammation is (to use a vulgar expression) to be knocked on the head, if possible, on the very first instance; and immediately the wound is dressed, the patient should be freely bled, and take some saline purgative medicines. With regard to the dressings, the orifice of the wound may be closed with sticking plaster, if the circumstance is practicable: if not, it may be covered with any mild superficial applications. Over the track of the stab, a compress should be placed, and over this a common roller applied with some degree of tightness. Thus, the sides of the wound will be kept, as much as possible, in universal contact; the chance of union by the first intention taken; and all painful operations avoided.

If strict antiphlogistic means, and pressure, are thus put in practice, many stabs unite without abscesses, when surgeons entertain little hope of such success.

But supposing, that suppuration follows, and a collection of matter takes place, will the patient suffer more, or be put into greater danger, by having a proper depending opening, of just sufficient size, now made into the abscess at a proper place, than if he had submitted to have the formidable operation of laying open the whole extent of a stab, performed in the first instance. In short, will he suffer half so much, be half so long in getting well, or have to encounter half the danger? With all this advantage, he will have taken a certain chance, which attends all these cases, of the wound becoming united by, what is called, the first intention, that is to say, without any suppuration. I need not enlarge upon this subject, but refer the reader to *Punctured Wounds*, in the article *Wounds*, and to the treatment of abscesses, in the article *Suppuration*. Gun-shot wounds, only injuring the parietes of the chest, are to be treated, according to the principles explained in the article *Gun-shot Wounds*.

OF WOUNDS PENETRATING THE CAVITY OF THE THORAX.

Wounds, which penetrate the chest, are always dangerous, and consequently, claim the utmost attention of the practitioner. We shall first treat of such wounds, as

enter the cavity of the thorax, but without injuring any of the viscera.

In the healthy state, the lungs so completely fill the cavity of the thorax, that both in inspiration and expiration, they are always in close contact with the pleura; and, whenever air, blood, or any other matter, insinuates itself, between the outer surface of the lungs, and the inner one of the pleura, more or less oppression, and difficulty, of breathing immediately take place. In all wounds, attended with a division of the pleura, occurring in a situation, where there happens to be no adhesion between this membrane and the lungs, some of the external air, or a small quantity of blood, or both, can hardly fail to get into the cavity of the thorax. If one of the intercostal arteries should be wounded, and the external wound be, at the same time, very narrow, the blood furnished by this vessel, is very apt to insinuate itself inwardly into the chest, and immediately occasion an immense oppression of the breathing, and other symptoms of pressure on the lungs. Of what is to be done in this case, we shall presently speak.

When a wound is known to have entered the pleura, and there is no symptom leading to a suspicion, that the lungs, or any large vessel, is wounded, the injury is to be dressed according to common principles, and the more superficially the better. Authors also usually direct us, just before we close the opening, to tell the patient to make a deep inspiration, for the purpose of expelling as much of the air as possible, which may have got into the cavity of the pleura. At the end of such inspiration, the edges of the wound in the skin are to be brought together, and kept so, with sticking plaster compresses, and a roller, applied round the body. The other grand indications, in the treatment, are to avert inflammation of the pleura and lungs, by a rigorous adoption of the antiphlogistic plan, copious bleeding, in particular, not being forgotten.

Let us now consider such wounds as penetrate the chest, and are complicated with some of the following circumstances: 1. With the presence of foreign bodies. 2. With injury of one of the intercostal arteries. 3. With a protrusion of a portion of the lungs. 4. With a considerable emphysema. 5. With an extravasation of blood in the thorax.

1. Almost all wounds, which penetrate the chest, occasion pain and difficulty of breathing. Many of them are also followed by an emphysematous swelling round the wound; the patient is frequently attacked by a spitting of blood: and after having had, for some time, a small con-

tracted, irregular pulse, with a pallid countenance, and cold extremities, he is too often seized with febrile symptoms. These should be counteracted by bleeding, diluent beverages, a proper regimen, quietude, and external applications of the resolvent kind. If such symptoms should continue longer, than the first few days, without any diminution, writers inform us, that there is ground for suspecting, that they depend upon the presence of some foreign body. However, it may be doubted, whether Sabatier's advice, immediately to make search after the extraneous substance, is proper, under these circumstances. For my own part, I cannot think the symptoms, above related, by any means unequivocal, and even were they so, the practice would still be questionable. (See *Médecine Opératoire*, tom. 2, p. 244.)

M. Sabatier has quoted the two following cases, for the purpose of shewing what may be attempted in these cases.—“A man, twenty-seven years of age, was struck very violently with a knife, on the outer part of the fourth true rib. Simple dressings were applied for the first few days; but, a considerable coughing, and spitting of blood ensuing, M. Gerard was consulted. This gentleman found, that the symptoms depended, on the presence of a piece of the blade of the knife, which pierced the rib, and projected, to the extent of about six lines, into the cavity of the thorax. So little of the foreign body was on the outside of the rib, and it was so fixed in the bone, that it could neither be extracted with any kind of forceps, nor even moved in the least with a leaden mallet, &c. Although, in these urgent circumstances, there seemed to be no other resource, except that of sawing, or cutting out the portion of the rib, M. Gerard, however, thought, that an attempt might first be made to extract the foreign body, by pushing it from within outward. For this purpose, having put a steel thimble on his index finger, he introduced it into the cavity of the thorax, and thus succeeded in pushing out the piece of the knife.

The foreign body being taken out, M. Gerard next introduced his finger, without the needle, for the purpose of examining, whether the inner surface of the rib was not splintered. A spicula of the bone was in fact detected, capable of pricking the parts within the chest; but, it was too firmly connected with the rest of the rib to admit of being completely taken out. Hence, M. Gerard adopted the plan of making the splintered piece of bone continue in close contact with the main portion, by immediately surround-

ing the whole rib, at the splintered part, with a ligature. This was passed by means of a curved needle, and firmly tied over a thick compress. To these ingenious proceedings, as the French term them, was imputed, not only the cessation of all the bad symptoms, but a speedy recovery. (See *M. de la Faye's Notes to the Traité des Opérations de Dionis*.)

M. Sabatier quotes another case, which we next insert in this Dictionary, for the information of the reader.

An officer was shot in the left side of the chest. The ball entered about where the bone, and cartilage of the seventh true rib unite, and came out in the situation of the angle of the same bone, which was broken in two places. The neighbouring part of the first false rib was also broken behind. Incisions were made, which enabled the surgeon to take away several splinters of bone, and facilitated, (that absurd French practice) the introduction of a seton. Soft mild dressings were put on the wounds. In consequence of the dangerous nature of the accident, the patient was bled twenty-six times, with a view of relieving the fever, difficulty of breathing, and spitting of blood. On the fifth day, suppuration had begun to take place, and the seton could be easily drawn. In about a fortnight, the patient experienced a considerable abatement of his sufferings, and passed some of the ensuing days in a tolerably easy state. Circumstances having made it necessary to move him to another place, on the twenty-fourth day, he had an uneasy night: febrile symptoms took place, and the discharge was not of its usual consistence. Two more bleedings were practised, and the critical state of the patient led the surgeon to examine the wounds again. On passing a finger into the wound, which was situated behind, a foreign body was felt, and easily extracted. It proved to be a piece of the patient's coat. A spicula of bone was also felt more deeply lodged, which required the posterior wound to be dilated for its extraction. Some amendment followed the removal of these extraneous substances.

On the thirtieth day from the receipt of the wound, the bad symptoms having come on again, two more bleedings were practised, and, as fear was entertained, that the seton did harm, it was suppressed. The patient now first made complaint of feeling something, which pricked him, in a deep situation, between the two openings of the wound. It was found impracticable to ascertain the cause of this sensation, without dividing all that intervened, be-

tween the two wounds, and which formed a space of seven or eight finger-breadths. This serious operation was resolved on in a consultation, and M. Guerin set about it by cutting from within outward, the parts between the two ribs, with the aid of a finger introduced into the posterior wound. Care was taken not to cut near the lower edge of the upper rib. In this way, the whole track of the ball was laid open, and, in the middle of it, a very sharp splinter was found, sticking in the substance of the lungs. This was removed, and the wound dressed with simple applications. From this day all the bad symptoms ceased, and the cure was completed at the end of four months. (*Obs. de Guerin in Mem. de l'Acad. de Chirurgie, tom. 2; 4to.*)

Mr. John Bell has taken notice of the preceding case: he observes, that some of M. Guerin's steps were bold and good, as well as successful; but, that the employment of the seton was wrong. The example teaches us several important circumstances: 1. The propriety of making very free dilatations for the extraction of splintered pieces of bone. 2. The utility of repeated copious bleedings, which, in the above case, indeed, had the greatest effect both in preventing such hemorrhage in the chest, as would probably have produced suffocation, and also in averting a degree of inflammation in the thorax, which would have proved fatal.

Mr. John Bell very judiciously condemns the seton, used by M. Guerin: "Had M. Guerin (says he) been asked what good it was to do, it would have been difficult for him to have invented even a plausible apology for the practice, which, if it was not doing good, could not fail to do harm. Was this seton necessary for keeping the wound open? No, surely; for the wound could not have closed, while it was irritated, and kept in suppuration by splinters of bone, and a piece of cloth within the breast. Was it to draw the piece of cloth out? Surely, in the course of twenty days, a piece of cloth would have had some chance, at least, of being floated towards the wound, either by the natural flux of the matter, or by the help of a mild injection. Was it useful in supporting the discharge? This would have been a sore question for M. Guerin; for it supported the suppuration only by inflaming the chest; and where inflammation of the chest, or high cough, or bloody expectoration, or a profuse discharge, were the chief dangers, a great seton could hardly be a comfortable inmate in the breast. I think one might very boldly promise to produce bloody expectoration and terrible cough, profuse

suppurations, and oppression, to any degree, by drawing such a cord across a sound thorax."

Mr. John Bell next censures M. Guerin for not having discovered the pricking piece of bone before the thirty-eighth day; and imputes this, in some degree, to the seton, the pain of drawing which across the chest deadened every lesser pain, and, consequently, the patient could not feel the trifling pricking of the bone, till his greater sufferings from the seton were allayed. "In short, (says Mr. John Bell) M. Guerin passes a great strap of coarse linen across the cavity of the chest, and when it causes inflammation, he thinks to subdue it by bleeding; when M. Guerin continued for thirty days drawing a coarse seton through the breast every morning, and bleeding for the cough every night, what did he do, but raise inflammation with his left hand, to shew how well he could cure it with his right?" (*See John Bell on Wounds, Vol. 2, p. 36—38.*)

2. When one of the intercostal arteries is wounded in the track of a narrow oblique wound, the nature of the accident cannot at first be known. The blood, which the vessel pours out, commonly makes its way into the cavity of the chest, where it causes an extravasation, which is more, or less considerable. But when the wound is ample, and penetrates in a direct manner, the effused blood, which has all the characters of arterial blood, leaves no doubt, concerning the injury of an intercostal artery. However, should there still be the least uncertainty, it may easily be dispelled, by introducing the end of a finger into the wound, and making pressure with it on the lower edge of the rib, which corresponds to the vessel suspected to be injured. Some have recommended introducing, under the rib, a hollow cylindrical piece of pasteboard; and they infer, that when the blood flows through its cavity, it comes from the intercostal artery; but, that if it passes out underneath the pasteboard, it issues from the cavity of the thorax. However, besides several objections, which might be urged against this method, its adoption cannot be made, unless there be a large, open wound, in which case, the plan may be dispensed with, because the place whence the blood flows, is now visible.

Surgeons, long ago, began to exercise their industry, in devising some means for suppressing hemorrhage from the intercostal arteries, in wounds of the chest. Gérard first proposed to stop such hemorrhage, by means of a ligature. His plan was to enlarge the external wound, as far as the upper edge of the rib, corresponding to the intercostal artery, which

is wounded, and then to introduce into the chest a common curved needle, armed with a ligature, to which is attached a dossil of lint. The needle is to be passed behind the rib, rather higher than the superior edge of the bone. The point of the instrument is then to be pushed, from within outward, and brought out through the external wound, together with the ligature, which follows it. When the dossil has come into contact with the artery, the two ends of the ligature are to be tied over a thick compress, placed on the outside of the rib. In this manner, the bone is surrounded with the ligature, and the artery compressed.

Goulard, a surgeon of Montpellier, having found difficulty in passing a common needle, whose shape little corresponded to the track, through which it had to pass, being curved towards its point, and straight towards the eye, had a particular one constructed for this operation. He also feared, that the former instrument, which has a sharp point, and edges, might wound the lungs. The one, which Goulard invented, formed three-fourths of a circle, and was fixed on a long handle, which facilitated its being introduced. The eye, in which the ligature is to be put, is situated near the point, which is a little blunted, and the ligature lies also in a groove, constructed along the convexity of the instrument. When this needle had passed through the intercostal muscles, and its point had made its appearance over the rib, which was above the artery, the ligature used to be united, and held, while the needle was withdrawn at the place, where it had entered. The ligature was then tied, just in the same manner, as in Gérard's method.

Since the use of the ligature, it has been thought, that compression might answer better. Löttery, professor of anatomy in the university of Turin, had constructed, for this purpose, a steel plate, which he submitted to the inspection of the Academy of Surgery, and is both described, and engraved in the second volume, 4to. of the *Memoirs of this Society*. This plate, as we have said, is made of steel, and is of a long shape; narrow at one end; broad at the other; curved in two directions at its narrow part; and pierced at this place with some holes, by means of which a compress, calculated for compressing the artery, is fastened on the instrument, an opening having been first made in the situation of the wound of the vessel, for the purpose of giving vent to blood, already extravasated in the chest. The other end of the steel plate has two long parallel slits,

through which a ribband is passed, in order to fasten the instrument.

This steel contrivance is used in the following manner: when the wound, corresponding to the intercostal artery, is sufficiently extensive in the transverse direction, the narrow, bent end of the instrument is to be introduced, in such a way, that the lower edge of the rib above may lie in the concavity of the curvature, and the compress press on the edge of the bone, and, of course, on the artery. The rest of the instrument applies itself to the side of the thorax, in which situation it is to be fastened. When the wound is not ample enough, a sufficient dilatation of it must be made for the introduction of the instrument.

M. Quesnay made use of a piece of ivory, which he covered with lint, &c. and then introduced within the chest. The instrument was then drawn from within outward, by means of a ribband, which was fastened to it, and thus the necessary compression was produced.

Quesnay's plan is somewhat like that invented by Löttery. But, to have introduced the compress entirely into the thorax, together with the ivory, which was the basis of it, and then to have drawn the contrivance from within outward, as was probably intended, a very large wound would have been indispensable. This is also one of the objections to Löttery's instrument, which, in fact, could only be employed, when there was a free and ample opening. However, there are other objections to this instrument: it obstructs the motion of the thorax; it prevents blood, extravasated in the chest, from readily making its escape, notwithstanding the opening made in the curved part of the instrument; and, lastly, it does not effectually stop the bleeding, because it does not hinder the rib from rising, against which the pressure should be made, and, consequently, the hemorrhage may then take place.

Belloque, seeing the inefficacy of all the compressing means, used before his time, and their inconveniencies, invented an instrument, which, he says, is calculated from making proper pressure, and, following, the motion of the ribs, without hindering the escape of extravasated blood. The machine is engraved, and described, in 2 tom. 4to. of the *Memoirs of the Royal Academy of Surgery in France*. It is composed of two plates, which are wadded, and capable of being approximated, by means of a screw. This instrument, as M. Sabatier observes, does indeed promise to be completely effectual in its action; but, it is complicated, and

awkward, and its utility is founded on the supposition of the wound being larger, than wounds are, which are made with common weapons.

As the object is to make pressure on the artery, it is quite unnecessary to have, for this rare accident, numerous instruments, which could seldom be at hand, and which are also liable to all the above objections. A common dossil of lint (says Sabatier,) fastened to a strong ligature, and introduced between the two ribs, or even quite into the chest, and then drawn, from within outward, like Quesnay's compress, would fulfil every desirable purpose. This being done, the external wound should be covered with simple dressings, and a bandage applied round the body. The patient should be freely, and repeatedly bled, and treated on the most rigorous antiphlogistic plan; every method being adopted, which seems proper, in cases of wounds penetrating the chest, which are almost always attended with symptoms of high inflammation and irritation. The dressings should not be removed, till the wound has suppurated, and then the rest of the treatment resembles that, which becomes necessary in wounds with extravasation, of which we shall presently speak.

3. The protrusion of a portion of the lungs, in consequence of wounds penetrating the chest, is a very unusual case; but, there are some instances recorded by writers. Schenckius relates an example, taken from Rolandus, one of the commentators on Albucasis. Rolandus having been called to a man, who had been wounded in the thorax, six days before, found a portion of the lungs protruded, and in a state of mortification, in consequence of the compression, which it had sustained. This surgeon extirpated the part, and applied astringent powders to the wound: the patient recovered in a very little time, without any indisposition whatever remaining.

Tulpius has recorded a similar fact. A man received an extensive wound, just below his left nipple. His naturally gay disposition, however, led him to neglect the injury; and, on the third day, a piece of the lungs, three finger-breadths long, protruded at the wound. The patient went to Amsterdam, whence he was distant two days' journey, for the purpose of receiving succour in one of the hospitals of that city. The protruded piece of lung, which was already mortifying, was tied, and cut off with scissars. It weighed three ounces. The wound healed in a fortnight, and the patient experienced no complaint afterwards, except a slight cough, which troubled him

from time to time. The man survived the accident six years, leading a wandering, drunken life. After death, nothing particular was observed in the thorax, except that the lungs had become adherent to the pleura, in the situation of the wound. Fabricius Hildanus also relates a case, which was communicated to him by Abel Roscius. A man was wounded with a knife, between the fifth and sixth ribs, near the sternum. A piece of lung protruded through the opening, and it was wished to reduce the part; but, as it seemed to assume a livid colour, it was extirpated with the actual cautery. Having dilated the wound, and kept the ribs apart, with a wedge, made of wood, the portion of lung, which had been girt by the opening, was returned. The patient after taking, what were called, pectoral and vulnerary medicines, soon got well, and felt no complaints in his chest afterwards.

A fourth example of a piece of lung, making a protrusion through a wound in the thorax, is among the cases, recorded by the celebrated Ruysch. The servant of a sea-faring man was wounded in the anterior and inferior part of the chest, and was immediately attended by a surgeon, who mistook the protruded piece of lung, for a portion of omentum, and applied a tight ligature round it. Ruysch, who was called in to the case, soon detected the error, which had been committed; but, he had no apprehensions, as he was convinced, that the wound would heal very well, as soon as the tied piece of lung was detached. The event justified his prognosis, and the patient recovered, in the same manner as the above-mentioned ones.

When the piece of protruded lung is sound, and its small size would admit of its being reduced, the attempt ought to be made, without the least delay. It should be done on the same principles as those, on which we return into the abdomen a piece of protruded intestine, or omentum. (See *Abdomen*.) A recurrence of the accident is to be prevented by closing the wound, and placing a compress over it. But, when the piece of lung is already in a mortified state, in consequence of the constriction, which it has suffered, or when its large size prevents reduction, Sabatier is of opinion, that the only resource is to extirpate the part, after applying a ligature round its base. If the latter step were not taken, a dangerous hemorrhage might follow, or else an extravasation of blood in the thorax. (*Médecine Opératoire*, tom. 2. p. 224.) However, the practice just now recommended seems very questionable:

in the instance of mortification, extirpation is clearly unnecessary, as the dead part will naturally be thrown off by a spontaneous process; and, when the wound is too small to allow the part to be returned, ought it not to be dilated, rather than cut off a considerable portion, or even any, of the lung?

4. Emphysema is another symptom, with which wounds penetrating the chest are frequently complicated, especially, when they are small, and do not enter the thorax in a direct manner. When such wounds are small, and not straight in their course; when their track is rendered impervious either by some change in the situation of the muscles, by the swelling, by clots of blood, or by any extraneous substances; air may insinuate itself into the cellular substance, so as to cause a great deal of tumour and distention. The emphysema is easily distinguishable by the tumefaction of the part affected, without any pain, or change of colour in the skin, and by the crepitation, which is perceptible, on making the air quit the situation which it occupies, and pass into the adjoining cavities of the cellular substance. The emphysema may take place, in cases in which the lungs are not wounded, and also in others, in which they are so. In the first instance, the emphysematous swelling is caused by the external air, which insinuates itself into the cavity of the thorax through the wound, during the first inspirations, which follow the occurrence of the accident, and the same air is expelled in the subsequent acts of expiration. In the second case, the emphysema arises from the escape of air from the lungs, during inspiration, first into the cavity of the thorax, and thence, through the inner opening of the external wound, into the cellular substance.

I should not have deemed it necessary to have said any thing in this part of the work, on the present subject, but should have contented myself with referring the reader to the article *Emphysema*, were not the cause of this symptom rather perplexing, and, did I not hope, that the following extract from Dr. Halliday's late publication will tend to facilitate the comprehension of these cases. This gentleman mentions the following circumstances, under which air may escape from the lungs, or emphysema arise.

1st. "An injury or disease of the pleura pulmonalis, causing a wound or ulceration of that membrane, and thus allowing the air to escape from the lungs, as in oblique external wounds, where the outer opening, and that of the pleura cos-

talis have healed, or closed up, and in ulcers of the surface of the lungs.

2dly. "The pleura pulmonalis, and pleura costalis, may be wounded or ulcerated, when there is no external opening, as when the ends of fractured ribs penetrate through both into the substance of the lungs, and it is from this accident, &c. that emphysema most commonly takes place.

3dly. "The common integuments of the parietes of the chest, the intercostal muscles and the pleura costalis, may be wounded, while the pleura pulmonalis and the lungs remain uninjured, so that the air admitted from without, and collected in the cavity of the thorax, may be pressed into the cellular membrane, so as to occasion emphysema."

Dr. Halliday shortly afterwards remarks: "that the lungs in the thorax, have often, and not unaptly, been compared to a bladder in a close pair of bellows: but if we suppose the bellows to be divided into two compartments, and each of these to contain a bladder, which mutually communicate with each other, and with the external air, by means of a tube, which is exactly adapted to the nozzle of the bellows, and which admits the air only into the cavity of the bladders, and not into the space, betwixt the bladders and bellows, we shall then have a perfect representation of the mechanical structure of the thorax. The bellows will represent the thorax, divided in the middle by the mediastinum; the bladders will represent the lungs of the right and left sides; and the tube, which communicates with the bladders and with the external air, will represent the trachea. The only thing, which is wanting to render this mechanical representation perfect, is, that the bladders should exactly fill the bellows, so as to leave no air betwixt them and the bellows."

Dr. Halliday notices, than when we lift up the handle of the bellows, the bladders become filled by the external air, which rushes in through the tube, which communicates with both of them. When the handle is depressed, the air is expelled again. In the like manner, the lungs are filled with air, and emptied again when the capacity of the chest is enlarged by the inspiratory muscles, and then diminished by the expiratory ones.

When emphysema arises from a wound, or ulceration of the pleura pulmonalis, on one side of the thorax, the case is nearly the same as if an opening were made in one of the bladders, which opening would form a communication, as Dr. Halliday observes, with the bellows and bladder

on one side. If this should happen, while the handle of the bellows is depressed, no sooner is the handle raised, than air rushes into the space, betwixt the bladder and bellows, and, on keeping up the handle a little while, the bladder will become quite collapsed, and the place which it occupied, while distended, will now be occupied by the air. If now, says Dr. Halliday, "we attempt to force out the air, by depressing the handle of the bellows, we shall find that this cannot be done; for, there is no direct communication, between the bellows and the external air; and, as the effused air presses equally on all parts of the collapsed bladder, it cannot escape through it."

When the thorax is expanded in inspiration, the pressure is taken off the surface of the wounded lung, and the air, which now enters this organ, instead of distending its cells, passes through its wound into the space between the pleura pulmonalis, and pleura costalis. The lung will, indeed, be partially expanded, as long as inspiration on that side goes on; the more so, the smaller its wound is. At every expiration, however, when the thorax is diminished, the effused air will be compressed against the wounded lung; but none of the air, which has escaped, can re-enter the lung again; "because (as Dr. Halliday accurately remarks) the whole of the air contained in the lung must be forced out, and then the pressure (of the air) against every part of the collapsed lung being equal, will prevent its separating any part, so as to make a passage for itself into the trachea." Thus fresh air accumulates at every inspiration in the space, between the pleura, while none can escape from the same situation during expiration, and the quantity accumulated will, at last, equal that which is received into the other lung, during the most powerful inspiration. Dr. Halliday notices, that some authors have termed this case *thoracic emphysema*; it is clearly attended with no diffusion of air in the cellular substance, a circumstance, generally implied, when we speak of *emphysema*.

When both the pleura pulmonalis, and pleura costalis are wounded, the same effusion of air between these two membranes continues to take place, from the above-mentioned causes, till the lung is collapsed. When an attempt is now made to expire, the injured side of the thorax must continue distended, notwithstanding every effort of the patient. However, when, in this expiratory act, the capacity of the thorax is diminished, and the air compressed, a part of it finds its way, through the wound in the pleura costalis,

into the common cellular substance of the parietes of the chest.

The passage of air into the cavity of the thorax during inspiration is, as Dr. Halliday observes, now more easy, than the return of that, which is already effused in the cellular membrane, and consequently, the *subcutaneous emphysema* continues to increase with the rapidity, which is remarkable, as long as the patient lives.

To explain the origin of *emphysema*, in cases of wounds, which only enter the chest, and do not injure the lungs at all, Dr. Halliday has recourse to the simile of the bellows, and bladders. Were an opening made into the bellows, without injuring the contained bladders, if the access of air by this opening be more free, than that by the nozzle, communicating with the cavity of the bladder, more air will enter by the opening, than by the pipe, on the handle being raised, so that the bladder will not rise as before, when no opening in the side of the bellows existed. If the latter opening be smaller, than that of the pipe, the bladder will only be partially filled, and, on depressing the handle of the bellows, the air, contained in the bladder, and that between the bladder and the bellows, will be expelled, in the same proportion to each other, as that, in which they were formerly filled. This process would continue to go on in the same way, did not the bladder naturally collapse more and more from its gravitation. Let us now stop the mouth of the pipe, while the handle of the bellows is raised, and the bladder partially filled. On trying next to depress the handle, it results, that, as no air can escape from the pipe, that air, which is contained between the bladder and the bellows, must be first evacuated, while that, contained in the bladder of the sound side, will be forced into the bladder on the injured side, and either distend it, so as to rupture it, or cause it to protrude.

Hence, in the case of a wound, penetrating the chest, without injuring the lungs, if the air can enter more freely by the wound, than by the trachea, more of it will enter, in the act of inspiration, into the cavity of the thorax, than into the lungs. On the contrary, when the opening of the wound is not so large as that of the trachea, less air will enter the thorax, than the lungs.

In expiration, the air will be expelled from the two different situations, in proportion to the quantity, which enters each of them in inspiration, and, no air at all would accumulate in the thorax, did not the lungs always tend to collapse from

their gravitation. Should, however, the patient, in making an effort to expire, contract the glottis, the air, contained in the lungs of the sound side, may be propelled into the bronchia and air-cells of the lungs, on the same side as the wound, so as to distend them, and even make them protrude at the wound.

Dr. Halliday remarks, that such a protrusion often happens, when wounds are made in dogs, and has been erroneously adduced as an argument against the collapse of the lungs, when an opening is made into the thorax of the human subject. See *Observations on Emphysema*, by A. Halliday, M. D. 1807. This work is highly deserving of perusal.

For information, concerning the treatment of the affection, the reader is referred to the article *Emphysema*, in this Dictionary.

5. We have already noticed, that wounds of the thorax may injure one of the intercostal arteries, and when the blood cannot find free vent outward, it may become extravasated in the cavity of the chest. The same consequence may follow wounds of the pulmonary vessels, those of the heart, or of the heart itself. When the hemorrhage, however, takes place from vessels above a certain size, the wounded person dies almost instantaneously; but, when they are not so large, he may live for a greater or less time, and receive the succour of surgery.

The following are the symptoms, which denote an extravasation of blood in the thorax. The patient feels great oppression, and such uneasiness as will not let him long continue in one position. He experiences much difficulty in standing up, or sitting up in his bed, unless he bends his body very much forward, in which position, the diaphragm is relaxed, and not so much dragged by the weight of the extravasated fluid. When the thighs are bent, the patient can lie with tolerable ease on his back; he is also not averse to lying on the side, on which the wound is situated; but, he cannot place himself on the opposite one, without feeling very acute pain in the situation of the mediastinum.

His respiration is short, frequent, and interrupted by sighs; his veins become empty; a mortal paleness spreads over his countenance; his extremities become cold; a viscid perspiration covers his neck and temples; his teeth chatter; his pulse becomes weak, and if, as most frequently happens, the lungs are wounded, he spits up frothy blood, and air issues from the wound.

Though one might suppose the above class of symptoms were always attendant

on a considerable effusion of blood in the thorax, yet they are not so. Wounded persons have been known to die of such an extravasation, whose respiration was tolerably free, and who did not complain of suffering more inconvenience in one posture than another. Sabatier says, that several facts of this kind have fallen under his own observation. Other wounded persons, also, who have suffered most of the complaints ascribable to extravasations of blood in the thorax, have been cured by ordinary means. M. Mery gives an account of a young man, wounded in the anterior and superior part of the chest, about two o'clock in the morning, who had such difficulty of breathing, and so much fever, five hours afterwards, that M. Mery was of opinion, that an extravasation had happened, and he was thinking of making an opening for the evacuation of the blood. A tumour, which originated near the great pectoral muscle, and presented, neither the feel of fluctuation, nor that of emphysema, made him suspend his decision. Some bleedings, and the application to the tumour of compresses, dipt in a mixture of spirit of wine and water, dispersed the symptoms. This recital shews, as M. Mery has remarked, how equivocal the symptoms of an extravasation in the chest are; how difficult it is to form an opinion; and how liable to failure any operation is.

However, even the assemblage of the above symptoms, did not lead M. J. L. Petit into a mistake. Having been requested to assist at an operation, which was about to be done on a wounded man, about whose armpit, pectoralis major, and latissimus dorsi muscles, a prodigious emphysematous swelling had taken place; whose respiration was painful and difficult; and who spit up frothy blood from his mouth; M. Petit gave it as his opinion, that it was unnecessary to make an opening into the chest. He thought, that it would be sufficient to enlarge the wound, which was at a little distance from the armpit, near the edge of the latissimus dorsi, so as to give vent to the effused air. This advice having been followed, the emphysema in a little while disappeared, and the patient soon recovered.

The equivocal nature of the symptoms of extravasations of blood in the thorax, has induced practitioners to pay the most scrupulous attention to every circumstance attendant on these cases. Valentine remarked, in several instances, that a few days after the wound, an ecchymosis occurred, at the angle of the false ribs, and spread towards the loins. The ecchymosis is described as being of a

clear purple colour, like the spots, which sometimes form on the abdomen, a little while after death. Such is the difference, between this ecchymosis and that, which consists of an extravasation of blood in the cellular substance, from the rupture of blood-vessels, which makes its appearance shortly after the accident, begins close to the injury itself, and is of a deep colour, commonly spotted with some red points. Valentine advised a counter-opening to be made, in a case, in which most of the symptoms of extravasation were combined with the above sort of ecchymosis. The advice was overruled, and the patient soon afterwards died. More than six pints of blood, were found extravasated in the thorax.

Sabatier remarks, that we cannot too highly applaud the zeal of those practitioners, who endeavour to dispel the doubts, which still prevail in some parts of surgery. At the same time, he thinks, that all, who take interest in the improvement of this science, should endeavour to ascertain the truth of any new observations, which are offered. Hence, he deems it proper to relate a case, which was communicated to him by M. Saucerotte (the father) an eminent military surgeon, and which shews, that the ecchymosis, observed by Valentine, is, at least, not invariably attendant on extravasations of blood in the chest. A carabinier, who had received a thrust with a sabre in the right side of the thorax, above the tendon of the pectoralis major, appeared to be going on very well for the first four days following the accident. On the fifth, he complained of difficulty of breathing, uneasiness, and an inability of lying on the left side, without aggravating his complaints. He complained of a great deal of pain in the region of the liver, and at the top of the shoulder. His pulse was small and contracted, and rather hard, than weak. The right side of the chest seemed larger, than the left. On the eighth and ninth day, the symptoms became more urgent, and the patient found no ease, except in leaning on his right side, and supporting himself on a chair, placed across his bed. This assemblage of symptoms indicated an extravasation of blood in the right cavity of the thorax; but, as the ecchymosis, which M. Valentine has described, was not apparent, M. Saucerotte thought that they might be deceitful. Their long continuance, however, had made him resolve to make a counter-opening, but, in the mean while, the patient died, in the night between the ninth and tenth day. When the operation was done on the

dead body, a pint of putrid blood flowed out.

When the surgeon feels assured, that an extravasation of blood in the thorax has really occurred, the only indication is to make an opening for its escape. However, before undertaking this operation, the revived state of the pulse, the return of warmth in the extremities, and the cessation of convulsions ought to denote that the hemorrhage no longer continues from the wounded vessels. If this were not the case, a fresh quantity of blood would soon be extravasated, and the patient die exhausted. Besides, by delaying to make an opening for the discharge of the blood, we give nature time to employ her own resources. Observers have recorded instances, in which extravasations of blood in the thorax have got well, without any operation. Fabricius ab Aquapendente relates an example of a man receiving so narrow a wound in the chest, that it was impossible to make out, whether it had penetrated the pleura, or not. The spitting of blood, weight on the diaphragm, fever, and oppression, with which the patient was soon seized, removed all uncertainty. It was determined to make an opening into the chest, when a large glassful of blood came away with the urine; the pain now subsided, the fever and other complaints abated; and a speedy recovery followed.

Though Fabricius sets this case down as one of extravasation, and that it was cured, in consequence of the evacuation of blood with the urine, both inferences may, at all events, be rationally questioned.

Authors make mention of five methods of discharging collections of blood in the thorax; viz. 1st. By placing the patient in a posture, which favours the escape of the blood; 2dly. By introducing a syringe for the purpose of sucking it out, or a mere cannula, through which it is to flow; 3dly. By enlarging the wound; 4thly. By employing injections; 5thly. By making an opening into the thorax in a depending situation.

1. Success cannot be expected from merely placing the patient in a posture, which is favourable to the escape of the extravasated blood, except when the wound is situated at the inferior part of the chest, and is large and direct in its course. Paré successfully adopted this method in the case of a soldier, who was stabbed in three places with a sword, one of the wounds, which entered the chest, being situated under the right nipple. The man was first dressed by a surgeon, who made several sutures. The

patient was soon afterwards attacked with considerable difficulty of breathing, fever, coughing, spitting of blood, and acute pain in the side. Paré, who was consulted the next day, suspected, that an extravasation had happened; consequently, he cut out the sutures, and placed the patient in a position, in which his feet were much more raised, than the head. Paré also recommended him to hold his breath, and then introduced his finger into the wound, in order to take away some clots of blood, which appeared at its orifice. By these steps, the discharge of seven, or eight ounces, of fetid, coagulated blood, was effected. Injections of barley-water, in which were mixed a little honey of roses and sugar-candy, gave the patient ease, and finished the cure.

2. The idea of sucking out of the cavity of the thorax, by means of a syringe, blood extravasated in this situation, was conceived a long while ago. The pipes of all syringes, for this purpose, should have blunt ends, lest they should injure the lungs. Mere tubes, containing a stilet, have also frequently been employed. In the cases, related by Scultetus, there is an example, in which an instrument of the latter sort was successfully made use of. No syringe, nor any suction with the mouth, was requisite; it was only found necessary to introduce the tube, and then withdraw the stilet.

Lamotte only used a simple cannula, which he introduced into the centre of the extravasation. Then having placed the patient in what he conceived to be the most favourable posture, and requested him to hold his breath, he drew off the collection of fluid. The cases, numbered 216, 217, 218, shew the success, which attended this method. Although it might also have answered very well in case 219, Lamotte saw, that the exceedingly high situation of the wound would not have allowed all the blood to be discharged, and, therefore, he made a counter-opening. Thus the thorax was completely emptied, and a recovery the consequence. When a cannula is employed, authors recommend it to be introduced every day, till the bad symptoms cease, and no more fluid escapes through the cavity of the instrument. After having given vent to blood, it allows a bloody serous fluid to escape, and at a later period pus, which becomes of a thicker and thicker consistence, the nearer the patient is to a recovery.

3. The cases, in which an enlargement of a wound, complicated with an extravasation in the chest, should be practised, are those, in which there is reason for

thinking, that the situation is favourable for the escape of the blood. The operation is performed by introducing a grooved director, along which the knife is to be guided. The integuments, and external muscles, are to be divided in a perpendicular direction, and the intercostal muscles in a line parallel to the ribs. Care is to be taken not to cut too near the lower edge of the upper rib, lest the intercostal artery should be wounded. Dionis relates, that he practised such an operation on a soldier, who was wounded at Bèfort in 1703, by the thrust of a sword below the right nipple, which made a direct opening into the thorax. As the patient was half a league from the town, his chest had become full of blood, before he could be assisted. When the extravasated fluid had been let out, Dionis made the patient lie on the wounded side, during the night, and in proportion as the blood continued to be thus evacuated, the breathing became free from oppression. The next day, the thorax was quite emptied, and the cure was so speedy, that the patient was in a state to join the army, a month afterwards.

4. The methods, which have just been explained, may be of use, when the blood retains its natural state of fluidity; but, when it has coagulated, as often happens, they can be of no avail. In this circumstance, the best plan, which can be adopted, is to inject warm water into the chest, which injection is the best calculated for loosening, and dissolving the coagula, and washing them out of the wound. A proper opening must, of course, be previously made. The French writers, even the modern ones (*Sabatier*) most absurdly recommend the injection of various detergent vulnerary decoctions, and of solutions of honey of roses, soap, salt, &c. What idea these authors can entertain of the great sensibility and tendency to inflammation of the lungs and pleura, or what good they can expect from such applications, is difficult of conception. I am firmly convinced, that the meanest scribbler on surgery, in this country, would be ashamed of being an authority for such advice.

5. When the wound is narrow, and situated at the upper part of the chest, we cannot expect to be able to give vent to the extravasated blood, without making a counter-opening at the lower part of this cavity. The best place for making the opening, and the proper manner of executing the operation, are explained in the article, *Paracentesis of the Thorax*.

When the opening has been made, the blood makes its escape. Its exit is to be

promoted by placing the patient in a posture, which makes the opening as depending as possible, and by desiring him to hold his breath.

After as much blood, as can be obtained, has been taken out, the common plan has been to maintain the opening, and not let it heal, till after a certain time.

For this purpose, the old surgeons used to employ tents, made of lint, which were proportioned to the size of the opening, being short, soft, and flattened. They had a sort of head, and a double ligature attached to them, and were often dipped in some kind of application. Tents have now been quite abandoned, as they are apt to bring on an inflammation of the lungs, hinder the escape of whatever fluid is contained in the chest, and cause great irritation in the parts, through which it passes, occasioning pain, inflammation, and even exfoliations from the ribs.

Others have recommended introducing the end of a kind of wick, which, they contend, keeps open the wound, without hindering the escape of fluids. Such advice, however, is not free from objections, nor is the latter reason altogether true.

Le Dran preferred tents to wicks: he states, that the hemorrhage can only be stopped by the coagulum, which forms over the mouth of the wounded vessel.—The clot is elongated, and even continued into the vessel itself, and while it remains there, no more blood is effused. In the mean while, it flows into the collateral vessels; and the mouth of the vessel closes, and includes within its parietes, the portion of the coagulum, which has formed in it. Thus the clot becomes gradually separated into two portions, one of which remains in the vessels, and acts as a sort of plug, while the other is detached with the suppuration. Hence, continues Le Dran, when a tent is introduced into the opening, which has been made, it must confine a part of the blood, which has been extravasated in the chest, and without which portion being retained, the clot would not be supported, but fall off, before the mouth of the vessel had closed, and the hemorrhage constantly continue. Without entering into an examination of Le Dran's theories of the stoppage of bleeding, a subject, which is fully explained in the article *Hemorrhage*, we may only remark, that this author's predilection for the use of tents is founded on a supposition, that the counter-opening has been made for the hemorrhage from the vessels has ceased. Every one, however, agrees, that no steps should be taken for the discharge of the blood, con-

tained in the thorax, before being assured, that the hemorrhage has ceased. Hence, the tent can only be regarded as hurtful. But, dismissing from consideration wicks and tents, the best means of maintaining an opening (were such thing necessary, which cannot frequently be the case,) would be, a short cannula, with a rim to keep it from slipping into the thorax, and two little rings for confining it in its situation with a ribband. This should only just enter deeply enough to have its inner orifice on a level, or very little further inward, than the pleura costalis, and consequently it could not injure, nor irritate the lungs. A plug should be kept in its outer opening, and withdrawn, as often as occasion requires, that is, as often as any material quantity of fluid collects, and requires to be discharged.

When the patient has been dressed, he is to be kept in bed, with his head and chest somewhat elevated, and his thighs bent, in which position, the breathing will be found to be least oppressed. It is usual also to recommend him to lie, as much as possible, on the side on which the operation has been done. He is to keep himself in as still, and quiet, a condition as he can. He is to be put on very low diet, and, if his strength allows, he is to be bled, and this evacuation repeated, with other antiphlogistic means, as often as the urgency of the fever and inflammatory symptoms indicates, and the strength of the constitution allows.—Bleeding from the arm, besides counteracting inflammation in the chest, which is a principal source of danger, does good by lessening the force of the circulation in the wounded vessels, and thus it diminishes the tendency to internal hemorrhage.

In keeping open wounds of the chest, the surgeon must be careful, that no tents, nor any of the dressings, glide into the cavity of the pleura. Numerous cases on record shew the necessity of using great caution, that no accident of this kind occur. Tulpius makes mention of a Danish gentleman, who had been under a careless surgeon, on account of a wound in the thorax, and who coughed up, six months afterwards, a large tent. A similar fact is recorded, among the cases collected and published by Fabricius Hildanus. A man was stabbed with a sword in the right side of the chest, near the axilla, between the second and third ribs. A great deal of blood was discharged, during the first fortnight, both from the wound, and by the mouth. The wound was successfully healed; but, the patient continued to suffer considerable difficulty of breathing, and an incessant

cough, and he used to spit up a greenish, fetid matter. Three months afterwards, he coughed up two tents, which had slipped into the cavity of the thorax, from beneath the dressings, with which the wound had been covered.

In whatever condition the patient may be, any change in the antiphlogistic regimen, must be made with very great circumspection. Too much nourishment, talking too frequently, and any exertion, are circumstances, which may induce a renewal of the hemorrhage, and extravasation, even after a considerable time. Vesalius saw an accident of this nature happen, a fortnight after the wound, and eleven days after the operation for empyema. A Biscayan soldier, who had been stabbed in two places with a sword above the right nipple, was attacked by fever, difficulty of breathing, restlessness, and acute pain at the bottom of the chest. These symptoms indicated to Vesalius, that an extravasation had taken place; but, he was afraid of making an opening into the chest, for fear the hemorrhage should still continue from the wounded vessels. However, as the patient remained in the same state, the fourth day after the receipt of the wounds, and his strength still lasted, Vesalius undertook the operation, by which a considerable quantity of extravasated blood was discharged. The patient felt great relief at the instant. The oozing of blood continued for a few days, after which a favourable suppuration took place in all the three wounds, and the case was, therefore, expected to end well. But, the patient having regained his strength, and taken too much food, the recurrence of hemorrhage caused his death, at the very time when he seemed to be getting well. M. Lombard, well known for some excellent productions on surgery, saw a soldier die instantaneously of internal hemorrhage, from throwing a bowl at some nine-pins, two months after he had been cured of a wound of the chest and lungs.

Authors in general advise us, before we close the wound, for the purpose of healing it, to make the patient expel the air from the chest. For this object, they advise the patient to be requested to make a strong inspiration, with the wound closed, and then a long slow expiration with it open, and so on, till as much of the air as possible is discharged, and then the wound is to be accurately closed with sticking plaster. From what we have said, however, in the article *Empyema*, it will appear, that when there is a direct opening into the thorax, so as to admit the external air, the lungs on one side collapse, and remain so till the

wound is healed, and the air absorbed. When one of these organs is wounded, a collapsed state is, indeed, the best condition, in which it can possibly be for a certain time, that is, till the breach of continuity in it has healed. All efforts to make the lung expand, by exhausting the air from the cavity of the pleura, seem unavailing; but, there is certainly no objection to not closing the wound, before as much air has been expelled in the above way, as can be thus got rid of.

Fistulæ sometimes continue for a long while after wounds of the thorax. Felix Platner mentions an instance, in which a man had in his chest a fistulous opening, out of which the air rushed with such force as to blow out a candle. He lived a long while with this disease, without suffering any particular inconvenience.

Another occasional consequence of openings made in the chest, is a hernia of the lungs, an affection, of which, Sabatier says, he is not aware, that any one has spoken. This gentleman, however, has seen such a case. A soldier, thirty years of age, who had been wounded at Rostock, with a bayonet, in the right side of the chest, between the middle part of the fifth and sixth true ribs, had several bad symptoms which he survived. The wound was successfully healed; but, as the intercostal muscles had been divided to a great extent, and could not be approximated with precision, there remained an empty space under the integuments, which allowed a piece of the lungs, as large as a walnut, to protrude between the ribs. The swelling enlarged at the time of inspiration, and grew smaller when expiration took place. It only occasioned a slight pain, without any oppression in the chest.

The making of an opening into the chest, as already spoken of, is recommended, as Sabatier, remarks, by all authors, who have treated of wounds of the chest. However, it does not appear, that the operation has been often done. Few instances are to be met with on record. J. L. Petit does not make mention of even one. Lamotte, who had the care of an infinite number of patients, never practised the operation, except twice, and, in one of these instances, it was done to let out a collection of matter in the thorax, which had occurred after a wound, which injured the lungs. Sabatier notices, that the seven volumes of the *Journal de Médecine Militaire*, which contain a collection of the most interesting cases, which have presented themselves in the military hospitals, record no example, in which it was necessary to resort to the operation in question. No in-

stances are related in the *Mém. de l'Acad. de Chirurgie*. Sabatier says, he has enquired of many army-surgeons; but, none of them have either seen the operation done by others, or performed it themselves. M. Saucerotte, observes Sabatier, is the only one, who did it with success in a case, in which the exigency for the operation would not be expected. It was in an instance of a gun-shot wound. The necessary dilations, and the extraction of extraneous substances, had diminished the inflammatory symptoms. These were subsiding entirely, when, on the third day, a violent hemorrhage took place from one of the branches of the internal mammary artery. This loss of blood, together with repeated venesections, did not hinder a considerable extravasation of blood in the chest from happening on the fifth day. The patient was threatened with suffocation. He was made to bend forward, in order to promote the escape of the fluid, of which about a pint, in colour like wine-lees, and having a disagreeable smell, was discharged. A considerable quantity was in this way evacuated, every morning and evening. The posture, in which the patient was necessarily put, and the efforts he was obliged to make to promote the evacuation, fatiguing him exceedingly, he consented to have a counter-opening made, at the lower part of the chest, on the eighteenth day. The operation gave vent to a pint of blood, of the same kind as that which had issued from the wound. The quantity emitted became daily less and less, and, in three months, the patient got quite well. Sabatier questions, from what has been stated, whether we may not conclude, that such extravasations of blood in the thorax, as admit of surgical aid, are exceedingly unfrequent cases, and that the symptoms, indicative of these instances, are not sufficiently clear, so that most of the patients, with such extravasations die, without it being in the power of surgeons to make any attempt to save them.

Every systematic writer on surgery has treated of wounds of the thorax: *John Bell's Discourses on Wounds*, and *Sabatier's Médecine Opératoire*, from which latter I have extracted a great deal of the preceding account, seem to me to merit attentive perusal.

THROAT, WOUNDS OF. Injuries of this kind are often attended with considerable danger, on account of the great number of important parts, which are interested; but, mere cuts of the integuments of the throat and neck are

not (generally speaking) dangerous cases, and do not materially differ from common incised wounds of the skin, in any other part of the body. They are not liable to be followed by any particular consequences, and require the same kind of treatment, as cuts in general do. (See *Wounds—Incised Wounds*.)

In wounds of the throat and neck, however, the larynx and trachea, pharynx and œsophagus, the trunk of the carotid artery, and all the principal branches of the external carotid, the large jugular vein, the eighth pair of nerves, and the recurrent nerve, are all exposed to injury; some much more so, than others; but, all of them occasionally not escaping the edge of the knife, or razor, or the point of the sword, or other instruments.

It would certainly amount to absurdity, to offer an account of what is to be done, in cases attended with some part of the mischief above pointed out; for, no patient, thus wounded, would ever be found alive. Wounds of the eighth pair of nerves are universally considered by all surgeons as certainly fatal. These nerves, we know, proceed down the neck, in the same sheath of cellular substance, which includes the carotid artery, and lie on the outside of this vessel, between it and the internal jugular vein.

Wounds, either of the carotid artery, or internal jugular vein, must for the most part prove immediately fatal, in consequence of the great and sudden loss of blood, which would inevitably arise from an open, cut wound, interesting these vessels. However, were any surgeon on the spot at the moment, he should immediately tie the end of the vessel, from which the blood gushes with the greatest force, which end, we know, would be the lower one of the carotid, and upper one of the jugular vein. One caution, however, is highly necessary in tying the carotid, viz. always to be sure, that the par vagum is excluded from the ligature; for were this nerve to be tied, this erroneous proceeding alone would remove every possibility of the patient's recovery.

If the mouth of the vessel could not be got at, pressure must be instantly resorted to, for the purpose of producing a temporary suppression of the hemorrhage. The surgeon should then either make the necessary enlargement of the wound in the integuments, with a due and constant recollection of the important parts near the place, or else, in the case of the carotid being injured, he should cut down to this vessel on the side towards

the trachea, where no parts of great consequence are situated.

In lacerated wounds, the carotid artery may be injured, and yet the patient not immediately bleed to death; for, it is the nature of all wounds, attended with much laceration and contusion, not to bleed so freely as clean cuts. Mr. Abernethy has related a case, in which the carotid, and all the chief branches of it, were wounded in a man who was gored in the neck with a cow's horn; yet, death did not immediately follow, and there was time to have recourse to the ligature.

Punctured wounds might obviously injure, either the carotid, or the internal jugular vein, without the patient expiring of hemorrhage at once; because, the smallness of the wound in the skin, would often hinder the fatal effusion of blood.

However, when these vessels are wounded, the par vagum is generally wounded also, and the case is inevitably mortal, either immediately, from the direct effects both of the injury of the nerve, and sudden loss of blood, or very soon afterwards, the bleeding being of a slower, and more interrupted kind, which must depend on the lacerated nature of the wound, the small size of the opening in the vessel, or of that in the skin, &c.

Persons who attempt to commit suicide, by cutting their throats, do not often divide the carotid artery, on account of their incision being made too high up. Where the carotid arteries emerge from the chest, they are situated by the side of the trachea, and even a little more forward, than it. However, as these vessels proceed up the neck, they become more laterally situated with respect to the trachea; and when they have arrived at the upper part of the neck, where persons, who attempt to commit suicide, almost always cut, they become situated more backward, than the trachea, inclining towards the angle of the lower jaw.

The œsophagus is so deeply situated, lying close to the bodies of the vertebræ, and behind the trachea, that it is not often interested in any incised wounds, which do not immediately prove fatal, in consequence of the division of other important parts. We read of many cases, in which this tube is said to have been wounded, and what is usually set down as a criterion of the fact, is the passage of victuals through the wound. The writers of many of these narrations have proved themselves most grossly ignorant of anatomy, by not knowing, that wounds made above the os hyoides, as they frequently are, may enter the mouth, and hence the victuals may escape through the cut,

without the œsophagus, or pharynx, being at all concerned.

However, no doubt, the œsophagus has occasionally been wounded, without the patient perishing so immediately, as not to be capable of receiving any succour. Stabs, and gunshot-wounds, might obviously injure the œsophagus, and leave other important parts untouched.

Even were the œsophagus known to be wounded, its deep situation would prohibit us from doing any thing to the breach of continuity in the tube itself. The best plan would be to have recourse to antiphlogistic means, and to introduce, a hollow bougie, from one of the nostrils, down the œsophagus, for the purpose of conveying nourishment and medicines into the stomach, without any risk of their getting out at the wound. An instrument of this kind will lie in the above situation, for any length of time, without occasioning any inconvenience, and, besides being advantageous for injecting nourishment and medicines down the passage, and keeping them from issuing at the wound, it prevents all necessity for the wounded œsophagus to act, and become disturbed, when there is occasion to take any kind of liquids, whether in the way of medicine, or food. The outer wound should be brought together, and treated on common principles.

When persons cut their throats, we have explained, that they do not often divide the carotid artery, owing to their incision being usually made high up in the neck, where this vessel has attained a very backward situation. When any serious hemorrhage does arise, it is sometimes from the lower branches of the lingual artery, but most frequently, from the superior thyroideal arteries. Such arteries may occasion a fatal bleeding, which, indeed, would more frequently be the event, than it actually is, did not the patient often faint, in which state the bleeding spontaneously ceases, and gives time for the arrival of surgical assistance.

I need hardly tell the reader, that these arteries are to be tied, and that this important object is the first, to which the surgeon should direct his attention. The danger of bleeding to death being obviated, as soon as possible, the other requisite measures may be more deliberately executed.

With respect to wounds of the trachea, the same plan of conveying food and medicines into the stomach, through a hollow bougie, introduced from one of the nostrils, down the œsophagus, is highly proper, though too much neglected. For, nothing creates such disturbance of the

wound as the convulsive elevation and depression of the larynx and trachea, which are naturally attendant on the act of swallowing.

When the trachea is cut, the patient's power of forming the voice is more, or less, impaired, in consequence of the air passing into, and out of, the lungs, chiefly through the wound. Besides air, a considerable quantity of the natural mucus of the trachea is also continually coming out of the wound.

The grand means of accomplishing the union of wounds of the trachea, are a proper position of the head, and a rigorous observance of quietude. By raising the patient's head with pillows, and keeping his chin close to his breast, the edges of the wound, both in the skin and trachea, are placed in contact, even without any other assistance, unless the division of the trachea be exceedingly large. It is proper, however, to assist the agency of a suitable position with strips of sticking plaster, and also, according to most authors, with a suture, or two. But, the necessity for sutures must depend on the extent of the division of the trachea; for, unless most of the circle of this tube be cut, and position be neglected, the wound in it will not gape. The stitches should never be passed through the lining of the trachea, as this method would be likely to make it inflame, and occasion considerable coughing, and irritation, which would have very pernicious effects on the wound.

Should there be much coughing, apparently arising from irritation and inflammation in the trachea, bleeding is proper, if other considerations do not forbid it. The spermaceti mixture with opium, is also frequently of great service. I never saw a wound of the trachea unite entirely by the first intention.

THROMBUS. (from *θρομβος*, coagulated blood.) A clot of blood. The term has also been applied to a tumour, formed by a collection of extravasated, coagulated blood, under the integuments after bleeding. When such an extravasation, though of some extent, is not considerable, it is usually called an *ecchymosis*. (See this word, and also *Bleeding, Occasional Ill-Consequences of*.)

A thrombus sometimes depends on the surgeon having totally divided the vein; but, much more frequently on his not having made the opening in the vessel, properly correspond to that in the skin. The patient's altering the posture of his arm, while the blood is flowing into the basin, will often cause an interruption to the escape of the fluid from the external orifice of the puncture; and, consequently, it insinuates itself into the cellular sub-

stance in the vicinity of the opening in the vein. In proportion as the blood issues from the vessel, it becomes effused between the skin and fascia, covering the muscles, in the interstices of the cellular substance, and this, with more, or less rapidity, and in a greater, or lesser quantity, according as the edges of the skin impede more or less the outward escape of the fluid. Sometimes, also, a thrombus forms after venesection, when the usual dressings, compress, and bandage, have been put over the puncture, and the patient imprudently makes use of the arm, on which the operation has been done. This is more particularly liable to happen, when a very large opening has been made in the vein.

The accident is not attended with any danger, when the extravasation is inconsiderable; for, in this circumstance, the tumour generally admits of being easily resolved, by applying to it linen, dipped in any discutient lotion. If the swelling should be more extensive, applying to it a compress wet with a solution of common sea-salt, is deemed a very efficacious plan of promoting the absorption of the extravasated blood. Brandy, and a solution of the muriate of ammonia in vinegar, are likewise eligible applications.

It sometimes happens, that a thrombus induces inflammation and suppuration of the edges of the puncture. The treatment is now like that of any little abscess; a common linseed poultice may be applied, and, any considerable accumulation of matter should be prevented by making an opening with a lancet in proper time. As soon as the inflammatory symptoms have ceased, discutients should be resorted to again, for the purpose of dispersing the remaining clots of blood, and surrounding induration.

When the quantity of blood is exceedingly large, authors generally recommend opening the tumour at once, and, despairing of the power of the absorbents to remove the extravasation, they recommended, as much of the blood as possible, to be pressed out through the incision. I believe, however, that making an opening is seldom necessary, and often brings on inflammation, and suppuration, which might be avoided. I have never seen any case, in which there was any real occasion to make an opening for the discharge of the blood. A case of this kind, however, may certainly be conceived.

THYMIUM. (said to be derived from *θυμος*, thyme, because of the colour of this herb.) A wart, or kind of excrescence on the skin.

THYMUS. (from *θυμα*, an odour, be-

cause of its fragrant smell.) The herb thyme. In surgery, the term is often applied to warty excrescences on different parts of the body, particularly, about the pudenda and anus, and erroneously supposed (as I conceive) to be of a venereal nature.

THYROID GLAND DISEASED. (See *Bronchocele*.)

THYROID GLAND, EXTIRPATION OF. That such an operation, though attended with great difficulties, is not impracticable, is proved by the following example:

In the year 1784, J. Hyons, twenty years of age, experienced an acute pain at the middle and anterior part of the neck, in consequence of a violent extension of the head: this pain, which was only momentary, was followed by some difficulty of motion. About three months afterwards, a small, hard, indolent tumour appeared on the right side of the trachea; this swelling was unattended with pain or alteration in the colour of the integuments; the tumour seemed to be raised by a pulsatory action, which seemed to prove the existence of a large artery situated underneath, and in fact its base was situated on the general course of the carotid artery. The patient, feeling no inconvenience, neglected it until June, 1788. At this time the tumour was one inch in diameter; its progress, which in the first instance was slow, now augmented with proportionable rapidity; internal remedies, and topical applications, had no effect in preventing its increase; a fluctuation in its centre was soon evident; an incision was then made into this part, and a quantity of yellow serosity discharged. Three months after this operation, which was not of the least service, recourse was had to caustics, which were repeatedly applied without any advantage being obtained. On the 20th of March, 1791, she presented herself for admission at the Hôtel Dieu. At this period the tumour was two inches in diameter, round, hard, and attached to the right and middle part of the trachea, and pushed outwards the sterno-mastoideus muscle. Independent of its being sensibly raised by each pulsation of the arteries, it obeyed the motions of deglutition, and in a slight degree impeded the passage of the solid aliment. The patient, earnestly desiring to get rid of such an inconvenient deformity, determined to submit to its extirpation, which appeared her only resource. The danger, the length of time, and the pain necessarily annexed to the operation, were not concealed from her. The operation, after a few day's previous preparation, was

performed in the amphitheatre by Desault in the following manner: the patient being laid on her back, a little inclined on the left side, with the head and neck more raised than the rest of the body, the surgeon made a longitudinal incision through the middle of the tumour, beginning one inch above, and finishing one inch below, to allow room to finish the operation with ease; in the first section he cut down as far as the gland, dividing the integuments, the platysma-myoides, and some fibres of the sterno-hyoidei and sterno-thyroidei muscles; an assistant, with the view of fixing the tumour, drew towards the left the inside edge of the wound made by the incision, whilst the surgeon detached it from the sterno-mastoideus muscle. In dissecting the cellular substance which united the parts, two small arteries were divided, which were raised by a pair of dissecting forceps and secured by ligature. The external surface of the tumour being thus disengaged, the internal part was detached in the same way. The tumour was drawn outwards by means of a hook, that it might be separated with more ease from the anterior part and from the side of the trachea. In the course of this dissection, the branches of the thyroid arteries were successively tied, as fast as they were divided. The assistant, to whom the hook was confided, directed the gland from within and forwards, whilst the surgeon finished the dissection outwards and from above downwards. This part of the operation was the most minute and difficult; it was necessary by means of a sponge continually to wipe away the blood, which necessarily prevented the parts from being easily distinguished, and obliged the surgeon to divide but a little at a time, and previously to feel with his finger those parts he was about to incise. By this cautious dissection of parts, the superior and inferior thyroid arteries were laid bare, and afterwards secured by ligature by means of a blunt crooked needle. They were afterwards transversely divided, and the remaining part of the tumour detached from the trachea, to which it strongly adhered. The wound resulting from this operation was near three inches in depth: it was outwardly bounded by the sterno-mastoideus muscle, and inwardly by the trachea and œsophagus; posteriorly by the carotid artery, and by the nerves of the eighth pair, which were exposed at the bottom of the wound. After the wound was well washed with warm water, and cleared from the blood, it was filled with coarse lint, powdered with colophony; square compresses, secured by a bandage moderately tight,

formed the rest of the dressing. The extirpated tumour was five inches in circumference; and on examination was found to differ in no particular from schirrous glands, except that in the centre there was a cartilaginous nucleus. The patient supported this long, difficult, and painful operation with uncommon firmness: she passed the rest of the day without experiencing any other symptom than a slight shivering, generally consequent to large wounds. The following night she complained of a sense of heat in the neck, and some difficulty in deglutition. The next day a little ease was obtained by moistening the dressing with a decoction of marshmallows. A weak drink of the herb dog's tooth, acidulated with oxymel, was prescribed. On the third day the fever was very moderate, but the difficulty in swallowing had considerably increased at this period; the compresses and the external lint were removed, and fresh applied. On the fourth, the fever ceased, and deglutition became less painful. Suppuration now became established. The next day all the lint was detached, and the whole of the dressings renewed. The wound was in a good state: it was dressed with soft lint and compresses moistened with an emollient decoction; a practice which was continued for the following days. No particular circumstance occurred during the cure. The wound followed the ordinary progress, and was cicatrized at the end of a month. The patient left the hospital, perfectly cured, the 34th day after the operation. (See *Desault's Parisian Chirurgical Journal* Vol. II. p. 292—296.)

To the preceding case, the editor has annexed the few following reflections:

The extirpation of the thyroid gland is an operation extremely difficult, and certainly highly dangerous, when performed by an operator but moderately exercised in the practice of his profession. The number and size of the arteries necessary to divide, the proximity of the trachea, œsophagus, and carotid, near which the knife must necessarily pass, are the principal dangers that the operator should avoid. These are the circumstances which have deterred the majority of practitioners from performing it, particularly those who from long established prejudice have been deterred from using ligatures in cases of wounded arteries. Examples of this operation are very rare. The first time that Gooch undertook to perform it, he was deterred from finishing it by the hemorrhage, and his patient died on the eighth day. The second time he succeeded better, but was incapable of securing the vessels, and succeeded in

stopping the hemorrhage, which would otherwise have been mortal, by causing the parts to be compressed by the hand of an assistant for the space of eight days. (*Gooch's Med. and Chir. Obs.* p. 130; *Bell's System of Surgery*, Vol. 5, p. 525; and *la Bib. Chir. de Richter*, l. 2. 4e partie, p. 128.)

A. F. Vogel and Theden have practised the same operation with the most complete success. All danger from the hemorrhage, or inconvenience arising from the discharge of blood, may be obviated by pinching up the small vessels, tying them as fast as they are divided, and by discovering and tying the large vessels previous to their division; other parts that cannot be wounded without danger, are to be avoided by dissecting slowly and a little at a time, and feeling with the finger every part previous to its division with the bistoury.

TIBIA, ABSCESS OF. (See *Caries*, and *Spina Ventosa*.)

TIC DOULOUREUX. A painful affection of the nerves of the face, particularly, of the filaments of that branch of the fifth pair, which comes out of the infra-orbitary foramen.

A cure has sometimes been accomplished by cutting down to, and dividing, the nerve, at the place where it emerges on the cheek. In other instances, this has been done, and the relief has only been of a temporary nature.

Similar affections of the nerves may also take place in other situations, besides the face. Mr. Abernethy relates an example, in which a lady became gradually affected with a painful state of the integument, under and adjoining to the inner edge of the nail of the ring-finger of the left hand. No injury to the part was remembered which could have brought on this disease. The pain occurred at irregular intervals, and was extremely severe during the time of its continuance, which was for a day or two, when it usually abated. Accidental slight injuries always occasioned great pain, and frequently brought on those paroxysms, which however occasionally occurred spontaneously, or without any evident exciting cause. In all these particulars, the disease correctly resembled the tic douloureux of the nerves of the face. As the pain increased, the disorder seemed to extend up the nerves of the arm. After the patient had endured this painful affliction for seven years, she submitted to have the skin, which was the original seat of the disorder, burned with caustic. This application gave her intense pain, and, on the healing of the wound, she found her sufferings rather augmented than diminished by this experiment. After four

more years of suffering, she consulted Mr. Abernethy, when the circumstances of the case was such as to render an operation indispensably necessary. The pain of the part was intolerable, and it extended all up the nerves of the arm; and this general pain was so constant during the night, as to deprive the patient of rest. The muscles of the back of the neck were occasionally affected with spasms. The integuments of the affected arm were much hotter than those of the opposite side, and sometimes the temperature was so increased as to cause a burning sensation in them. Under these circumstances, Mr. Abernethy did not hesitate to divide the nerve of the finger, from which all this disorder seemed to originate. He laid it bare by a longitudinal incision of about three quarters of an inch in length, from the second joint of the finger, and divided it opposite to that joint, by a curved sharp-pointed bistoury, which was conveyed under it. He then took hold of the nerve with a pair of forceps, and reflecting it downwards, removed a portion of it, half an inch in length, that the possibility of a quick reunion might be prevented. The wound was brought together by sticking plaster, and it united by adhesion; but, the upper part of the wound, opposite to the upper end of the nerve, became slightly inflamed, and was very painful. However, the appearance of inflammation gradually went off in the course of three weeks. After the operation, Mr. Abernethy pinched the originally affected integuments sharply with his nails, without causing any sensation; but if, in so doing, he moved the finger, then pain was felt. Mr. Abernethy found it difficult to convince the patient, that the skin at that part was actually devoid of sensation, for she still continued to feel similar sensations to those, which formerly occurred, though in a much diminished degree: but she became gradually as perfectly convinced as any medical man could be, that these sensations arose from the irritated state of the end of the nerve, above the place where it was divided. The painful affection of the nerves of the arm still continued, though considerably lessened in violence; however it was sufficiently severe to make the patient apprehend, that little permanent benefit would arise from the operation. This pain continued occasionally about four months with varying degrees of severity, but the temperature of the skin was not hotter, than that of the opposite side, as it had been before the operation. At the expiration of three months, the patient ascertained, that the integuments at the end

of the finger actually felt when any thing was applied to them, and this proved a new source of alarm. Mr. Abernethy adds, that more than nine months have now elapsed, since the performance of the operation, and the general pains in the nerves have become very trivial; but, the sensation of the integuments at the end of the finger, has during that time gradually increased, and the skin has now its natural sensibility, so as accurately to distinguish the tangible properties of any body applied to it. If also the originally affected part be compressed slightly, painful sensations resembling those which formerly occurred, take place. (*Abernethy's Surgical Observations*)

Mr. Lawrence lately mentioned to me a case resembling the former, and which was the consequence of a wound of the finger. This gentleman also cut down to the nerve, and removed a portion of it, with every appearance, at present, of permanent relief.

TINCTURA CANTHARIDIS. (*lytta*.)

Surgeons sometimes employ this medicine, in cases of gleet, and those of incontinence of urine, arising from a want of proper action in the sphincter vesicæ muscle, the due power of which it seems to restore. The usual dose is from ten to forty or sixty drops, twice or thrice a day; but its effects should be vigilantly attended to; for it is apt to occasion dangerous inflammations of the urinary organs, and violent stranguries and retentions of urine.

Tincture of cantharides has also been sometimes employed as an injection for exciting inflammation, in old, chronic, callous, fistulous sinuses, with a view of curing them. Laying them open with a knife, however, is now universally preferred by all the best surgeons.

Tincture of cantharides has occasionally been used as an ingredient in various liniments, and external applications, when the object has been to stimulate the skin, rouse the action of the nerves of the part, or that of the absorbents. In this manner it has been made use of by surgeons in some cases of ptosis, paralysis, &c.

TINCTURA FERRI MURIATI. For an account of the manner of making it, see the *London Pharmacopœia*. The writer of the *Pharmacopœia Chirurgica* remarks, that the tinctura ferri muriati has sometimes been exhibited "for gleet; but a more important use has been assigned it by Mr. Cline, who orders it in dysuria, when a consequence of stricture, in the dose of ten drops every twenty or thirty minutes. This relaxes the spasm, through which the retention is occasion-

ed, by a mode of operation not easily explained.

"Mr. Justamond's liquid for external use in cancers, and which the original inventor called his *panacea anticancerosa*, partook considerably of the nature of this tincture, which, indeed, with an equal quantity of spirit of wine, was sometimes substituted for it.

"Lastly, it is remarkably efficacious in destroying venereal or other warts, either used alone, or diluted with a small proportion of water."

TINCTURA THEBAICA. ℞. Opii purificati ʒij. Cinnamomi, Caryophyllorum, sing. ʒj. Vini, albi lib. j. These are to be macerated, without heat, for a week, and then filtered.

This was one of the formulæ of the old London Dispensatory, and though the tinctura opii is now substituted for it in that work, yet, in one particular surgical case, it is found that the tinctura thebaica cannot be superseded by the other preparation, without great disadvantage to the patient: I allude to inflammation of the eyes. Mr. Ware has found the tinctura thebaica, in this instance, eminently serviceable. His plan has been to put one drop of it into the eye, once or twice a day, according as the symptoms are more or less violent. When first applied, Mr. Ware remarks, that it causes a sharp pain, accompanied with a copious flow of tears, which continues a few minutes, and gradually abates; after which a greater and remarkable degree of ease generally succeeds. This gentleman observes, that "the inflammation is often visibly adapted by only one application of this tincture; and many bad cases have been completely cured by it in less than a fortnight, after every other kind of remedy had been used for weeks, and sometimes months, without any success. But this speedy good effect is not to be expected in all cases indiscriminately. In some, the amendment is more slow and gradual, requiring the tincture to be made use of for a much longer time; and a few instances have occurred, in which no relief at all was obtained from its first application. In cases of the latter kind, in which the complaint is generally recent, the eyes appear shining and glossy, and feel exquisite pain from the rays of light. However, notwithstanding these symptoms, the application is sometimes found to succeed; and whether it will or not, can only be determined by making the trial; which is attended with no other inconvenience than the momentary pain it gives. When it is found to produce no good effect, the use of it must be suspended, until evacuations, and other pro-

per means, have diminished the excessive irritation; after which, it may again be applied, and bids equally fair for success, as in those instances, in which it never disagreed.

If two or three drops of the thebaic tincture are applied at once to the globe of the eye, the pain they occasion will be considerably greater than if they are placed in the inner angle of the eyelids, and made to glide gradually on the eye, by gently drawing down the lower lid. At the same time that this latter mode of applying the tincture is much less painful than the former, Mr. Ware has found, in a great variety of cases, that it is equally beneficial. (See *Ware's Remarks on Ophthalmia*, &c. his *Additional Remarks* on the same subject; and the article *Ophthalmia* in this Dictionary, at which part of the book, the particular cases, in which the application can be judiciously made, are pointed out.) The reader should be well apprised, that the tinctura thebaica cannot be made indiscriminate use of, for all inflammation of the eyes, without doing serious mischief in many instances.

TINEA CAPITIS. A disease, so named from its eating away the skin, in the manner that a moth (in Latin *tinea*.) does various substances. The *Scaldhead*. Term-ed also *Achor*, or *Achores*, a Greek word, said to be derived from *αχνη*, bran, and applied to this disorder, in consequence of the branny scales which are thrown off the part affected.

Tinea capitis consists of small ulcerations which originate on the scalp, more particularly in children, and discharge a viscid secretion. The disease begins by small vesicles, which rise above the level of the skin, which now becomes very manifestly red. The little vesicles burst, ulcerate, and emit a secretion, which, is at first fluid, but afterwards dries more or less, so as to become of a thicker consistence, and form scabs. Several of these scabs becoming connected together, form very large ones, of various degrees of thickness, and when these fall off, others of a similar nature are soon produced in the same situation.

Some writers assert, that the seat of this disease is in the sebaceous glands, which now pour out an increased quantity of their secretion, which is said to be of a thicker, and more acrimonious nature, than natural. This theory, however, rests unsupported by any evidence or facts. There certainly is no relative proportion, between the preternatural quantity of matter secreted, and the glands to which its secretion is ascribed. Besides, it is well known, that the scabs frequently

form in situations not remarkable for being furnished with sebaceous glands.

Authors have distinguished two species of the *tinea capitis*. One affects children at the breast, and makes its appearance promiscuously on every part of the head, on the forehead, temples, and even the lips. This case is considered as the most benign, and, when cleanliness is attended to, gets well of itself.

The other species of *tinea* is of a more inveterate nature, and the matter which it produces is said to be much more irritating than that of the preceding form of the disease. The ulcerations, attendant on it, have occasionally penetrated down to the cranium, and even rendered it carious; an event, however, which is described as being exceedingly uncommon, except in children of very unhealthy constitutions. One may reasonably infer also, that whenever the disease attains so high a pitch, there must have been great neglect. The second kind of *tinea capitis* sometimes affects children after they have been weaned, and even persons who have attained the age of puberty.

The causes of *tinea capitis* are very imperfectly understood. Some writers have imputed them to a scrophulous constitution; but, I cannot discover any reason for this doctrine, except that some of the great number of scrophulous children, always to be met with, are affected with the scaldhead. However, so they may be with many other disorders, which no man, in his sound senses, would suspect to be at all connected with scrophula. One of the greatest sources of error among medical men, in the investigation of the causes of disease, is their continually forgetting that two of the kind above-mentioned may happen quite independently of each other, in the same person, and that there is no reason, why *tinea capitis*, as well as the itch, a chancre, and many other affections, should not occur in a patient manifestly strumous. What I conceive to be a clear proof that scrophula is not a cause of *tinea capitis*, though it may certainly influence its progress, is, that the latter is a very common disease in countries, in which scrophula is scarcely ever seen. One thing, which is decidedly very conducive to the occurrence of *tinea*, is uncleanness, and it is on this account, that the disease prevails most among children of the lower classes of society. Poor-living seems also to have some share in keeping up, at least, if not in inducing the complaint. But, there are some circumstances, relative to the causes of *tinea*, with which we are not

at all acquainted; for, the disorder now and then happens in children which are taken the greatest care of, being well fed, and carefully washed and cleaned, every day. The tendency of the *tinea capitis* to spread, is easily explained, by the secretion among the roots of the hair, having the power of communicating the morbid action to every part of the surface of the scalp, with which it is allowed to come into contact.

The principal objects, in the treatment of *tinea capitis*, are to soften and take away as many of the scabs as possible; to cover the subjacent ulcerations with suitable applications; to keep the scalp closely shaved; and, in very obstinate cases, or unhealthy subjects, to prescribe proper alteratives.

In order to fulfil these indications, the best plan is to have the hair cut, and shaved off the whole of the affected part of the head, and also off a good deal of the surrounding surface. The scabs are next to be softened by rubbing them well with fresh butter, and as many of them taken away as possible. This being accomplished, let the head be next washed with some strong soap-suds and a flannel; and the common turpentine soap is the best for the purpose.

The scalp having been dried, is afterwards to have applied to it an ointment, consisting of the unguentum picis, and the unguentum sulphuris, mixed together in equal proportions, and spread upon a piece of bladder, or green oil-skin, which latter substance alone will, when aided by properly washing the parts, effect a cure of itself.

The dressings are to be changed every day, and the parts shaved, and well washed with strong soap-suds equally often. Cleanliness, indeed, has astonishing effect in curing *tinea capitis*.

I have met with instances, however, which resisted the foregoing plan, and, also, the application of the unguentum hydrargyri nitrati, hellebore ointment, &c. The cases in question, however, always yielded to the employment of a lotion composed of a dram or two of the kali sulphuratum, dissolved in a pint of lime-water. Linen, wet with this solution, was kept constantly applied to the parts, which were shaved and washed as often as is above recommended.

Some very obstinate cases demand the exhibition of internal medicines. Small doses of calomel alone, or conjoined with *cicuta*, may be tried. However, the most successful alterative is Plummer's pill, taken once or twice a day, according to circumstances.

TINNITUS, from *tinnio*, to tingle,)

A noise or ringing in the ear; a symptom of some diseases.

TOBACCO. The use of this plant in surgery is for promoting the reduction of strangulated hernia. For this purpose it is employed either in the form of a fluid glyster, or of smoke, which latter is introduced up the rectum by means of an apparatus constructed for this object, and sold in the shops. Excepting the operation, the power of tobacco, particularly, when assisted with the topical application of cold to the tumour, is most to be depended upon in bringing about a return of the protruded viscera into the abdomen. (See *Hernia*, and also *Enema*.)

TONICS. (from *ταυνω*, to strengthen.)

Medicines which strengthen.

TONGUE, DISEASES OF. This part is subject to various diseases, as ulcers, tumours, and such enlargements of it as sometimes put the patient into imminent danger, and claim the practitioner's utmost attention.

Carious teeth, having points and inequalities, occasioning incessant irritation, are the most frequent cause of ulcerations of the tongue. The sores, thus produced, often resist every kind of remedy, and ignorance of the cause sometimes leads the practitioner to consider them as incurable; whereas, a cure might easily be effected by extracting the carious tooth, or simply filing off its sharp irregularities and pointed parts. The advice just delivered, is exceedingly ancient, and is the subject of a chapter in Celsus, who has treated of the diseases of the tongue.

The glandular papillæ which are situated on the dorsum, or upper surface of the tongue, are naturally formed with a narrow base, and a broad termination or head, like a mushroom. They are capable of becoming considerably enlarged, so as to form preternatural tumours which may be very improperly mistaken for cancerous excrescences.

A young man, eighteen years of age, had on the middle of his tongue, a circumscribed tumour, about as large as a middle-sized nutmeg. M. Louis, who was consulted, perceived that the swelling was only of a fungous nature, and he tied its base with a ligature, with the noose of which he contracted the diameter of the pedicle, while, with the ends, he kept down the tongue. Then, with one stroke of a pair of curved scissars, he cut off the tubercle. M. Louis afterwards applied caustic, with the requisite precautions, to the base of the tumour, and the patient got perfectly well in five or six days. (*Mémoires sur les Maladies de la Langue*,

dans les Mémoires de l'Acad. de Chirurgie, Tom. 5.)

Morgagni speaks of these tubercles, which occasionally form on the tongue; but he had never advised their extirpation, not even when they had become hard and scirrhus: for, though he had not deemed the operation impracticable, he had had no confidence in the skill of the surgeons, who would have been employed. (*De Causis et Sedibus Morborum*.)

The tongue is occasionally affected with a true cancerous disease; one of the most afflicting cases, indeed, to which mankind are exposed. M. Louis saw a lady, who had an ulcerated cancerous tubercle on the left edge of the tongue. The little swelling was circumscribed; its size did not exceed that of a filbert; the pains were lancinating; the sore had penetrated deeply; and its tuberculated edges were affected with a scirrhus hardness. Extirpation of the disease seemed to present the only chance of freeing the patient from the terrible disorder; but, she refused to accede to any thing but palliative plans, and she died in the course of a few months.

Forestus makes mention of four women, who were attacked with cancer of their tongues, and died from the ravages of the disease, and hemorrhage. In the writings of Fabricius Hildanus, there is a description of the origin and progress of a cancerous tubercle on a young man's tongue, who had a most intolerable fetor of the breath, and died, suffering the most excruciating pains. The same author informs us of another case, exhibiting the good effects of sedative remedies in palliating a cancerous ulcer of the tongue, and the fatal consequences of an opposite line of conduct. In authors, many other examples, of the same kind, are to be met with.

Surgery, however, is not destitute of resources against diseases of so formidable a nature. The following case will serve to shew, what benefit may be effected by this useful profession, when not exercised by men of too timorous a character.

An elderly woman had on her tongue an ulcerated hardness. It had been several times removed with a knife, and as repeatedly returned. Ruysch was called in to a consultation with one of the surgeons, who was attending the patient, and who had already extended his incisions very deeply in removing the disease. The result of their deliberations was another attempt to extirpate the tumour, and they also determined, that after it was cut away, the actual cautery should be freely applied, with a view of destroy-

ing the roots of the fungus. The patient consented to the plan, and bore the operations in question with great fortitude. The tongue was taken hold of with a cloth, and Pierre Le Memnonite, a surgeon of eminence, removed the disease with a curved bistoury. The inside of the mouth was then protected with wet cloths, and the actual cautery applied, several times to the wound in the tongue. The pain was appeased, and the separation of the eschar promoted by emollient gargles. The place soon healed, with the aid of what were called vulnerary decoctions, containing honey of roses, and the tincture of myrrh and aloes.

It is much easier to cut off a complete portion of the tongue, through all its diameter, than to remove a cancerous ulceration, situated on one of its edges.

In both cases, there is a good deal of difficulty in fixing it; for it is so very moveable, that it is not easy to keep it in a steady position. M. Louis recommended, for this purpose, the employment of forceps, with blades which terminate in hook-like extremities. With this instrument, the part of the tongue to be amputated can be kept from slipping away from the operator.

Cruel as the operation of removing the tongue may appear, we should not hesitate to perform it, whenever the disease has made a certain progress, and is decidedly of a cancerous nature.

It should be noticed, however, that very malignant ulcers on the tongue have sometimes been cured by milder means. Very bad sores of this description are reported to have yielded to the repeated application of leeches under the tongue, after a vast number of remedies had been tried in vain. In the *Encyclopédie Méthodique*, *Art. Langue*, there is an account of a very alarming affection of the tongue, (reputed to be cancerous, though this may be doubted,) which got completely well under a very simple plan of treatment. A woman, thirty-five years of age, subject to cutaneous diseases, and ill-conditioned ulcers, complained, for seven or eight months, of little swellings, accompanied with heat and pain, which made their appearance on the edge, and towards the apex, of the tongue. At length, the part affected began to swell, grow hard, and cause lancinating pains. Its surface became irregular and rough; and all the side of the tongue was considerably swelled. The patient could not put her tongue out of her mouth, nor swallow any thing except liquids; and her breath was intolerably fetid. Various sedative remedies had been employed without success. *Cicuta* had been used as a topical applica-

tion; it had been exhibited internally in large doses; the patient had taken, for a long while, the corrosive sublimate; but nothing proved of any avail. At length, the patient was so tired of trying the effect of medicines and applications, that she gave them up entirely; and contented herself with trying the experiment of keeping some honey continually in her mouth. As this method seemed to give her some ease, she was prevailed upon to persist in it, and, in this way, the pains were gradually appeased; the swelling was diminished, and, at the end of two or three months, the woman got quite well, except that an indurated cicatrix remained on the part affected, and considerably obstructed the extension of the tongue on that side.

On this case, however, it might be remarked, that the retardation of the cure seems also ascribable to the injury of the health produced by the hemlock, mercury, &c. and that the amendment, following their discontinuance, might arise from the consequent improvement of the patient's health.

Many writers have confirmed the fact, that very inveterate diseases of the tongue are sometimes cured by hemlock. In the work, last cited, is mentioned an instance of a very unhealthy-looking ulcer, near the apex of the tongue, attended with a considerable thickening of the part, and of some duration, which affection was cured by giving large doses of *cicuta*.

However, notwithstanding many facts of this kind on record, medicines should not be tried too long, that is to say, so as to let the disease extend so far as not even to admit of being cut away. When the disease makes progress, the knife should be employed, before it is too late.

When any part of the tongue is to be amputated, the surgeon is to be prepared for putting a stop to the hemorrhage. Authors very properly recommend the chief vessels to be tied, if possible; but, when this cannot be accomplished, they advise the employment of astringent gargles, such as a strong solution of alum, distilled vinegar, or diluted sulphuric acid. When these methods fail, the actual cautery is advised as the only resource. Some surgeons, however, impressed with the horror of red hot irons, might think it better to tie the trunks of the lingual arteries, as they pass over the os hyoides. A patient should undoubtedly never be suffered to die of bleeding, and some bold step ought certainly to be taken; but, I cannot presume to decide, which of the two latter measures is the best. Perhaps, with a practitioner, well

acquainted with anatomy, the last one should be preferred.

The whole of the tongue sometimes inflames, and becomes considerably enlarged, either spontaneously, and without any apparent cause, or in consequence of some other disease; or else from some particular irritation; such as that of mercury, or some poisonous substance. Slegel, a German physician, who was at Paris about the middle of the 17th century, saw a patient in a salivation, whose tongue became so enormously enlarged, that the mouth could not contain it. Pimprenelle, an eminent surgeon of that time, was sent for, and finding that all trials to relieve the affection had been in vain, amputated one half of the tongue, with a view of preventing it from mortifying. When the wound was healed, it is said, that the patient could articulate as well as before. M. Louis, from whom this fact is quoted, very justly remarks, that the measure resorted to by M. Pimprenelle was an exceedingly violent one; for he has often seen urgent symptoms occasioned, during a salivation, by a rapid and enormous swelling of the tongue, very quickly yield to bleedings, purgative glysters, change of air, and leaving off mercury.

Trincavellius mentions two women, who had considerable enlargements of their tongues. One of these patients, who was young, had been rubbed with mercurial ointment even on her head; and the other, who was about fifty years old, had her tongue attacked with the ravages of the small-pox. The excessive swelling of the tongue, in both these instances, terminated in resolution, and a separation of its outward membrane.

When the urgency is such, that an immediate diminution of the swelling becomes necessary for the relief of the symptoms, nothing, it is said, is attended with so much success, as at once making one or two deep incisions along the tongue. This, it is added, is particularly proved by the cases, inserted by M. de la Malle, in the fifth volume, 4to. of the *Mem. de l'Acad. de Chirurgie*, and by some others, related by M. Louis in the paper above cited. Such cases are extremely interesting, and seem to merit an insertion in this Dictionary.

A man, who was recovering from a bad fever, was suddenly attacked with a pain in his tongue, followed by a swelling equally large and rapid in its formation. In less than five hours, the part became thrice as large, as it is in its natural state; and, in this space of time, M. de la Malle, who had been consulted, had bled the patient successively in his arm, neck, and

foot. The man felt very acute pain; his skin was excessively hot; his face was swelled; his pulse was hard and contracted; and his look wild. He could hardly breathe; the tongue filled all the cavity of the mouth, and protruded out between the lips. In this very urgent case, the surgeon had recourse to no other expedient, than keeping the mouth a little more open than it was made to be by the swelling of the tongue, and making with a knife three parallel incisions along this organ, one along its middle, and the other two between the one in the centre and the edges of the part affected. The cuts extended through two-thirds of the preternatural swelling, and had all the good effect, which could possibly be desired. There was a great deal of hemorrhage, and the enlargement of the tongue subsided so much, that, an hour after the operation, the patient was able to speak. The next day, the incisions had the appearance of being only superficial scarifications, and the tongue was in its natural state. In short, the incisions healed in a few days, the patient having merely made use of a simple gargle.

M. de la Malle quotes several other cases, all of which tend to shew the success, which he has met with in applying this practice to other similar cases. He confirms his own sentiments, by quoting the testimony of some authors, antecedent to him, who have recommended the method. The following case is taken from Job à Meckren, an eminent Dutch surgeon, who lived about the middle of the seventeenth century. This author relates, that a sailor's wife, who, for three, or four days, had experienced a great dryness of her throat, was suddenly threatened with suffocation by a quantity of humour, which she made efforts to expel. The tongue, the tonsils, and the whole palate, soon became swelled. Gargles, poultices, and glysters, produced no effect. It was not deemed advisable to bleed the patient, because the tumefied parts had a whitish appearance, and the swelling did not seem to be of an inflammatory nature. Purgative glysters; scarifying and cupping on the nape of the neck, and between the shoulders; and blisters behind the ears; were recommended, with a view of promoting, what the old surgeons implied by the term, *derivation*. Such remedies did not lessen the disease; on the contrary, it manifestly continued to grow worse, and the livid colour of the tongue, and adjacent parts caused a fear of mortification. Meckren called into consultation François de Vicq, a very experienced surgeon, who acknowledged, that he had never seen any similar case in the whole

course of his practice. He advised blood to be taken away from the arm, and rari-
fied veins, which latter operation was
effected with a good deal of difficulty.
The breathing at first became a little more
easy; but, as the symptoms still continued
to be alarming, it was determined to
make a long and deep incision on the
tongue, to the right and left. A good
deal of blood was discharged; the respi-
ration was immediately relieved; the
swelling diminished; the facility of speak-
ing returned; and, at length, all the
symptoms disappeared in an unexpected
manner. The sirop of roses and purlain
served as a liniment for the wounds, which
soon got well.

It may be concluded from the preced-
ing cases, that making incisions into the
tongue would have saved numerous pa-
tients, who have been suffocated, in con-
sequence of enormous enlargements of
this organ. In the small pox, the tongue
sometimes became immensely swelled;
and, it is more than probable, that, in
many instances, the employment of the
above method would have afforded great
relief to patients, whom the disease has
been known to have entirely bereaved of
the power of swallowing. (See *Mémoire
sur les Maladies de la Langue, dans les Mé-
moire de l'Acad. de Chirurgie, Tom. 5.
Mem. de M. Malle; same Work. Ency-
clopédie Méthodique, Partie Chirurgicale,
Art. Langue.*)

TONSILS. (dim. of *tolæ*, the kernels.)
Tonsillæ. Amygdalæ. The tonsils, like all
the other parts at the back of the mouth,
are subject to different kinds of swell-
ing, which vary as much in their nature
as their consequences. Some are rapid
in their progress, and these are frequently
observed to affect persons of, what is
termed, a sanguineous temperament.—
They are also prone to attack young peo-
ple, and such as labour hard, and they
have all the essential characters of inflam-
mation.

Other swellings of the tonsils are slow-
er in their progress, occur in damp cold
weather, and in indolent, and what the
old physicians used to call, phlegmatic
constitutions.

Lastly, another kind of enlargement of
the tonsils, which is usually contagious,
readily falls into a sloughing, gangrenous
state, sometimes extends to the neigh-
bouring parts, and too often proves fatal.
Hence, the various species of angina have
been named by some writers inflamma-
tory, catarrhal, and gangrenous. The
two first kinds frequently terminate in re-
solution; but, sometimes, the affected
tonsils afterwards assume a scirrhus
hardness, obstruct respiration and deglu-

tition, so that it becomes indispensably
necessary, either to extirpate the diseased
parts with the ligature, or the knife.

The cutting away of enlarged tonsils
was an operation, which was performed
by the ancients, and, in different ways.—
Sometimes, they tore with their fingers
the membrane covering the tonsil, and
then pulled this part out of the situation,
which it occupies between the two pillars
of the *velum pendulum palati*. In other
instances, in which they experienced too
much resistance, they seized the diseased
tonsil with a kind of hook, and then cut
it away with a bistoury, which Paulus
Ægineta informs us, was concave on the
side towards the tongue.

The moderns, who, for a long while,
were timid in the employment of both
these methods, adopted plans of a more
cruel description. The actual cautery
was proposed, and some partial success,
which followed its use, at once established
its reputation. Caustics were afterwards
employed, instead of actual fire; but, the
inconvenience of not being able to limit
their action, and the hazard of their fall-
ing down the *œsophagus*, soon caused
them to be relinquished by all rational
practitioners. Then the operation of
cutting away the tonsils was revived, and
it was performed, sometimes in the man-
ner of the old surgeons, sometimes with
various kinds of curved scissors, or
knives. Instead of the simple tenaculum
used by the ancients, a sort of double one
came into fashion. Every practitioner
seemed to regulate the choice of his in-
struments, by his own ingenuity; and an
operation, which was capable of being
done at once, became complicated by be-
ing divided into several processes.

Bichat describes the following plan, as
the common one practised at the present
day. The patient being conveniently
seated, the surgeon is to open the mouth
very wide, and depress the tongue with
any flat instrument, which is afterwards
to be committed to the care of an assist-
ant. The operator is then to take hold
of the diseased tonsil with a tenaculum,
and with a common scalpel, having the
back half of its blade covered with rag,
he now removes as much of the tonsil, as
ought to be taken away. In common
cases, it is deemed sufficient to cut on a
level with the pillars of the *velum pen-
dulum palati*. If any other portion should
require removal, this should next be per-
formed. The operation being finished,
the patient is frequently to wash his mouth
with proper gargles.

The preceding plan seems a very sim-
ple and easy one, and was, for a long
while, adopted by Desault. It is said,

however, to be liable to one objection, which is, that, when the end of the knife is conveyed far into the mouth, it may do mischief, not (as has been alleged) to the internal carotid artery, the backward situation of which completely keeps it out of all danger of being wounded, but to the membranous covering of the palate, in a place not corresponding to the tonsils. Desault thought this objection was the more forcible, as when the hook is introduced into the tonsil, the danger of the above mischief is considerably increased by a general spasm, which seems to affect every part of the mouth. Hence, this eminent surgeon used to employ, for cutting away diseased tonsils, an instrument, which was first invented for dividing cysts of the bladder. The contrivance consisted of a sharp-edged blade, which was included in a silver sheath. The latter had at its extremity a kind of notch, in which the gland, which was to be extirpated, was received. The rest of the instruments were similar to those used in the operation above described. Desault used to proceed, as follows:

1. The patient being seated on a high chair, with his head supported on an assistant's breast, the surgeon is to make him open his mouth very wide, and the lower jaw is to be kept thus depressed, by any solid body placed between the teeth, and held there by an assistant.

2. The tongue is to be kept down with a broad spatula.

3. The surgeon is next to take hold of the tonsil with a double hook, with which he is to raise and draw it a little towards him. He is then to take the above cystitome, and put the tonsil in the notch, on a level with the place, where the incision is intended to be made.

4. When the portion, which is to be cut off, is engaged in the notch, the operator is to draw the part towards him, so as to stretch it, and press the instrument against it from below upward. The blade being next pushed across the notch, the necessary section is accomplished. When the division is not complete, which is particularly liable to happen, when the diseased gland is of considerable magnitude, the blade is to be drawn back, and the section completed by applying the instrument to the wound, which it has already made. Even a third application may possibly become requisite on some occasions.

5. The patient is to be directed to wash his mouth. Bichat states, that this plan of operating, adopted by Desault, is equally simple and easy as the method above related, with the advantage of being safer. Such is the construction of the blade of the instrument, that when it slides across

the notch, it presses against, and steadily fixes the parts, which are to be divided; an advantage which neither the knife nor scissors have, before the action of which the parts are quite moveable. Hence, there is difficulty in cutting them. When the introduction of the instrument from above downward, is difficult, it is better to withdraw it; and, after turning the notch in the opposite direction, pass it from below upward. In general, however, the first of these methods is preferable, because the gland, when half cut through, cannot now fall back and obstruct the rima glottidis, so as to bring on danger of a sudden suffocation; a circumstance which Wiseman and Moscati have seen happen. With a view of preventing this occurrence, M. Louis recommended the common scalpel to be used, with its edge directed upward, as has been advised for the above instrument; which latter contrivance, however, being, according to Bichat's account, more easy and safe, merits the preference. Besides the advantage of fixing the soft parts, which are to be cut, it has that of not confusing them, like most other instruments of this nature, as, for instance, scissors. The oblique disposition of its blade makes it divide parts, in the manner of a saw.

The above contrivance, as Bichat allows, is certainly increasing the number of surgical instruments; a thing, which all the best modern surgeons endeavour to avoid. But, as this author remarks, this instrument is not exclusively applicable to any particular operation. It may be employed for cutting away the tonsils and uvula; dividing membranous fræna in the rectum, vagina, and bladder; amputating fungous excrescences, polypi in the nose (if this mode of extirpating them were preferred) and various tumours in general, which are deeply situated in different cavities of the body, where instruments introduced unguardedly might injure parts which should be avoided, or where the base of the tumour should be steadily fixed, when its division is to be accomplished. The latter object cannot safely be effected by scissors. When the base of the tumour is too large to be received in the notch, one part is first to be divided, and then another, till its whole thickness is cut through.

The ligature, as a means of extirpating enlarged tonsils, is, in general, only proper for timid patients, who will not have the knife employed, or whose fears are such as would baffle the operation with a cutting instrument. Tying the tonsils is more tedious, and not at all less painful, than cutting them away, and always creates a vast deal more irritation. Mus-

cati having once adopted this plan, very severe pain and inflammation ensued; the difficulty of swallowing and breathing compelled him to amputate the tumour at the place where the ligature was applied, and all the bad symptoms immediately ceased. Besides, when the ligature is used, the oozing of blood cannot take place from the ends of the cut vessels, and which tends so much to diminish the inflammation. The base of the swelling is also commonly broader than its upper part, and does not admit of being properly surrounded with a ligature. And, when it has a narrow base, it can then be so easily removed with a cutting instrument, or with Desault's instrument, and with so little pain, that one of the last modes is always preferable.

The ligature, however, has had its advocates. Heister recommends it, in certain cases: Sharp praises it; and others approve its use, and the plans of employing it have been as various as the inventive genius of the different partisans of the practice. Some make use of Levet's double cannula, which is furnished with a silver wire noose, in which the tumour is to be engaged. By twisting the instrument, the diseased part becomes constricted; and this plan being repeated every day, the circulation is intercepted, and the gland mortifies, and sloughs away. Some, after putting the noose of a ligature over a kind of tenaculum, hook hold of the tonsil, push the ligature over the enlarged gland, which they tie, without having any means of increasing the constriction every day. Some employ Belloque's instrument for putting the ligature over the tonsil. Others require no instrument whatever for the purpose, and accomplish the business with their fingers.

Passing over a more ample historical detail, we need only observe, that two inconveniences generally attend all the above plans. Some of them do not admit of the constriction being afterwards increased, and, therefore, are apt to prove insufficient. Indeed, this is usually the case; and it becomes necessary to apply another ligature. Others of the above methods, free from this objection, are attended with the inconvenience of leaving in the mouth too large a body, which is very annoying. The repeated twisting of the wire, also, sometimes makes it break, and renders another operation indispensable, which is much more painful than the first one.

In order to obviate these inconveniences, Desault employed an instrument, which the French call *un serre-nœud*, which is an exceedingly simple thing, being, in fact, nothing more than a long, narrow,

round piece of silver, terminating at one end in a little ring, or hole, and, at the other, in a kind of groove or notch. Desault sometimes employed the same instrument for tying nasal polypi, and tumours in the vagina, and rectum.

The following was this celebrated surgeon's method of extirpating the tonsils with a ligature.

1. The patient is to be seated on a high chair, with his head held back, on an assistant's breast; his mouth is to be opened very wide, his tongue depressed, and the diseased tonsil taken hold of with a double hook.

2. The surgeon takes the *serre-nœud*, in which a ligature has been passed, so as to form a noose. The noose is to be put over the handle of the hook, which is to be committed to the charge of an assistant, and the noose then pushed over the tonsil, so as to embrace it completely.

3. The surgeon is now to draw the ligature strongly towards him, and push forward the *serre-nœud*, so as to produce the requisite constriction of the tumour. In general, the ligature should not be made very tight the first day.

4. When the constriction is such as it ought to be, the double-hook is to be withdrawn, and the ligature twisted round the notch, at the outward end of the instrument.

5. The next day, the gland becomes unusually large, in consequence of the impediment to the return of the venous blood. The ligature is to be unfastened from the notched end of the instrument, and drawn more out, so as to increase the constriction. When this is sufficient, the ligature is to be again twisted round the notch. This plan is to be followed up, till the tumour is detached, which usually happens on the fourth or fifth day.

The method just described, is more simple, than those described in Paré, Fabricius Hildanus, Scultetus, &c.; but, as Bichat and Desault recommended, the knife, if possible, should always be preferred to the ligature. (*Desault par Bichat, Tom. 2.*)

I shall conclude this article with observing, that the best modern practitioners in this country, prefer a common knife to any other instrument, for the performance of this operation.

TOPHUS. (said to be derived from a Hebrew word.) A swelling, which particularly affects a bone, or the periosteum. See *Node*.

TORCULAR. (from *torqueo*, to twist.) A tourniquet. See this word.

TORMENTIL. (from *tormentum*, pain, because it is said to relieve the tooth-

act.) *Tormentilla Erecta*. Linn. The root of this plant is exceedingly astringent, and, on this account, is sometimes employed in affections arising from atony, and a relaxation of certain parts. It has been used for making astringent poultices, in cases of prolapsus of the anus, and also of that of the vagina. In relaxations of the uvula, and scorbutic affections of the gums, gargles, made with tormentil, are said to have proved useful. Fomentations, prepared with this plant, have been recommended, as being very serviceable for relieving the weakness of joints consequent to sprains.

TORTICOLLIS. (from *torqueo*, to twist; and *collum*, the neck.) The wry-neck. See *Wry-neck*.

TOURNIQUET. (French, from *tourner*, to turn.) An instrument used for stopping the flow of blood into a limb, until some requisite operation has been performed, or some more permanent plans of checking hemorrhage, have been put in practice.

The old surgeons used to surround the limb with a band, with which they made such a degree of constriction, that the circulation was quite stopped. These practitioners also believed, that the pressure of the band was advantageous, by benumbing the limb, and moderating the pain of operations.

The violent pain and contusion, however, which this tourniquet occasioned, being frequently followed by mortification and abscesses, surgeons endeavoured to devise some other method of checking hemorrhage. The application of the circular band was first improved, so that it caused less pain, and less mischief to the skin. The limb was surrounded with a very thick compress, over which the band was placed. Two small sticks were next put under the band; one on the inside, the other on the outside of the limb; and they were twisted till the band was rendered sufficiently tight. It is in this manner, says Dionis in his *Traité d'Opérations*, that carriers tighten the cords which fasten the bales of goods in their carts. A French surgeon, named Morel, is said to have made this first improvement in the application of tourniquets.

M. Petit, in 1718, presented to the Academy of Sciences, a tourniquet of his own invention, which was much more perfect, than any one ever contrived before. It consists of two pieces of wood, one of which is superior, the other inferior. The inferior piece is about four inches and a half long, and nearly two broad. Its under surface is somewhat concave, while its upper one is a little convex, and the ends are hollowed out.

From its middle part rises a round eminence, about seven lines high, and eight and a half broad. The superior piece is almost the same as the inferior one, just described, but rather shorter. The eminence which ascends from its middle part, is six lines high, and an inch and a half in diameter. This eminence is hollow within, and calculated to receive a wooden screw, the top of which is a sort of button for turning the screw. The grooves of Petit's screw were about four, or five, and each of them four lines in diameter, in order that a half turn might produce the necessary effect. Lastly, all the pieces of the instrument were fastened together by an iron pin, which went through the middle of the two pieces of wood, and through the whole length of the screw. This iron pin is rivetted under the inferior piece, and at the top of the button, in such a manner, however, that the screw is capable of turning on it, as on a pivot.

In order to apply this tourniquet, the limb is to be surrounded with a double strap, about four finger-breadths wide, and made of chamois leather, which is the softest material which can be used. To one end of the strap a double little cushion is fastened, of the same length and breadth as the lower piece of the tourniquet. A narrow compress, or cylindrical pad, is also requisite, for the purpose of compressing the track of the vessels. This compress consists of a very firm roll of linen, covered with chamois leather. The ends of a piece of tape are sewed to the outer part of the pad, and thus the tape leaves a passage for the leather strap. By this artifice, the pad can be moved to any situation on the strap, which is most convenient, according as the bulk of the limb may require. The middle of the tape is to be fastened to the outside of the leather strap. The cylindrical compress, or pad, is to be put over the course of the vessels. The double cushion is to be placed on the opposite side of the member, while the leather strap is to surround the limb in a circular manner. All the different pieces of the apparatus are next to be retained by the tape, which is to be tied at the side of the cushion.

The tourniquet is now to be put over the cushion, on that side of the limb which is furthest from the track of the large vessels, and is to be fastened in this situation by a double band, with a hole in it for the reception of the upper part of the screw.

In order to make the proper compression, the screw is to be half turned

round, from the right to the left. The upper piece of the tourniquet, becoming now further from the lower one, the double band draws the pad, and presses it against the vessels, so as to make the due degree of compression.

The following are the advantages, attending the use of Petit's tourniquet: 1. It compresses the lateral parts of the limb less, than the tourniquet previously in use. 2. It requires the aid of no assistant, either to hold, tighten, or loosen it. 3. The operator is able of himself to stop the flow of blood in the artery, by means of the screw. 4. When there is any danger of hemorrhage after an operation, this kind of tourniquet may be left on the limb, and, in case of the bleeding coming on, the patient, if no one be at hand, can tighten the instrument himself, as much as is necessary. 5. The constriction, which this tourniquet produces, does not create any danger of mortification, because it does not altogether stop the flow of blood through the collateral arteries.

The tourniquet just described, is certainly very complex, when compared with the one used by the best modern practitioners; but, still it is the original of the latter, and both are constructed on the same principles. All the pieces of modern tourniquets are kept connected together, and instead of two pieces of wood, used by Petit, there is contrived a brass bridge, which is capable of being elevated, or depressed, by means of a screw, made of the same metal. Over this bridge, a very strong band proceeds, and by passing under two little rollers, at each end of the bridge, it always remains connected with the instrument. A convex firm pad is sewed to the band, and put immediately over the artery, where the instrument is applied. There are no cushions for the opposite side of the limb under the screw; but a thick piece of leather, through which the band proceeds in two places, is always situated under the lower surface of the brass, and serves to prevent any bad effects of its pressure. It is usual also for the surgeon to fold some rag, and put it in this situation, at the time of applying the instrument. (See some other remarks on the tourniquet, in the article *Hemorrhage*.)

TRACHEA. (from *τραχυσ*, rough.) The wind-pipe, so named from its asperities. For an account of its wounds, see *Throat*.

TRACHELO'PHYMA. (from *τραχηλος*, the throat, and *φυμα*, a tumour.) A wen, or tumour on the throat.

TRACHEOCE'LE. (from *τραχεια*, the wind-pipe, and *κηλη*, a tumour.) A tumour on the trachea.

TRACHEOTOMY. (from *τραχεια*, the wind-pipe, and *τεμνω*, to cut.) *Tracheotomy*. The operation of cutting an opening into the wind-pipe for various surgical purposes. See *Bronchotomy*.

TRACHO'MA. (from *τραχυσ*, rough.) A roughness on the inner surface of the eyelids.

TRAUMATICS. (from *τραυμα*, a wound.) *Traumatica*. Medicines, or rather applications, which promote the healing of wounds.

TREPAN. (from *τρυνω*, to perforate.) *Trepanum*; *Terebellum*; *Modiolus*. An instrument, which is intended for sawing out circular portions of bone. Before a more convenient instrument, named the trephine, came into use, surgeons commonly employed the trepan in various injuries of the head. (See *Head, Injuries of*.) It is nothing else, in short, than a cylindrical saw, and it only differs from the trephine, in having a different kind of handle.

TREPHINE. The instrument now commonly preferred for perforating the cranium, for purposes which we shall presently explain. It consists of a simple cylindrical saw, with a handle placed transversely, like that of a gimlet; and, from the centre of the circle, which the teeth of the saw describe, a sharp little perforator projects, named the centre-pin. The upper part of the centre-pin is made to screw in a corresponding hole at the inside of the top of the saw, and is capable of being taken out, or put in, at the surgeon's option, by means of a little key for the purpose. Its use is to fix the trephine, when it is first applied, that is, before the teeth of the instrument have made a sufficient circular groove, in which they can steadily work. When this has been accomplished, the centre-pin must always be removed; because now it is not only not needed, but, if left, it would retard the progress of the operation, and inevitably wound the dura mater and brain, when the teeth of the saw had cut to a certain depth through the cranium. My trephines, which I bought of Mr. Savigny, have their centre-pins contrived to slide up, or down, and to be fixed in either position by turning a little screw. This method seems to me both ingenious and convenient.

The cylindrical part of the trephine is often termed the *crown* of the instrument. The surgeon should always have at least two, or three cylindrical saws of various

sizes; for, it is always a commendable rule never to saw away any more of the cranium, than is absolutely requisite for the accomplishment of some assignable object. There is no occasion, however, for having more than one handle, which may be made to screw on any of the saws.

Trephines are also occasionally applied to other bones, besides those of the cranium. In the articles *Antrum*, *Caries*, *Exostoses*, *Spina Ventosa*, and *Fractures of the Sternum*, other cases are mentioned, in which the employment of these instruments sometimes becomes proper.

It is certainly not always desirable to remove a complete circular portion of the cranium; the taking away a piece of smaller size, and of a different shape, would frequently be much more advantageous. Some surgeons, I understand, who object to removing any unnecessary quantity of the cranium, have been in the habit of employing a trephine, terminating only in a semi-circular, instead of a circular saw, by which means, they can often cut across the base of a depressed portion of the skull, and take it away, without any occasion for removing also a circular piece of bone. An instrument of the latter kind may certainly be sometimes found useful.

The saws, however, which Mr. Hey has described, should constantly be kept in every case of trephining instruments. This practical writer remarks, that "the purposes, for which any portion of the cranium is removed, are, to enable the surgeon to extract broken fragments of bone, to elevate what is depressed, and to afford a proper issue to blood or matter, that is, or may be confined, &c.

"When a broken fragment of bone is driven beneath the sound contiguous part of the cranium, it frequently happens, that the extraction cannot be executed without removing some of the unbroken part, under which the fragment is depressed. This might generally be effected with very little loss of sound bone, if a narrow portion of that, which lies over the broken fragment, could be removed. But such a portion cannot be removed by the trephine. This instrument can only saw out a circular piece. And as, in executing this, the central pin of the saw must be placed upon the uninjured bone, it is evident, that a portion of the sound bone, greater than half the area of the trephine, must be removed at every operation. When the broken and depressed fragment is large, a repeated application of the trephine is often necessary, and a great destruction of sound bone must be the consequence.

"When the injury consists merely of a

fissure with depression, a small enlargement of the fissure would enable the surgeon to introduce the point of the elevator, so as to raise the depressed bone. But a small enlargement of the fissure cannot be made with the trephine. When it is necessary to apply the elevator to different parts of the depressed bone, a great deal of the sound cranium must be removed, where a very narrow aperture would have been sufficient.

"The same reasoning will apply to the case of openings, made for the purpose of giving a discharge to extravasated blood, or matter.

"If a saw could be contrived, which might be worked with safety in a straight, or gently curvilinear direction, it would be a great acquisition to the practical surgeon. Such a saw I can now with confidence recommend, after a trial of twenty years, during which time, I have rarely used the trephine in fractures of the skull. Its use has been adopted by my colleagues at the General Infirmary in Leeds; and will be adopted, I hope, by every surgeon, who has once made trial of it." Mr. Hey next informs us, that the instrument was first shewn to him by Dr. Cockell, of Pontefract; but that there is a saw, formed on the same principle, in Scultetus's *Armamentarium Chirurgicum*. The saws alluded to, are very short ones, fixed at the end of a longish straight handle; their edges are made either straight, or semi-circular. The latter construction qualifies the instrument for cutting in a curvilinear direction, which is often proper. The edge of the saw should always be made a little thicker, than the rest of the blade, by which means it will work in the groove, which is cut, with more facility.

Saws, made on the principle just described, are also of infinite use in cutting away diseased portions of other bones, besides the skull, exostoses, &c. In cases of necrosis, when a dead part of a bone is quite wedged in the substance of the surrounding new bony matter, Mr. Hey's saws may often be advantageously employed for cutting away the parts, which mechanically prevent the detachment of the dead piece.

Besides trephines of various sizes, and the saws just now noticed, the surgeon should also take care to have in his case of instruments for this operation, a little brush for occasionally cleansing away the particles of bone from the teeth of the saw, in the progress of the operation; a pair of forceps adapted for extracting the round piece of bone after it has been detached by the saw; a lenticular for removing any inequalities, which may pre-

sent themselves, round the sawn edge of the cranium, after the circular piece is taken out; a raspatory for the same purpose, and, also, for scraping the bone in order to see whether it will bleed, which is a circumstance in some cases very important to be attended to; (see *Head, Injuries of*;) a largish common scalpel for dividing the scalp, &c.; and some elevators for raising depressed pieces of bone.

The common elevator is now generally used by all the best English surgeons; but, several others have been proposed, as, for instance, the tripod elevator; and another one, invented by M. J. L. Petit, and afterwards improved by M. Louis.

The common elevator is a kind of lever, bent in two different directions, and the ends of which are made rough, in order that they may not easily slip away from the piece of bone, which is to be raised. This instrument may be used by forming a fulcrum for it in the hand, which holds it; or else by making a fixed point for it on the edge of the opening, made with the trephine, or of that, which the accidental violence has occasioned. In the first case, the instrument cannot be employed with much force; the hand may give way; or the elevator may slip away from the bone, against which it presses, and thus occasion a considerable concussion. In the second case, the parts, on which the instrument is placed, may be forced inwards.

These inconveniences led to the invention of the three-footed elevator, which consists of three branches uniting above into one common trunk. This part of the elevator is pervaded by a long screw, having below a kind of hook, and above a sort of handle for turning it. It is with the hook, that the depressed portion of bone is to be elevated. This part of the instrument is to be introduced into the opening, made in the cranium, as soon as the elevator has been put in a proper position, and it is to be made to ascend by turning the screw. Formerly, the tripod elevator was also sometimes used conjointly with a short screw, which was first fixed in the piece of bone to be elevated, and then drawn upwards by placing the hook of the elevator in a ring, which was attached to its upper part. Those surgeons, who invented the three-footed elevator, were well acquainted with all the objections to the ordinary one, and they endeavoured to obviate them, by procuring a firmer fulcrum, and more power. But it was necessary to change the situation of their elevator, as often as there was occasion to raise a different portion of bone, and the hook,

also, being connected with an inflexible piece of steel, the direction of which was always the same as that of the instrument, it was troublesome and difficult to place the hook under the piece of bone, which required being raised.

Such were the reasons, which induced M. J. L. Petit to invent a new elevator. This is a lever mounted on a handle, and straight, throughout its whole length, except just at its very end, which is slightly curved, in order that it may be more easily applied under the bone, which one wishes to elevate. The lever in question is pierced, at various distances from its bent end, with several holes, intended for the reception of a little kind of moveable screw-peg, fixed on the top of a sort of bridge. This latter part of the instrument is a kind of arch, the ends of which are long, and covered with little cushions. In the middle of the bridge is the moveable screw-peg already mentioned. Petit wished the peg to be joined to the bridge, by means of a hinge; and, as he often found it necessary to elevate several different pieces of bone in the same wound, he thought that the little screw should not be completely fastened in the hole; but, that the instrument should be capable of being turned to the right, or left, or to any point of the cranium. However, a screw is an inclined surface, which revolves round in a cylindrical cavity; consequently, when the fulcrum, formed by the bridge, is once placed, and (instead of moving the elevator directly upward) one wishes to turn the instrument to the right, or left, it can only be applied obliquely, and, with its edge, under the piece of bone which is to be raised.

M. Louis learnt from experience the inconveniences of Petit's elevator. The former of these celebrated surgeons obviated them by substituting, for the hinge, a kind of joint, for the purpose of connecting the lever with the bridge. This construction, which makes the lever capable of being readily moved in every direction, also adapts it for being put under every point, which may require being raised, and this, without any occasion for changing the position of the bridge, forming the fulcrum. M. Louis also substituted for the screw a pivot.

I have only to repeat, respecting elevators, that all surgeons in this country prefer, what we have called, the common one, which is the most simple, and is found to answer every desirable purpose.

Before beginning the description of the operation, I think it highly proper to remind the reader, of what has been so forcibly dwelt upon in the article *Head*,

Injuries of,—that the removal of pressure off the brain, which pressure must also actually occasion dangerous symptoms, can form the only true and vindicable reason for employing the trephine, or sawing away any portion of the skull. There are a very few exceptions to this remark: it may, indeed, be now and then proper to saw away the bony edges, which surround some fungous excrescences, which grow from the dura mater, and make their way outward, by occasioning an absorption of the part of the skull immediately over them. (See *Dura Mater*.) It may also be now and then proper to saw out diseased portions of the skull, though, it must be confessed, that in general their separation might be left to time and nature. To have a proper idea of all the circumstances in which trephining is indicated, the reader must turn to the article, *Head, Injuries of*.

When the operation is determined on, it is more convenient to have the head shaved; indeed, this is often done immediately the surgeon is called, in order that he may have a better opportunity of seeing what parts of the scalp have been struck; for, it is in such situations, that he has most reason to apprehend fractures of the bone, or extravasations beneath it. If, however, the violence has occasioned a large wound, or laceration of the scalp, the practitioner, knowing where the force has been applied, is frequently content with having a little of the hair shaved off the parts surrounding the injury. All that need be said on this subject is, that it is better to have enough of the hair always taken away, to afford the surgeon an uninterrupted opportunity of examining the scalp freely, and doing whatever may be necessary. The loss of a little hair is of very little consequence, while the concealment of the seat of a depressed fracture, or extravasation, might lead to fatal consequences.

When the propriety and necessity of trephining are fully indicated by circumstances and symptoms, explained in the article, *Head, Injuries of*, provided the wound, or laceration of the scalp, should not have exposed a sufficient surface of the bone for the application of the crown of the trephine, an adequate dilatation of such wound ought immediately to be made. If, in the situation of the blow, there should only be a contusion, or a lump, unattended with any wound, a division of this part of the scalp is to be made by carrying the knife quite down to the bone. In those cases, in which the swelling, occasioned by the violence, is considerable, and attended with the sensation of a crepitus; as well as in

other instances, in which there is only a contusion, under which a fracture and displaced pieces of bones may be felt: the scalp must be divided in the same manner, only with greater caution, lest the point of the knife should insinuate itself through the fracture, and do mischief to the dura mater and brain.

Authors recommend the shape of the incision to be different according to the kind of fracture, and the parts of the head, on which the violence has operated. When the whole extent of the injury can be brought into view, by means of an incision, having the form of a letter T, the surgeon should be content with such a division: but, if this be not sufficient, he may render it a crucial one. When the trephine is to be applied to the squamous parts of the temporal bone, they are recommended to make the incision, as much as possible in the shape of the letter V, the branches of which are to be upward, and the angle downward, in order that as little as possible of the temporal muscle may be cut, and that the division of its fibres may be avoided as far as it is in our power.

Having divided the scalp, the next object is to reflect it; but, no man would be warranted in cutting any part of it away, although such practice is advised by Pott, and many other eminent writers. The purposes of the operation do not require any removal of this kind; and, the method would leave a wound, which would be long in healing, and, when healed, never exempt from deformity. In short, the reflected flaps of the scalp are capable of adhering to the parts, on which they are laid, after the operation, and, consequently, ought never to be wantonly cut away.

The scalp being reflected, authors next advise us to scrape away the pericranium, either with the knife, or the raspator. Perhaps, this measure may be considered as one, which does neither much harm, nor much good. The design is to facilitate the application of the trephine to the bone. However, the teeth of a proper instrument, in good order, will not be impeded by the slender periosteum; and scraping this membrane away from parts of the skull, which are not to be removed, must be conducive to exfoliations.

Sometimes, the bleeding from branches of the temporal, or occipital artery, is so copious, that the bone cannot be very conveniently perforated before the hemorrhage is suppressed. If it be prudent to wait a little, and the case (as it generally does) should be likely to be benefited by the evacuation of blood, it is as well to let the bleeding continue for a certain

time. The surgeon may then just direct an assistant to put the end of one of his fingers on the mouth of the vessel, and proceed in the operation. In some cases, the bleeding might be so troublesome, that it would be better to tie the artery at once.

All parts of the cranium do not admit of being trephined with equal convenience and safety. It has usually been set down by surgical authors, that the trephine cannot be applied below the transverse ridge of the os occipitis. There are some cases, however, which prove that such an operation may be safely done, and that we ought not, in urgent circumstances to be afraid of dividing the trapezius and complexus muscles, in order to be enabled to apply the trephine to the bone. (See *Hutchinson's Case in Medico-Chirurgical Transactions*, Vol. 2, p. 104, &c.)

The majority of writers also forbid us applying the trephine to the frontal sinuses, in consequence of the indeterminate depth of these cavities, and the apprehension of incurable fistulæ. M. Larrey, however, has deviated from this precept in two instances, and his practice confirms the statement of Mr. C. Bell, that by opening the frontal sinus with a large trephine, and then using a small one, the internal parietes of this cavity may be trephined with perfect safety, and no risk of injuring the dura mater with the saw. (See *Larrey's Mém. de Chirurgie Militaire*, Tom. 2, p. 136—138.)

Writers also caution us not to apply the trephine to the anterior inferior angle of the parietal bone, in consequence of the middle artery of the dura mater lying under it, generally in a groove of the bone, and occasionally in a canal in its very substance. In the latter circumstance, this portion of the parietal bone could not possibly be taken away, without wounding the vessel. However, notwithstanding this advice, which has been unthinkingly handed down by one writer to another, from generation to generation, I very much question the soundness of the doctrine. We undoubtedly ought to avoid trephining this part of the cranium, when we can prudently do so. But the causes demanding this operation are always so urgent, that the patient's sole chance of existence depends on their quick removal. Hence, were there pressure on the brain, either from a depressed portion of bone, from blood, or matter, and such pressure could not be removed without trephining the anterior inferior angle of the parietal bone, what operator would be afraid of doing so? Besides, the fear of the he-

morrhage has been very unfounded; for, the lodgment of the artery in a bony furrow, or canal, which authors have pointed out, as rendering the suppression of the hemorrhage more difficult, is a mere visionary idea, as it is well known, that a little plug of lint, pushed in the orifice of a vessel, so situated, will always stop the bleeding, with as much certainty and ease as can possibly be imagined.

The foregoing suggestion was made in the early editions of my works, and I now see the safety of the practice has been confirmed. "I have also applied the trepan (says M. Larrey) over the track of the spheno-spinous artery, at the inferior anterior angle of the parietal bone. The artery was divided; but, I stopped the hemorrhage almost immediately, by applying an iron probe red hot." (*Mém. de Chirurgie Militaire*, Tom. 2, p. 138.)

Writers, until very lately, also prohibited us from trephining over any of the sutures, and, especially over the sagittal suture, beneath which the longitudinal sinus is situated. The fear of the dura mater being injured, and of this vessel being wounded, was the reason for the advice. With regard to the sutures in general, the trephine may be applied to them, as well as to any other part; and, as for the sagittal suture, many facts confirm the propriety of not being deterred even by it, though situated immediately over the longitudinal sinus. It is to be remembered, also, that the dura mater, in cases of extravasated blood, and matter, beneath the cranium, is detached by the intervention of such fluids from the inner table.

By means of a perforation practised over the sagittal suture, Garengot successfully elevated a portion of bone, which pressed upon the longitudinal sinus, and made the patient quite comatose. The depressed piece of the cranium could not have been so advantageously raised, had the trepan been applied in any other situation. But a still stronger argument, in favour of this practice, when the case at all requires it, is the fact, that wounds of the longitudinal sinus, and the hemorrhage resulting from them, are not attended with any serious danger. Sharp mentions his having twice seen a bleeding of this kind. Another instance is also recorded in Warner's Cases. A child received a wound on its forehead: the two parietal bones were fractured, and a portion of each was depressed on the dura mater. The child lived a month, without any operation being done; but, at the end of this time, Warner applied the trepan.

He found a splinter of bone sticking in such a way in the longitudinal sinus, that it could not easily be got out; consequently, he enlarged with a lancet the opening, in which the splinter was entangled. The hemorrhage, which was copious, was easily suppressed by the application of a little dry lint, and the child was relieved, though it died at the end of two months, after suffering a variety of symptoms, which had no connexion with the wound of the sinus, the opening of which soon healed. The fourth case, related by Marchettis, also confirms, that wounds of the longitudinal sinus are not fatal. Pott has since recorded other facts, tending to the same conclusion.

[In confirmation of the above remarks, I take the liberty to state, that I have myself seen a case in which the trephine was applied over the longitudinal sinus; and upon removing the bone, this vessel was found wounded, and bled profusely: the application of lint stopped the hemorrhage, and the patient recovered.]

Whenever a depressed fracture can be elevated to its proper level, without applying the trephine, and with the mere aid of a pair of forceps, or an elevator, trephining should never be performed, unless there should be reason to apprehend, that blood, or matter, lodged on the surface of the dura mater, contributes to the occurrence of the bad symptoms, and ought to be discharged.

The scalp having been divided, if necessary, and the pericranium scraped from the surface of the bone, according to the common precepts, and practice, the next thing is the application of the crown of the trephine.

The surgeon is first to make a little impression with the point of the centre-pin, for the purpose of shewing the place, where it will work, when the crown of the trephine is applied in the proper situation; for, where such impression is made, the operator must make a small hole with a perforator, in order to fix the point of the centre-pin, on which the crown of the instrument turns backward and forward, as on an axis, during the first stage of the operation. Mr. Savigny's centre-pins make a perforation, without need of any particular instrument for the purpose, and, in this respect, are advantageous.

The point of the centre-pin having been fixed, the trephine is to be turned, by regular semicircular motions, alternately to the right and left, which object is effected by steady pronations and supinations of the operator's hand. The

teeth of the saw having made a tolerable circular groove, in which they can steadily work, the centre-pin becomes useless, and, as it would, if not withdrawn, or removed, certainly injure the dura mater and brain, by reason of its projecting farther, than any other part of the instrument, it would be an unpardonable blunder to let it remain, after a proper circular groove has been formed by the teeth of the saw.

The beginning of the sawing may be executed boldly and quickly; for, the operator runs no hazard of doing mischief. It is necessary occasionally, with a view of facilitating the action of the instrument, to clean away the particles of bony matter, with a little brush, usually kept for the purpose in every box of trephining instruments. Were this plan neglected, the action of the cylindrical saw would be very much clogged.

The operator, however, must increase his caution, when the sawing has made greater progress; for, were he to be too bold, he might sometimes lacerate the membranes of the brain with the teeth of the instrument, particularly, as the thickness of the cranium is subject to infinite variety, both in different parts of the same head, and in different subjects. Let the surgeon, therefore, never forget to examine frequently with the point of a quill, whether any part of the circular groove is cut through, or nearly so; for, when this is the case, the instrument must only be worked in such a way, as to make pressure upon, and cut, the part of the circle, which yet remains to be divided. In some few cases, it is said, that the surgeon can distinctly feel, when the teeth of the saw reach the diploe, or medullary structure, between the two tables of the cranium, and some writers have rashly directed us to saw with boldness, till the sensation of this occurrence is communicated to our hand and fingers. However, I believe, this possibility of discriminating the arrival of the teeth of the saw at the diploe is so uncommon, and so fallacious, that it should never be expected, or relied on. Nor ought the surgeon to saw with incautious force and rapidity, till he sees the teeth of the trephine bloody, which has been set down as another criterion of their having reached the diploe. I have already stated, that a great many skulls have hardly any space between several parts of the two tables. This is particularly often the case in old persons.

A prudent man will always prefer exerting a little force for the purpose of breaking some of the bony connexion,

retaining the circular piece of bone, to running any hazard of injuring the dura mater, by sawing too deeply. After a certain time, therefore, it is better to lay down the trephine, and endeavour to elevate the portion of bone, with the aid of a pair of forceps, constructed for the purpose, and kept in most cases of trephining instruments, or else by means of an elevator, which is still more calculated for the purpose.

When the circular piece of bone has been taken out, and the edges of the perforation are unequal, and splintered, the irregularities are to be cut off with the lenticular knife. When there is extravasated blood underneath the opening which has been made, it sometimes spontaneously makes its escape, and, if it should not do so, the surgeon should remove it himself. If one perforation of the skull should not suffice for letting out the blood, as much more of the cranium ought to be removed with the trephine, as circumstances may require; there being no comparison between the danger of repeating the application of the instrument, and that of leaving a quantity of undischarged, compressing fluid, on the surface of the brain. Certainly, many facts on record evince, that the dura mater may be very extensively uncovered, without dangerous consequences. Sarrau saw a whole parietal bone exfoliate, in consequence of a blow on the head. Blegny relates a similar case; and Saviard makes mention of a woman, who had lost the upper part of the os frontis, both the parietal bones, and a large portion of the os occipitis, all of which had come away at the same time. The woman, notwithstanding, recovered. Vaugion, however, who also seems to relate this identical case, describes the exfoliation as not being quite so extensive.

I am of opinion, notwithstanding these facts, that exposing a large part of the dura mater with the trephine is, by no means, an operation exempt from serious danger. And, what I conceive confirms this statement, is my having known instances, in which persons, who had been rashly advised to submit to being trephined, for the cure of violent pains in the head, &c, died, in consequence of the operation.

However, I perfectly coincide with writers, who recommend the removal of as much bone, as is requisite, in order to be able to remove the whole of the pressure from the surface of the dura mater.

The application of the trephine, in cases of large extravasation, must in

particular be made several times, when the situation of the fluid does not favour its escape. However, in this circumstance, Sabatier says, that we should not make numerous perforations all along the extent of the extravasation; but, only a counter-opening, as is done on the soft parts. This author expresses his surprise at there not being on record many examples of counter-openings made on the cranium, since analogy demonstrates their utility. I cannot help remarking on this part of the subject, that one very obvious objection to making openings of this kind in the cranium, is the impossibility of knowing with certainty, whether blood lies under any particular part of the skull; whereas, in abscesses of the soft parts, the surgeon feels the fluctuation of the matter, and knows, that his counter-opening will be made in the cavity containing it. One might also have occasion to make more than one perforation, in order to discharge blood extravasated beneath the skull, when the blow has happened near a suture, to which the dura mater continues adherent; for, it might happen, that an opening made only on one side of the suture, might only give vent to a part of the extravasation.

If we should not find blood lodged under the cranium; but the dura mater should seem elevated, tense, dark-coloured, forming a prominent fluctuating tumour, outward, it may be cautiously opened with a lancet, or bistoury, with a view to letting out any collection of blood underneath. In the article, *Head, Injuries of*, we have stated the result of Mr. Abernethy's experience, in regard to the operation of opening the dura mater. This gentleman found, that the method never effectually discharged all the blood, but only the serous part of it. The evacuation of any of the compressing fluid must, however be desirable; and, if the surgeon cannot do more, yet he has fulfilled his professional duty.

The utility of trephining is not limited to discharging extravasated blood, or matter, lodged underneath the skull. This operation frequently enables us to elevate depressed portions of bone. The latter object can often be accomplished by merely making one perforation. Sometimes, several perforations are requisite to be made near each other. Authors even state, that it may also become necessary to remove the intervening portions of bone with a pair of cutting forceps. The depressed part may then be easily raised by means of an elevator. Occasionally, indeed, I may say, very often, the best practice is to remove the depressed

portion entirely, when its entire separation from the rest of the skull can be accomplished by cutting across the base of the depressed piece. If any splinter stick in the dura mater, and not admit of being withdrawn, without enlarging the wound in the membrane, the surgeon should not be afraid of doing this with a sharp instrument.

The operation being completed, the flaps of the scalp are to be laid down, and a little soft lint applied, covered with a pledget of simple ointment. The lighter the dressings are, the better, and no bandage will serve for retaining them so well, as a common elastic night-cap.

The practitioner should not now conceive, that he has done all that he ought to do. Let him remember the urgent necessity of keeping off, or diminishing, the inflammation of the dura mater and brain, which is to be feared. Let him bleed the patient largely and repeatedly; exhibit saline purges, glysters, and antimonials; and, if the symptoms continue, let him apply a blister to some part of the head. I shall avoid, however, any repetitions on this subject, by referring to *Head, Injuries of*.

The reader may find an account of the operation of trepanning, or trephining, in every system of surgery: but, he should particularly consult the writings of Sharp, Le Dran, Dionis, Bertrandi, Pott, and Sabatier, which latter writer has materially assisted me in the preceding article. Several parts of the *Mémoires de l'Acad. de Chirurgie* are also highly deserving of perusal.

TRICHIASIS. (from *Spiz*, the hair.) *Entropion.* Scarpa distinguishes two kinds of this disease; in one the eyelashes incline inward, without any change in the natural position of the cartilage of the eyelid; in the other, the edge of the latter part turns in a preternatural manner inward, and, of course, the cilia point toward the eyeball.

Scarpa describes the first species of trichiasis, as being exceedingly uncommon. Indeed, he adds, that he had never seen but one such example, and in this only some of the hairs were distorted inward. The common kind of trichiasis is the second one, or that, in which both the tarsus and eyelashes are preternaturally turned inward at the same time. The disease may either be complete, so as to interest the whole of the eyelid, or incomplete, when only the edge of the tarsus takes a wrong position. One eyelid alone may be affected, or both, and occasionally the eyelids on each side are thus diseased.

Scarpa considers the *distichiasis*, or species of trichiasis, said to arise from there being two rows of hairs on each eyelid, as merely imaginary; and he reminds us of what Winslow and Albinus have explained, that notwithstanding the roots of the eyelashes seem to be arranged only in one line, the hairs themselves, by separating from each other, may seem to form several rows, while their insertions do not deviate in the least from the common, natural arrangement. (See *Distichiasis*.)

It is not easy to determine exactly the causes which sometimes make a few of the eyelashes deviate from their natural direction, while the position of the eyelid itself is not at all altered. The causes are generally imputed to scars on the tarsus, in consequence of previous ulceration, which makes the hairs fall off, and hinders others, which grow, from assuming a proper direction. However, this cause is not the only one; for, Scarpa has seen an instance, in which two, or three hairs grew inward against the eyeball, notwithstanding the tarsus had no ulceration, nor cicatrix whatever upon it.

Scarpa says, he is inclined to think, that the little ulcers and scars, which sometimes form on the inner edge of the tarsus, would occasion the second species of trichiasis, or an inversion of the edge of the eyelid, and consequently of the cilia against the eye, rather than the first species of the affection. As such ulcers eat deeply into the part, and, when neglected, destroy the substance of the lining of the eyelid near the tarsus, it necessarily happens, that as the sores gradually cicatrize and contract, they draw inward the tarsus, and even the hairs implanted into it. Since the little ulcers in question do not always extend all along the edge of the tarsus; but, are occasionally confined to a few lines in its centre, or near the outer angle, all the eyelashes do not incline inward after cicatrization, but, only a few of them, which correspond to the extent of the ulcers, which were formerly situated along the inner edge of the tarsus. Indeed, in all cases of imperfect trichiasis, caused by a cicatrix on the inside of the eyelid, it may readily be seen, that the tarsus and the eyelashes are in their natural position, except opposite the place, where the ulcers on the inner edge of the eyelid were previously situated. If the eyelid be turned out, its lining, near its edge, corresponding to the seat of the trichiasis, will be found pale, rigid, and callous, and it will be obvious, that the inversion of its cartilaginous edge, and the faulty inclination of

the eyelashes against the eyeball, originate from the contraction of that part of the inside of the lid.

Besides these causes, there are some others, which are capable of producing the same bad effect. First, the inveterate chronic ophthalmia, which gradually grows worse and worse, (such as the scrophulous, or that arising from the small pox,) and which keeps the integuments of the eyelids, for a long while, in a state of distention and œdema, next induces a relaxation of them, and, the cartilaginous edge of the eyelid, not being properly supported by the skin, falls inward against the eyeball, and draws with it the eyelashes into the same faulty direction. The same bad effect is sometimes produced, independently of any relaxation of the integuments, by a morbid softening of the cartilage of the tarsus, occasioned by a long-continued, copious discharge from the Meibomian glands. In consequence of this alteration in the cartilage, either the whole length, or only a part of it, becomes incapable of keeping itself erect, and of retaining the curve, which its perfect coaptation with the other eyelid requires. Hence the whole or a part of the cartilage becomes folded inward, and makes the corresponding eyelashes incline inward against the eye. These causes are not unfrequently found combined together, and they are also often accompanied with cicatrices of the membrane, which invests the inner edges of the eyelid. Some pretend (says Scarpa, alluding to Mr. B. Bell,) that trichiasis sometimes arises from a spasmodic contraction of the orbicular muscle of the eyelids; but, Scarpa owns, that he himself has never seen such a case, and thinks it scarcely credible, that any spasm of this muscle, however violent, can ever occasion a turning inward of the tarsus and eyelashes. Even were it to have the power of doing so, the spasm could not be a permanent cause of the complaint.

Any one, however little acquainted with surgery, may readily conceive what great inconveniences must be occasioned by the continual friction of the eyelashes against the cornea, and white of the eye. The complaint is generally rendered still more aggravated, by the inverted hairs becoming far thicker and longer, than those, which have not had their natural direction changed. Although the affection may only be situated in one eye, both are usually affected from sympathy, and the sound one cannot be moved, without producing pain in the other, which is irritated by the friction of the inverted eyelashes. Both eyes of persons, affected

with trichiasis, are generally exceedingly irritable, and cannot bear much light. In cases of incomplete trichiasis, as the patient has some little power of opening the eyelids in order to see, particularly, towards the inner canthus, his head and neck very often become inclined in an awkward position. This circumstance at last frequently occasions, in children, a wryness of the neck and shoulders, which deformity is very difficult to correct, even after the trichiasis has been completely cured. Children also cannot endure the irritation, produced by the inflected eyelashes, and are continually rubbing the eyelids, which tends very much to aggravate all the bad consequences, arising from trichiasis, particularly, chronic varicose ophthalmia, and opacity and ulceration of the cornea.

The second species of this disease, that is to say, the one which is commonly met with in practice, and which consists in a faulty inclination of the tarsus, and, consequently, of the eyelashes against the eyeball, is cured by artificially turning out the tarsus, and replacing it securely in its natural position, together with the eyelashes, which rub against and irritate the eyeball. Such is the mode of cure, whether the disease has originated from cicatrices, and a contraction of the internal membrane of the eyelids, near their margin, in consequence of ulcers near the latter part, or whether the disease has been occasioned by a relaxation of the skin of the eyelids, a morbid softening of the cartilage of the tarsus, or all these causes combined together. Cutting off a certain portion of the skin, near the edge of the eyelid, completely fulfils the indication just mentioned. The piece removed should be sufficiently broad and extensive to make the tarsus and edge of the eyelid turn outward, far enough from the eyeball, when the wound has healed, and, in such manner, that the eyelid may find in the cicatrix of the skin, a due support for keeping it in its natural position. Scarpa confesses, that at the present day, after so many fruitless trials, he does not believe, that any surgeons would now entertain any expectation of radically curing the trichiasis, either by merely plucking out the hairs, which assume a wrong position; by bending them outward, and keeping them in this manner, by means of sticking plaster; or by pulling them out, and then touching the situation of their roots with caustic, and even the actual cautery. Scarpa believes, that still less reliance would be put in cutting away with the hairs the edge of the eyelid, or in dividing the orbicularis palpebrarum, from within the eyelid, or

the supposition, that trichiasis, sometimes depends on a spasmodic affection of this muscle. All these plans, which have been the fruit of theory, have been rejected from practice, as being either insufficient, hurtful, apt rather to exasperate, than cure, the disease, or liable to induce affections of the eyelids, not at all less severe, than the trichiasis itself.

Scarpa remarks, that the most effectual mode of curing this disease, comprehending the method advised by Kokler (*Versuch einer neuen Heilart der Trichiasis*; Leipzig, 1796) and known ever since the time of Rhases, consists, as has been already stated, in the excision of a certain portion of the skin of the affected eyelid, near the tarsus. This operation, when simplified in the manner Scarpa describes, by abandoning the numerous instruments formerly used, and also sutures, is easy of performance to the surgeon, little painful to the patient, and constantly followed by an expeditious cure.

The patient being seated, if an adult, or placed on a table of convenient height, if a child, with the head raised, and steadily held by an assistant standing behind, the surgeon is to push outward, with the end of a probe, the hairs, which irritate the eye. Then, with a pair of dissecting forceps, or the ends of his forefinger and thumb, (which answer equally well, and, in many cases much better, than forceps,) the operator should lift up a fold of the skin of the affected eyelid, taking great care, that the piece, which is taken hold of, corresponds exactly to the middle of the whole extent of the trichiasis; for, as we have already explained from Scarpa, sometimes the whole, sometimes a half, and, in other instances, only a third of the extent of the tarsus is inverted. The surgeon, with his left hand, must raise the fold of the skin, more or less, according as the relaxation of the integuments, and the inversion of the tarsus, are more, or less considerable. The reason of this is exceedingly evident, viz. that the greater the quantity of skin is, which is raised, the greater is the quantity which will be cut away. Supposing the patient to be an adult, as soon as the fold of skin has been raised in a certain degree, the surgeon must request him to open his eye, and, if in this act, the tarsus, and eyelashes resume their natural place and direction, the portion of skin already raised will be sufficient for the purpose. We must trust to our own judgment, with regard to children, as they seldom let us have recourse to the mode of discrimination just related. The forceps of Bartsch; of Verduin, and those improved by Raw, formerly employed,

are objectionable, because they raise the skin equally from one end of the eyelid to the other: in consequence of which, too much of the skin must be cut off near the extremities of the eyelid, and not enough in the middle. On the contrary, when the integuments are elevated, by means of a pair of dissecting forceps, and care is taken to lay hold of the skin precisely at the middle point of the whole extent of the trichiasis, it necessarily follows, that the consequent section of the skin will form an oval, and that the greatest width of the wound will correspond exactly, or nearly so, to the middle of the eyelid, and its narrowest parts to the angles, or commissures of the same. This contributes very materially to make the cicatrix correspond to the natural fold of the eyelid, and hinder the origin of a disease of an opposite nature to the one about to be remedied, towards the angles of the eye, viz. an eversion of the commissures of the eyelids. See *Ectropium*.

Besides this caution, relative to this situation and figure of the fold of the integuments to be cut off, the surgeon must be careful, that the division of the skin be made very near the inverted tarsus. Were this circumstance neglected, the operator might have the displeasure of finding, after the wound is healed, that although the eyelid is shortened, on the whole, from the eyebrow to the place of the recision, yet it is not equally so at the space, which is between the edge of the eyelid, and the cicatrix of the skin. Hence, the tarsus would remain inverted, as before, or not be sufficiently turned outward to keep the eyelashes from rubbing against the eye. This inconvenience would oblige the patient to submit to a second operation, done lower down, than the first.

Things being thus arranged, the surgeon, holding up the fold of the skin by means of the forceps, in his left hand, is with a pair of probe-pointed, sharp curved scissors, to cut off the whole of the duplication, being first sure that one of the blades of the instrument is applied close to the edge of the eyelid. If both eyelids should be affected, the same operation should immediately be done upon both of them, with such cautions, and, in such proportion, as the extent of the disease, and the degree of inversion inward of each eyelid may require.

Scarpa next dissuades us from employing any suture to unite the wound, and represents, that it will be sufficient to keep the eyebrow as much downward as possible, if the operation has been done on the upper eyelid, or, if on the lower, to support it against the inferior arch of

the orbit, by pressing it from below upwards, so as to keep the edges of the wound from becoming separated. Then the lips of the wound are to be put into exact contact, by means of strips of adhesive plaster, which should extend from the superior arch of the orbit, to the zygoma, and the support of the wound in apposition will be still more securely effected by placing two compresses, one on the eyebrow, and another on the zygoma, together with the uniting bandage, applied in the direction of the monocolus. (See *this word*.)

Scarpa seems to think, the surgeons have been led to employ sutures in this case, by seeing, that, after the fold of the skin has been cut off, (as for example, that of the upper eyelid,) the integuments become so retracted towards the eyebrow, and downwards towards the tarsus, that the whole eyelid seems, at the time, to be entirely deprived of skin. But, all this is only a mere appearance; for when the eyebrow is depressed by means of compresses and the uniting bandage, the eyelid immediately becomes covered with skin, as before, and the edges of the wound are easily put into contact without any occasion for using sutures. Gendron is one of the few, says Scarpa, who, in these circumstances, prefer strips of sticking plaster to sutures; he had often noticed, that, when sutures were used, a great deal of tension and inflammation followed, and produced a laceration of the points. Scarpa adds, that his own experience has confirmed Gendron's opinion, and that the disuse of sutures has been very beneficial to his patients, and increased the simplicity and expedition of the operation.

On taking off the first dressings, the third day after the operation, the surgeon will find that the patient can open his eye with ease, and that the inverted tarsus and eyelashes have resumed their natural position and direction. In the partial, or incomplete trichiasis, or that which only occupies a half, or a third of the whole length of the tarsus, and in subjects, who have had the skin of the eyelids very loose, Scarpa has often had the pleasure of finding the wound perfectly united on removing the first dressing.

When, however, only a part of the incision has healed, while the rest seems disposed to heal by suppuration and granulation, the surgeon covers the wound with a small piece of lint, spread with the unguentum cerussæ; and, if the sore should become flabby, it must be touched, every now and then, with the *argentum nitratum*, until the cure is per-

fect, which commonly happens in the course of a fortnight.

Thus far, Scarpa's observations have related to the radical cure of the second, or most frequent, kind of trichiasis.

With regard to the first form of this disease, or that, in which the eyelashes project against the eyeball, without the natural position of the tarsus being at all altered, (a case, which is fortunately very rare,) the accomplishment of a cure is very difficult, since, as we have already explained, neither the pulling out of the hairs, nor burning the situation of their roots, are means at all to be depended upon for producing a complete cure of the disorder: and since, turning the tarsus, out of its natural position, would make the patient liable to an irremediable flowing of the tears over the cheek, attended with a chronic thickening of the lining of the eyelid. The treatment of this species of trichiasis is still imperfectly understood, and seems to claim more attention, than it seems hitherto to have had paid to it. In the instance of this form of the disease, which Scarpa met with, only two, or three of the eyelashes inclined against the eyeball. He found, on turning the eyelid a little out, opposite to the situation of the faulty hairs, that he could not, indeed, completely put them in their natural position; but, he saw, that he could thus remove them so far from the cornea, that they would not rub against it, without altering the position of the eyelids so much as to occasion a perpetual discharge of the tears over the cheek. And, as in the patient alluded to, the skin about the eyelid was very tense, Scarpa deviated from the above rule, by making an incision with the back of a lancet, near the tarsus, three lines long, and he took away a small piece of skin of the same length; but, very little more, than one line broad. When the cut healed, the operation was found to answer as well as the nature of the case would allow, though the cure was not complete, nor would it have obviated all the inconveniences in cases of greater extent.

The trichiasis being cured, something more always remains to be done, for the purpose of correcting the cause of the disease, as well as curing the disorder of the eye, occasioned by the previous friction and irritation of the inverted hairs. The usual indications are, to restore the tone of the vessels of the conjunctiva, to lessen the swollen Meibomian glands, and to remove any cloudiness of the cornea. How to fulfil these objects, is explained in the articles, *Cornea*, *Opacity of*; and *Ophthalmia*.

Scarpa remarks, that the celebrated Albinus is the only writer, that he is acquainted with, who has taken notice of the *trichiasis of the caruncula lachrymalis*. As Scarpa thinks the history of it very interesting, he quotes it in the following terms: "*In subtilibus illis pilis, quos Morgagnus in caruncula lachrymali animadvertit, trichiasis speciem vidi. Unus eorum increverat præter naturam, crassior longiorque atque ita se incurvans, ut globum oculi extremâ parte attingeret. Consecuta est inflammatio dira, cruciatu tetro, et, quod causa non intelligebatur, pertinax. Adhibita fuerant quæcumque suggerere ars potuerat, et empiria; collyria, epispastica, purgantia, sanguinis missiones, fonticuli, diæta. Quum nihil proficiretur, fortè itum ad me. In causam, si invenire possem, inquirens, ecce pilus. Quo evulso, subsedit malum.*" (Acad. Annot. lib. 3. cap. 8.) Scarpa notices, however, that Albinus has omitted to mention a very essential circumstance, viz. whether the hair grew again after a certain time, and in what direction. (*Scarpa sulle principali Malattie degli Occhi; 1802.*)

Dr. Crampton has published an essay on the Entropion, in which he found the following mode of operating very successful in one instance. "Let the eyelid be well turned outwards, by an assistant; let the operator then with a lancet divide the broad margin of the tarsus completely through, by two perpendicular incisions, one on each side of the inverted hair or hairs. Let him then, by a transverse section of the conjunctiva of the eyelid, unite the extremities of the perpendicular incisions. The portion of cartilage, contained within the incisions, can then, if inverted, with care be restored to its original situation, and retained there by small straps of adhesive plaster, or (perhaps, what is better) by a suspensorium palpebræ, adapted to the length of the portion of the tarsus, which it is intended to sustain, should one or two hairs be displaced, without inversion of the tarsus."

The late Mr. Saunders' operation for the cure of trichiasis is described in my other work, entitled the "First Lines of the Practice of Surgery," and I do not feel it necessary to repeat an account of it in the present place.

[The American Editor considers the excision of a portion of the tarsus the best mode of treatment in the present case, and therefore subjoins the following extract from his "Elements of Surgery."

In reflecting on the nature of the complaint, several years ago, I was induced to think that the eyelid could very readily be cut half off, without much incon-

venience, because the orbicularis muscle is capable of contracting in such a degree as to throw the folds of skin into numerous wrinkles, thereby demonstrating that much of it could be removed and the eye still be closed. A case of trichiasis came under my care in the Philadelphia Almshouse, in July 1810, in which several operations had been performed, but without effecting a cure: about one third part of the cilia were inverted. In this case I made an incision through the tarsus and cut out completely all that portion of the eyelid, from which the cilia proceeded. My patient in a few days was perfectly cured, was extremely pleased with the operation, and very little disfigured; indeed, compared with her inflamed eye, her appearance was improved. Encouraged by the success of this case, I have twice since performed the operation of removing totally the lower half of the tarsus cartilage, together with the skin covering it, and the inverted cilia, the success has been complete in both cases, the wound healed up very readily, the inflammation quickly subsided, and the opacity of the cornea was soon removed.

By one of those coincidences, which are often occurring, the late Mr. Saunders of London, contrived, and performed the same operation, and with equal success. A small volume, on the diseases of the eyes which for the first time I saw during the present winter, though it was published in 1811, contains an account of this operation. Mr. Saunders remarks "the certainty of its relieving the patient, is what I more value than the credit, if there be any, of having suggested it;" and in this sentiment I heartily join him. I shall therefore proceed to describe the manner of operating proposed by Mr. Saunders, and afterwards relate my own method.

Mr. Saunders directs the operation to be performed as follows: "a piece of thin horn or a plate of silver having a curvature corresponding with that of the eyelid is to be introduced, and its concavity turned towards the globe within the eyelid, which is to be stretched upon it. An incision is to be made through the integuments, and orbicularis palpebrarum, immediately behind the roots of the cilia to the tarsus, and should extend from the punctum lachrymale to the external angle. The exterior surface of the tarsus is then to be dissected until the orbital margin is exposed, when the conjunctiva is to be cut through directly by the side of the tarsus which must now be disengaged at each extremity; the only caution necessary being to leave the punctum lachrymale uninjured."

The manner in which I have performed

the operation is extremely simple. A hook is passed through the edge of the eyelid in order to gain a secure hold of it, and with a pair of sharp scissors the necessary portion of the eyelid is removed by two or three cuts. "Nothing can be more simple than this piece of dissection."—A remark applied by Mr. Saunders to his operation, but which is much more applicable to mine. The punctum lachrymale must be carefully avoided.

The wound generally heals in a few days; no dressings are necessary, but a soft compress may be lightly bound over the eye. Mr. Saunders says a fungus arose from the cicatrix in all his cases, which required caustic or the knife; all the cases I have seen, healed immediately without any inconvenience, and the deformity is not so great as would be imagined.*]

On the preceding subject, consult particularly *Scarpa sulle principali Malattie degli Occhi*; *Crampton's Essay on Entropion*; *Saunders' Obs. on several Practical Points relative to the Diseases of the Eye*; *Richter's Anfangsgrunde der Wundarzneykunst*, Band. 3.

TRICHISMUS. (from *τριξ*, hair.) A species of fracture, which appears like a hair, and is almost imperceptible.

TRICHOMA (from *τριχες*, the hair.) The disease called the plaited hair, or, *plica polonica*.

TRICHOSIS. The same

TRIPSIS. (from *τριβω*, to bruise.) A contusion.

TRISMUS. (from *τριζω*, to gnash the teeth.) The locked jaw. See *Tetanus*.

TROCHAR, or TROCAR. (from the French, *trois-quart*, three-fourths, from its point, being of a triangular form.) An instrument used for discharging aqueous fluids, and now and then, matter from different cavities in the body, particularly, those of the peritoneum, and tunica vaginalis, in cases of ascites and hydrocele. Trocars are also employed for tapping the bladder, dropsical ovaries, &c.

A trocar consists of a perforator, or stilette, and of a cannula, which latter is so adapted to the first piece of the instru-

ment, that, when the puncture is made, they both enter the wound together, with perfect ease, after which the stilette being withdrawn, the cannula remains in the wound, and gives a ready passage for the fluid outward.

Such are, the use of a trocar, and the principle, on which it should be constructed. It would be unnecessary in this work to detail every little particularity in the instrument. I shall just observe, that the triangular-pointed trocars seem to retain the greatest share of approbation; for, although, flat, lancet-pointed ones enter parts with most ease, their cannulae are not large enough for readily letting fluids pass out, which are at all thick, gelatinous, or blended with hydatids, and flaky substances.

The trocar, which is used for puncturing the bladder from the rectum, should be eight, or nine inches long, and of a curved form.

Surgeons ought always to have at least three trocars; one of full size; another of middling width: and a third, small one. The latter is often preferable to a larger one, in cases of hydrocele.

TRUSS. (*trousse* French.) *Bracherium*. A bandage, or apparatus, for keeping a hernia reduced.

Trusses are either of an elastic or non-elastic kind: the latter cannot be much depended upon, and are now seldom employed. The *spring*, is a very essential part of every elastic truss, and it consists of a narrow piece of steel, which is adapted to the side of the body, on which the hernia is situated. The front part of the steel spring has an expanded form, and, when the truss is properly applied, ought to be situated over the mouth of the hernial sac. Under the back surface of the anterior end of the spring is placed the pad, which should be adapted in shape and size to the passage, which it is intended to shut up. The steel spring is usually covered with leather, is lined with soft materials, and, after being put on the patient, it is fastened in its situation by means of a strap, which extends from the two ends of the spring, round that side of the body, on which the hernia is not situated.

When the pad of the truss cannot be kept from rising too high, another strap, passing under the thigh from the back of the spring to its anterior end, becomes necessary. Sometimes, a band extending over the shoulder, is requisite for keeping the pad from descending too low.

The springs of trusses, intended for children, and persons, who do not undergo much labour and exertion, need not

[* The operation is, I believe, new, though Haller in his *Bibliothica Chirurgica*, states, that Rhazes recommended cutting and burning the eyelid, in similar cases; the nature of his operation I cannot ascertain, as the only copy of Rhazes which I have been able to see, contains nothing on the subject. It is a black letter edition, very ancient, in barbarous Latin, belonging to the Loganian Library in this city.]

be made so strong, as those designed for hard-working, active people.

The idea, that children cannot wear steel trusses, is as erroneous, as it is dangerous in its practical consequences. Mr. Pott has strongly written against this ill-founded supposition.

When great pressure, and a very strong spring, are found necessary for keeping a hernia securely reduced, and the spermatic cord swells and inflames in consequence of such pressure, it is better to have a little excavation in the pad, for the reception of this part.

Some trusses are formed with pads, which are moveable on a rack, so that their position can be altered, and adapted to the parts, with the greatest ease.

A compress of calico, placed under the pad, is said both to preserve the instrument from the effect of perspiration, and make the truss fulfil its object in a better manner.

Mr. Lawrence has described a new kind of truss, invented by Mr. Whitford, surgeon's instrument maker, near St. Bartholomew's Hospital: The spring passes on the ruptured side, just below the outer edge of the crista of the ilium, as far as the posterior superior spinous process of that bone. It then goes straight across to the same point of the opposite bone, and pursues its course, on the sound side of the pelvis, in the same relation to the crista ilii, as it held on the side of the rupture, as far as the anterior superior spinous process, where it terminates as usual in a leathern strap. In this mode of construction, the motions of the trunk and thigh cannot derange the instrument, which requires a still further stability from the extension of the spring round the sound side of the pelvis." (*Treatise on Hernia*, p. 41.)

In the article *Hernia*, we have given an account of the truss for umbilical hernia, invented by Mr. Morrison, and described by Mr. Hey. In the same part of this Dictionary may also be found some observations, relative to the place, against which the pressure of the pads of trusses should be directed in cases of inguinal hernia, in conformity to Mr. A. Cooper's description of the situation, at which the parts first protrude from the abdomen.

TUBERCLE. (dim. of *tuber*, a knob.) A little tumour.

TUMEFACTION. (from *tumefacio*, to make swell.) A Swelling.

TUMOUR. (from *tumeo*, to swell.) A swelling. In the present article, I merely intend to treat of, what are usually called, sarcomatous and encysted tumours. Mr. Abernethy thinks, that the manner, in which tumours are formed, is best illus-

trated by those, which hang pendulous from the membranous lining of different cavities. This gentleman adverts to an example noticed by Mr. Hunter, in which, on the cavity of the abdomen being opened, there appeared lying upon the peritoneum, a small portion of red blood recently coagulated. This, on examination, was found to be connected with the surface, upon which it had been deposited by means of an attachment, half an inch long, and this neck had been formed before the coagulum had lost its red colour.

(See *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*, Vol. 1, p. 231.) Mr. Abernethy observes, that if vessels had shot through the slender neck, and organized the clot of blood, this would then have become a living part: it might have grown to an indefinite magnitude, and its nature and progress would probably have depended on the organization, which it had assumed. He mentions his having in his own possession a pendulous fatty tumour, which was found growing from the surface of the peritoneum, and which was undoubtedly formed in the same manner as the tumour noticed by Mr. Hunter, viz. by vessels shooting into a piece of extravasated blood, or lymph, and rendering it a living organized substance. Tumours, in every situation, and of every description, are probably formed in the same way. The coagulating lymph being effused, either accidentally, or in consequence of a disease, is afterwards converted into a living part, by the growth of the adjacent vessels and nerves into it. Mr. Abernethy remarks, that, when the deposited substance has its attachment by a single thread, all its vascular supply must proceed through that part; but, in other cases, the vessels shoot into it irregularly at various parts of its surface. Thus, an unorganized concrete becomes a living tumour, which has at first no perceptible peculiarity as to its nature. Although its supply of blood is furnished by the vessels of the surrounding parts, it seems to live and grow by its own independent powers, while its future structure seems to depend on the operation of its own vessels. Mr. Abernethy conceives, that the altered structure of an enlarged gland affords no contradiction to the above account, as in this latter case, the substance of the gland is the matrix, in which the matter forming the tumour, or enlargement, is deposited. According to Mr. Abernethy, the structure of a tumour, is sometimes like that of the parts, near which it grows. Such, as are pendulous in joints, are cartilaginous, or osseous. Fatty tumours, he observes, fre-

quently form in the midst of the adipose substance, and he has seen some tumours growing from the palate, which had a slender attachment, and resembled the palate in structure.

However, this resemblance of the structure of a tumour, to that of the neighbouring parts, is not always observable. I have in my own possession a completely cartilaginous tumour, which I found in the midst of the fat near the kidneys. The pendulous portion of the fat, growing from the peritoneum, and mentioned by Mr. Abernethy, serves as another instance of the fact; and, one might add, that every polypus which we meet with, bears no resemblance in structure to the neighbouring parts. Mr. Abernethy mentions his having seen bony tumours, which were unconnected with bone, or the periosteum, and he observes, that the structure of a tumour is, in general, unlike that of the part, in which it is produced.

When the coagulable part of the blood is effused, and the absorbents do not take it away, the surrounding blood-vessels grow into it, and convert it into a vascular tumour. The effusion of the coagulable part of the blood may be the effect of accident, or of a common inflammatory process, or it may be the consequence of some diseased action of the surrounding vessels, which (diseased action) may influence the organization, and growth of the tumour.

In the former cases, the parts surrounding the tumour, may be considered simply as the sources, from which it derives its nutriment, whilst it grows apparently by its own inherent powers, and its organization depends upon actions begun and existing in itself. If such a tumour be removed, the surrounding parts being sound, soon heal, and a complete cure ensues. But, if a tumour, be removed, whose existence depended on the disease of the surrounding parts, which are still left, and this disease be not altered by the stimulus of the operation, no benefit is obtained. These parts again produce a diseased substance, which has generally the appearance of fungus, and, in consequence of being irritated by the injury of the operation, the disease is in general increased, by the means, which were designed for its cure. It appears, therefore, that in some cases of tumours, the newly formed part alone requires removal, whilst, in others, the surrounding substance must be taken away, or a radical cure cannot be effected. (*Surgical Observations, by John Abernethy, F. R. S., &c. 1804.*) This gentleman conceives, that the irritation of the tumour itself, when once the swelling has been produced,

keeps up an increased action in the surrounding vessels, so as to become a sufficient cause of the disease continuing to grow larger. As the tumour becomes of greater magnitude, it condenses the surrounding cellular substance, and thus makes for itself a sort of capsule. The close, or loose manner in which tumours become connected with the surrounding parts, seems to depend very much on the degree of irritation, and inflammation excited in the circumjacent parts. When a tumour has been at all tender, painful, and inflamed, it is generally found intimately adherent to all the neighbouring parts. Mr. Abernethy conceives, that the increased irritation, which a tumour creates, when it has exceeded a certain size, may explain, why some tumours, which are at first slow in their progress, afterwards begin to grow with great rapidity.

The process, by which tumours are formed, is commonly thought to be attended with an increased action of the vessels, which supply the swellings with blood. It is supposed, in short, to be the same kind of process, which forms all the thickenings and indurations, which, under various circumstances, occur in all the different parts of the human body. It has sometimes been named *chronic inflammation*, to distinguish it from that, which is more quick in the production of certain effects, and is attended with a manifest throbbing in the part affected.

It seems generally to be admitted, that the growth of all tumours may be always retarded, and that sometimes, they may even be diminished by means of topical bleeding with leeches, and keeping the parts in a continually cool state, by the incessant application of cold sedative washes. Afterwards, when the increased action of the vessels seems checked, and the tumour ceases to enlarge, discutients are indicated, such as frictions with mercurial ointment, pressure, electricity, rubefacient plasters, solutions of salts, blisters, and issues. Very few sarcomatous or encysted tumours, however, are ever completely removed by these local means. The swelling, on the contrary, generally increases, notwithstanding them, and the irritation of these diseases by the latter stimulants, is not altogether untended with danger of the affections becoming changed by them into very malignant, and dangerous ones, sometimes to all appearances, cancerous. The most advisable plan is to recommend the removal of all these tumours with the knife, while they are small, and in an incipient state. For, thus, they are got rid of by an operation, which is, certainly

trivial, compared with the one, which may afterwards become requisite, when the disease has attained an enormous magnitude.

TUMOURS, SARCOMATOUS. These have been so named, from their firm, fleshy feel. They are of many kinds, some of which are simple, while others are complicated with a malignant tendency. Mr. Abernethy has attempted to form a classification of sarcomatous tumours, for the different species of which he has proposed names, deduced from the structure, which they exhibit on dissection. This gentleman has named the kind of swellings, which he first considers, *Common Vascular, or Organized Sarcoma*. Under this title, Mr. Abernethy includes all those tumours, which appear to be composed of the gelatinous part of the blood, rendered more, or less vascular by the growth of vessels through it. The vessels, which pervade this substance are, in different instances, either larger, or smaller; and more, or less numerous; being distributed in their usual arborescent manner, without any describable peculiarity of arrangement. Perhaps, all the varieties of sarcomatous tumours are at first of this nature. The structure, under consideration, is met with not only in distinct tumours, but, also, in the testis, mamma, and absorbent glands. When a common vascular, or organized sarcoma has attained a certain magnitude, the veins of the skin seem remarkably large, and their winding under the integuments excites notice. This kind of sarcoma is not at all tender, so that it may be freely handled, and also electrified, without giving pain. The tumour sometimes grows to such a size, that the skin bursts, the substance of the swelling sloughs out, and the disease is got rid of. However, this mode of cure is attended with such terrible local appearances, and so much fever, &c. that the removal of the disease with the knife is preferred.

The second kind of sarcomatous tumour, noticed in Mr. Abernethy's classification, is the *Adipose Sarcoma*. Every one, at all in the habit of seeing surgical diseases, must know, that fatty tumours are exceedingly common. There can be little doubt, that these swellings are formed in the same manner, as others, viz. in the first instance, they were coagulable lymph, rendered vascular by the growth of vessels into it, and that their future structure depended on the particular power and action of the vessels. Adipose sarcomatous tumours always have a thin capsule, formed by the simple condensation of the surrounding cellular substance. It adheres very slightly to the swelling,

and, chiefly by means of vessels, which pass through this membranous covering in order to enter the tumour. As Mr. Abernethy has accurately described, the vessels are so small, and the connexion so slight, that, in removing the tumour, no dissection is requisite, as the operator may easily put his fingers between the swelling and its capsule, so as to break the little vascular connexions, and entirely detach the disease.

Adipose tumours are never furnished with any large blood-vessels, and the fear of hemorrhage, which frequently deters surgeons from operating, is very unfounded. It is an undoubted fact, that there is no species of tumour, that can be removed with so much celerity, with such apparent dexterity, or with such complete security against future consequences, as those of an adipose nature. However, now and then, when the tumour has been at all in an inflammatory state, the capsule becomes thickened, and intimately adherent to the surface of the swelling, so that the separation of the disease is more difficult, and requires the knife to be more employed. The tumour also sometimes becomes, after inflammation, closely adherent to the contiguous parts. Adipose tumours often acquire an enormous magnitude; Mr. Abernethy relates an example of one, which Mr. Cline removed, which weighed between fourteen and fifteen pounds. In this state, of course, the immense size of a wound, requisite for the removal of the tumour, must be dangerous, and it is a strong argument in favour of having recourse to the operation at an earlier period.

[A wen, or "adipose sarcoma," perhaps the largest on record, was removed by the American Editor from the back of a black woman aged forty-five years, at the Pennsylvania hospital. The dimensions were as follow:—Circumference at the neck, or narrowest part, 2 feet 10 inches; circumference at the thickest part, 3 feet 9 inches; circumference horizontally, 3 feet 1½ inches. The tumour emptied of blood, weighed 25 pounds.]

The operation was completed in 28 minutes, and the patient discharged, cured in 52 days. In removing these large tumours, it is of great consequence to dissect as quickly as is consistent with safety; for the bleeding from superficial veins, is generally very great. In the case alluded to, the veins were emptied of blood, at the suggestion of Dr. Physick, by placing the patient on her face, so as to render the tumour the most elevated part. Gravity favoured the descent of the blood out of the tumour and varicose veins, half an inch in diameter were thus completely

emptied, and when cut into did not bleed.]

The next species of sarcoma, noticed in Mr. Abernethy's classification, is what this gentleman names *pancreatic*, from the resemblance of its structure to that of the pancreas. This kind of disease, according to Mr. Abernethy, is occasionally formed in the cellular substance; but, more frequently, in the female breast, on that side of the nipple, which is next to the arm. When a pancreatic sarcoma is indolent, and increases slowly, the surrounding parts, and the glands in the axilla, are not affected. But, some of these swellings deviate from their common character, and become of a very irritable nature, occasioning severe and lancinating pain, and producing an inflammatory state of the skin covering them, so that it becomes adherent to their surface. The absorbents leading to the axilla are also irritated, and the glands enlarged. Pancreatic sarcomas do not grow to a very large size; but, when their progress is unrestrained, the pain, attendant on the disease, becomes lancinating, and so severe, as to make the patients feverish, and lose their health and strength. Mr. Abernethy remarks, that, when the axillary glands become affected, one generally swells at first, and is extremely tender and painful; but, afterwards the pain abates, and the part remains indurated. Another then becomes affected, and runs through the same course.

Another species of sarcoma, Mr. Abernethy has characterized by the epithet *mastoid* or *mammary*, from the resemblance which this gentleman conceives its structure bears to that of the mammary gland. This kind of disease, Mr. Abernethy says he has not often seen. In the example, which he met with, the tumour was about as large as an orange, and situated on a woman's thigh. The swelling was removed by an operation; but, the wound afterwards degenerated into a malignant ulcer, attended with considerable induration of the surrounding parts, and the woman died of the disease in two months. Mr. Abernethy conceives, that the whole of the morbid part had been cut away, but, that the contiguous parts had a disposition to disease, which was irritated by the operation, and, that if the nature of the case could have been known beforehand, it would have been right to have made a freer removal of the substance surrounding the tumour.

Mr. Abernethy places the mastoid sarcoma, between such sarcomatous swellings as are attended with no malignity, and the following ones, which have this quality in a very destructive degree.

The *tuberculated* sarcoma is composed

of a great many small, firm, roundish tumours, of different sizes and colours, connected together by cellular substance. Some of the tubercles are as large as a pea; others equal a horsebean in size; most of them are of a brownish red colour; but some are yellowish. Mr. Abernethy mentions his having seen this species of sarcoma chiefly in the lymphatic glands of the neck. The disease proceeds to ulceration; becomes a painful and incurable sore; and ultimately occasions death.

Another kind of sarcoma, mentioned in Mr. Abernethy's classification of tumours, is distinguished by the epithet *medullary*, from its having the appearance of the medullary matter of the brain. It appears to be an exceedingly malignant disease; communicates to the lymphatic glands a similar distemper; ulcerates and sloughs, and at last proves fatal. It is particularly apt to make its attack on the testis, and it is treated of in another part of this book. (See *Testicle, Diseases of*.)

Mr. Abernethy includes also in his classification *carcinomatous* sarcoma. (See *Cancer*.)

For an account of the plan of operating, in removing sarcomatous tumours, see *Mamma, Removal of*.

TUMOURS, ENCYSTED. These, which are also commonly named wens, consist of a cyst, which is filled with different substances. When the contained matter is fatty, it is termed a *steatoma*; when somewhat like honey, *meliceris*; when like pap, *atheroma*. These are the three species, into which writers usually divide encysted tumours. However, some of these swellings do not conform to either of the above distinctions, as their contents are subject to very great variety indeed, and are occasionally of an earthy, bony, or horny nature. It is said, that some encysted tumours of the latter description have occasionally burst, and assumed the appearance of horns, by the gradual projection of the matter secreted in their cysts. I remember seeing an excrescence of the kind alluded to, removed some years ago from the scrotum of a man in St. Bartholomew's Hospital. Sir James Earle performed the operation, and, if I am not mistaken, the preparation of the disease is in Mr. Abernethy's Museum.

Encysted tumours are generally of a roundish shape, and are more elastic, than fleshy ones. However, the latter circumstance depends very much on the consistence of the contents, and the thickness of the cyst. As far as my observation extends, encysted tumours form more fre-

quently on the head, than any other part; but, they are very frequently met with in all situations under the integuments, and sometimes in deeper places. Encysted tumours are also very often seen on the eyelids.

Some surgeons have tried to cure encysted tumours by pricking them with needles, and squeezing out their contents; or by applying stimulating, and discutient applications to them. This practice, however, is by no means a prudent one; for, it seldom succeeds, and sometimes, in consequence of making the cyst ulcerate, it induces a terrible disease, in which a frightful fungus shoots out from the inside of the cyst, attended with immense pain and irritation, and often proving fatal. In order to confirm this statement, I shall quote the following case; recorded by Mr. Abernethy.

A gentleman, of a stout make, and about forty years of age, had a tumour, supposed to be sarcomatous, which had formed beneath the integuments on the lower edge of the pectoral muscle. It was attended with severe pain occasionally, at which time it rapidly increased in size, and produced a great deal of fever and irritation, which made him look very sickly, and grow very thin, and caused some persons to deem the disease cancerous.

When the tumour had acquired a magnitude of about four inches in length, and three in breadth and depth, he submitted to its removal; the integuments were divided and turned back, and the tumour dissected off the surface, and, in some degree, from under the edge of the pectoral muscle.

When the tumour was examined, it was found to be composed of a steatomatous substance, contained in a thin capsule. The substance resembled that, which I have described as being sometimes found in cells in the testis, or intermixed with the diseased organization of that part. It was firm, and resembled cheese in its yellow colour and unctuous appearance; but, it was not unctuous to the touch.

The wound made in the operation soon healed, and the patient's health was restored to as good, or seemingly a better state, than before the formation of this disease. He also regained his usual athletic form. But, in less than three months after his recovery, two new tumours formed, one above, and the other below the cicatrix of the wound. The patient did not particularly attend to them till they had attained a size equal to that of a large walnut. To dissect out both these tumours, and make so free a removal of parts as to render it probable, that no new

growth would ensue, seemed to be a very formidable operation; and, as the nature of the former tumour was known, and it was supposed, that these were of the same nature, it was agreed to puncture the upper one; to express the contents, and await the event. This was done by a puncture of half an inch in length, made by an abscess lancet. The contents were exactly like those of the original tumour. Vehement erysipelatous or irritative inflammation took place, and sloughing about the diseased part: the inflammation rapidly extended to the opposite side of the thorax, and then down the integuments of the abdomen to the groin. The derangement of the constitution was as violent as the local disease, and, in about a week the patient died. (*Surgical Observations*, 1804, p. 94.)

Similar, alarming, fungous diseases are also apt to arise, whenever the surgeon, in cutting out encysted tumours, leaves any part of the cyst behind.

The most advisable method is to have recourse to the knife, before an encysted tumour has attained any considerable size. When it is large, however, before the operation is resorted to, a portion of the skin must be taken away with the swelling in the manner mentioned in the article *Mamma, Removal of*. The chief piece of dexterity in the operation consists in detaching all the outside of the cyst from its surrounding connexions, without wounding it. Thus, the operator takes the part out in an entire state, and is sure, that none of the cyst remains behind. When the cyst is unskilfully opened, some of the contents escape, it collapses more or less, and the dissection is rendered more tedious and difficult.

Excepting Mr. Abernethy's Classification of Tumours, contained in his *Surgical Observations*, 1804, I am not acquainted with any particularly good work expressly on the subject. However, every system of surgery treats of it, and Mr. John Bell, in his *Principles of Surgery*, Vol. 3, has written a great deal concerning it.

TURUNDA. (*a terendo*, from its being rolled up.) A tent for keeping open wounds.

TYLO'MA, or **TYLO'SIS**. (from *τυλος*, callous.) A callous roughness on the inside of the eyelids. Also, a wart, or a corn.

TYLOTICA. (from *τυλωω*, to harden.) Medicines, which promote the formation of callus.

TYMPANUM. (*τυμπανον*, a drum.) The cavity of the drum of the ear. For an account of its diseases, see *Ear*.

TYPHLOSIS. (from *τυφλος*, blind.) Blindness.

U.

ULA, A gum boil. Also, a cicatrix.

ULCERATION, is the process, by which sores, or ulcers are produced in animal bodies. In this operation, the lymphatics appear to be, at least, as active as the blood-vessels. An ulcer is a chasm formed on the surface of the body by the removal of parts back into the system by the action of the absorbents. At first, it may be difficult to conceive how a part of the body can be removed by itself; but, there is not more difficulty in conceiving this, than how a body can form itself. Both facts are equally well confirmed. When it becomes necessary, that some whole living part should be removed, it is evident, says Mr. Hunter, that nature, in order to effect this subject, must not only confer a new activity on the absorbents; but, must throw the part to be absorbed into a state, which yields to this operation. The absorption of whole parts in disease, arises from five causes: pressure; irritation of stimulating substances; weakness; inutility of parts; death of them. (*Hunter on Inflammation, &c. p. 442—446.*)

Ulceration, or, in other terms, absorption, takes place much more readily in the cellular, and adipose substance, than in muscles, tendons, ligaments, nerves, and blood-vessels. Hence, in the progress of pus to the surface of the body, ulceration often takes a circuitous course for the purpose of bringing the matter to the skin. The skin itself, also, being highly organized, considerably retards the bursting of abscesses. It is on this same account, that, when ulceration is spreading, the edges of the skin hang over the ulcerated surface. (*Hunter, p. 447.*)

New-formed parts, such as cicatrices, callus, and all adventitious new matter, such as tumours, readily admit of being absorbed. The adventitious matter, indeed, is more prone to be absorbed, than that, which is a substitute for the old. Mr. Hunter explained this circumstance on the principle of weakness.

When ulceration takes place, in consequence of the death of an external part, it occurs first on the outer edge, between the dead and living substance.

Abscesses constantly make their way to

the surface of the body by ulceration; but, as some textures more readily admit of being absorbed, than others, the matter often follows a circuitous course, before it can arrive at the skin. (*Hunter, p. 448, 449.*)

A tumour, when it makes equal pressure in every direction around, will only make its way in an external course, because what Mr. Hunter termed interstitial absorption, only happens in this direction. (*P. 449.*)

The parts, which are situated between an abscess, or any extraneous substance, and the nearest surface, are those, which are most susceptible of ulceration. This is one of the most curious phenomena, connected with the process under consideration. It shews, that there is a principle in the human body, by which parts are always prone to free themselves of disease. Slight pressure from without will even produce a thickening of parts, and hence, Mr. Hunter remarks, there even appears to be a corresponding backwardness to admit disease. (*P. 449.*) Both these facts, he observes, are shewn in the case of fistula lachrymalis; for, though the matter is nearest the cavity of the nose, still it makes its way externally by means of ulceration, while the Schneiderian membrane even becomes thickened, so as to become a barrier against the progress of the disease inward. (*P. 451.*)

There is one difference, between the advancement of an encysted tumour to the surface of the body, and the progress of an abscess in the same direction, viz. that the former does not excite ulceration of the cyst; but, an interstitial absorption of the sound parts, between the cyst and skin, till the cyst and external skin come into contact, at which period, inflammation takes place, and absorption becomes accelerated into ulceration. In an abscess, the progressive ulceration begins in the cyst, at the same time, that the interstitial absorption in the sound part, covering the matter, is going on. (*P. 452—457.*)

The action of progressive absorption is to remove surfaces contiguous to irritating causes, which Mr. Hunter referred to pressure, irritation, and weakness. In cases of tumours, pressure becomes a

cause. The buttocks and hips of persons, who lie long on their backs, often ulcerate. The heels of many patients, with fractures, who lie for a great while in the same position, are apt to ulcerate. In the latter instances, Mr. Hunter conceived, that ulceration is a substitute for mortification, and is, at the same time, a proof of a certain degree of strength; for, if the patient's constitution were very weak, the same parts would mortify. (P. 453.) That pressure is a frequent cause of ulceration, is also evinced by the occasional effects of chains on prisoners, and harness on horses.

That irritating substances produce ulceration, needs no illustration.

Progressive absorption may occur either with, or without suppuration. We have instances of the latter in cases of extraneous bodies, which travel about the body, without producing irritation enough to give rise to the secretion of pus. In the progress of aneurisms of the aorta, and of fungous tumours of the dura mater to the surface, the same fact is also illustrated. (P. 455.)

Absorption with suppuration, in other words, ulceration, either happens in consequence of suppuration already begun, in which event the pus acts as pressure; or else absorption attacks external surfaces from particular irritations, or weakness, in which case, suppuration must follow. (P. 456.)

The production of ulceration requires much greater pressure from without, than from within. The process is always disposed to take place more quickly when near the surface of the body, and its progress becomes accelerated, in proportion as it arrives near the skin.

The adhesive inflammation precedes the suppurative, and prevents the pus from becoming diffused, as soon as it is secreted, and when the cyst afterwards ulcerates, in order to let the matter approach the skin, the adhesive inflammation still continues to go before the ulcerative process, and thus prevents the matter from insinuating itself into the interstices of the cellular substance. (P. 457.)

The pain of ulceration is, in some degree, proportioned to its quickness. When ulceration begins on a surface, or takes place for the purpose of bringing matter to the skin, the pain is always considerable. When ulceration takes place, in order to separate a dead part, as in sloughing, exfoliations, &c. there is seldom any particular pain. (P. 459.)

The ulcerating sore always exhibits little cavities, while the edge of the skin is scolloped, and thin, at the same time, turning a little out, and overhanging, more

or less, the ulcerated surface. The face of the sore appears foul, and the discharge is very thin.

When ulceration stops, the edges of the skin become regular, smooth, a little rounded, or turned in, and of a purple colour, covered with a semi-transparent white. (*Hunter on Inflammation, &c. p. 460.*)

ULCERS. Surgeons usually define an ulcer to be a solution of continuity in any of the soft parts of the body, attended with a secretion of pus, or some kind of discharge.

In the present part of this Dictionary, there will not be occasion to speak of several sorts of sores, which have been treated of in other articles. (See *Cancer, Scrophula, and Venereal Disease.*)

Some authors divide ulcers into *local* and *constitutional ones*. Other writers make distinctions, which are more particular, and Mr. Home has treated of six kinds of ulcers, viz.

1. Ulcers in parts, which have sufficient strength to carry on the actions, necessary for their recovery.

2. Ulcers in parts, which are too weak for that purpose.

3. Ulcers in parts, whose actions are too violent to form healthy granulations, whether this arises from the state of the parts, or of the constitution.

4. Ulcers in parts, whose actions are too indolent, whether this arises from the state of the parts, or of the constitution.

5. Ulcers in parts, which have acquired some specific action, either from a diseased state of the parts, or of the constitution.

6. Ulcers in parts, which are prevented from healing by a varicose state of the superficial veins of the upper part of the limb.

OF ULCERS IN PARTS, WHICH HAVE SUFFICIENT STRENGTH TO CARRY ON THE ACTIONS NECESSARY FOR THEIR RECOVERY.

Mr. Home remarks, that, in this species of ulcer, the pus is of a white colour, thick consistence, and readily separates from the surface of the sore, and when diluted, and examined in a microscope, is found to be made up of small globules, swimming in a transparent fluid. The granulations are small, florid, and pointed at the top. As soon as they have risen to the level of the surrounding skin, those, next to the old skin, become smooth, and are covered with a thin, semi-transparent film, which afterwards becomes opaque, and forms cuticle.

In the treatment of this kind of ulcer, it is only necessary to keep the surface

clean, and prevent the natural processes from being interrupted. Mr. Home observes, that this is in general best done, by the application of dry lint, for the purpose of absorbing and retaining the matter, which serves as a soft covering for the granulations, and by putting over the lint a pledget of any simple ointment, in order to hinder the matter from evaporating, by which means the dressings will not become adherent, and may be easily taken off, as often as requisite.

Although healthy ulcers require no medicated application to be made to them, the dressings must be such as do not disagree with the granulations, or surrounding skin.

With some patients, a roller, applied with moderate tightness, with a view of retaining the dressings, will cause uneasiness in the part, and make the ulcer lose its healthy appearance. Mr. Home states, that he has seen several such cases, in which the proper appearance of the sore returned as soon as the bandage was discontinued.

In some patients, ointment irritates and inflames the neighbouring skin; and certain superficial ulcers will not heal, while kept in a moist state, and unexposed to the air; but heal, when allowed to become dry and covered with a scab.

Mr. Home refers these particularities to constitutional causes, and not disease; for, the ulcers heal as soon as the particular things, which disagree with them, are discontinued. These peculiarities in certain healthy sores may also attend others of a different description, and should always be discriminated from the effects of disease.

Mr. Home very judiciously recommends enquiring of patients, who have previously had sores, what kind of applications they derived most benefit from, and what dressings were found to disagree.

TREATMENT.

1. Applications in the form of vapour, and fomentations, should never be employed, as they render the texture of the granulations looser, and diminish the disposition to form skin.

2. With respect to fluid applications, Mr. Home also very properly condemns poultices, as well as fomentations. He speaks of alcohol, as being an application, which promotes the formation of a scab, when this mode of cure is chosen.

3. In regard to ointments, their only use, in cases of healthy ulcers, is to keep the matter from evaporating. The most simple ointments are the best for the pur-

pose; particularly, the one composed of white wax and olive oil.

Mr. Home observes, that the great objections to the common simple ointments are, that they sometimes disagree with the skin, even when recent, and free from all rancidity. When they have acquired the latter quality, they still more frequently create a greater degree of irritation.

4. With respect to applications in the form of powder, Mr. Home remarks, that, when it is desirable to form a scab on the ulcer, any inert powder may be sprinkled on the sore; but, he prefers dry lint. Nothing should touch the powder, or lint, and, to prevent this circumstance, Mr. Home recommends applying a little bolster on each side of the sore, and over them a roller, which will go from one bolster to the other, in the manner of a bridge.

For healthy ulcers, dry lint is to be regarded as being, upon the whole, the most eligible application. When the sore does not secrete pus enough in twenty-four hours to moisten the lint, the dressings are only to be changed every other day.

When a moderately tight bandage is not forbidden by constitutional peculiarities, it is useful, both in supporting the muscles, and skin, which are often in a flabby state from the unexercised state of the limb, and in defending the newly formed parts. (See *Home on Ulcers*.)

ULCERS IN PARTS, WHICH ARE TOO WEAK TO CARRY ON THE ACTIONS NECESSARY FOR THEIR RECOVERY.

This is the second of the classes, into which Mr. Home has divided ulcers in general.

The granulations of these sores are larger, more round on their external surface and of a less compact texture, than those formed on ulcers in healthy parts. Mr. Home has also noticed their semi-transparent appearance. When they have filled up the cavity of an ulcer to a level with the surface of the body, they do not readily form skin, but, rising up in a still higher manner, often lose altogether the power of producing new cutis. When the parts are still weaker, the granulations sometimes continue gradually to fill up the hollow of the ulcer, and then, all on a sudden, are suddenly absorbed, so as to leave the sore, as deep as it was before.

Ulcers may be weak from the first, or become so in the progress of the case. Even granulations of the most healthy kind, if they are not skinned over in a certain time, gradually lose their primitive strength.

Sores on the legs are greatly under the influence of all natural peculiarities of the constitution, and every thing, which affects the health. When the constitution becomes in the least weaker or stronger, the appearance of the granulations becomes changed accordingly, and this effect of constitutional weakness, or strength, on ulcers is greater, in proportion as the sores are further from the source of the circulation.

While the constitution is undergoing any kind of disturbance, the healing of an ulcer is suspended. Mental anxiety is very apt to retard cicatrization.

Such effects, of the constitutional kind, on ulcers are greater in weak, and delicate persons, than in the strong and robust. Change of weather has considerable influence over the healing of sores. Mr. Home mentions, in proof of this fact, that, when there were several hundreds of ulcers in the Naval Hospital at Plymouth, in 1778, every time the weather changed, from a dry to a moist state, the ulcers universally assumed an unhealthy appearance; but, put on a better aspect, when the weather became dry again.

In the treatment of this kind of ulcer, tonics are to be exhibited, particularly, bark and steel, and every thing which disagrees with the constitution, is to be avoided. Wine and cordial medicines are also usually prescribed. Porter, however, is deemed better, than wine, for working people.

Mr. Home observes, that the first object in the local part of the treatment, is to keep the granulations from rising above the edge of the surrounding skin. This gentleman (in my opinion) very judiciously represents the greater propriety of preventing the granulations from ever becoming too high by the employment of proper applications, than following the common plan of destroying the high granulations with escharotics, after they have risen to an improper height. There cannot be the smallest doubt, that if the granulations could always be prevented from rising up too much, the patient would suffer a great deal less pain.

Instead of applying to the surface of the ulcers, now under consideration, lunar caustic, blue vitriol, red precipitate, &c. Mr. Home prefers mixing these escharotics with other substances, so as to render them only strong stimulants, and using them in this latter form. He conceives, that, when the high granulations are destroyed with escharotics, the disposition of the surface underneath to reproduce them is increased, but, that this is not the case, when the luxuriant parts are

only stimulated, so as to become absorbed.

The same gentleman seems to think, that, when animal substances grow with great rapidity, they are, like vegetable ones, weaker, than when produced in a slower manner. Hence, Mr. Home is of opinion, that the growth of granulations ought to be checked in the early stage of their formation, by some resistance, which they are just able to overcome, under which circumstances, they derive strength from the limited increase of action, which they are obliged to undergo.

On the same principle, according to Mr. Home, the pressure of tight bandages is advantageous, and ulcers, which heal, while the patient is walking about, are not so apt to break out again, when healed, while the parts are in a state of perfect rest.

In the treatment of these ulcers, when the granulations have come to a proper height, and do not form a thin, semi-transparent pellicle upon their surface, they are to be considered as weak parts, and treated accordingly. Mr. Home thinks, that, in this circumstance, the best plan, when no particularity of constitution forbids, is pressure, made with a thin piece of lead over the dressings, and supported with a tight bandage.

OF APPLICATIONS TO ULCERS ATTENDED WITH WEAKNESS.

Although, strictly, we have no topical applications, which can directly communicate strength to granulations, there are certainly some, which prevent the granulations from exhausting themselves by luxuriant growth, and stimulate them to draw more blood from the arteries; which effects, as Mr. Home remarks, render such granulations stronger.

1. This gentleman very properly condemns, as applications to weak ulcers, all relaxing fomentations commonly employed; and recommends, instead of them, the use of spirits of wine and the decoction of poppies, in equal proportions, not, however, to be applied hot.

2. With regard to moist applications, the same gentleman expresses his disapprobation of poultices, and mentions a weak solution of the *argentum nitratum*, as the most eligible application in an aqueous form.

3. On the subject of powdered substances, as applications to weak ulcers, Mr. Home says, he has often tried bark, and the *lapis calaminaris*, without perceiving, that the former had any power of strengthening granulations, or the latter

any virtue in disposing them to form new skin; properties commonly imputed to these applications.

Mr. Home entertains no better opinion of plaster of Paris, or powdered chalk, employed with a view of promoting the formation of skin. Powdered carbon, he speaks of, as being more adapted to irritable, than weak ulcers. He praises powdered rhubarb, as particularly applicable to the latter kind of ulcer, because, it represses the luxuriant growth of the granulations, renders them small and compact, and disposes them to form skin. When, however, the granulations have risen above the level of the skin, it is not powerful enough to reduce them. When the rhubarb is too stimulating, it is to be mixed with a fourth part of crude opium in powder.

A piece of lint, a little less, than the sore, is always to be put over the powder, and covered with a pledget of simple ointment.

4. Ointments, according to Mr. Home, are particularly apt to disagree with weak ulcers. When other applications fail, however, greasy ones may be tried, and the above gentleman gives a preference to the ung. hydrarg. nitrat. mixed with hog's lard, in the proportion of one to five, or else to common cerate, blended with a small quantity of the hydrarg. nitrat. ruber.

OF ULCERS IN PARTS, WHOSE ACTIONS ARE TOO VIOLENT TO FORM HEALTHY GRANULATIONS; EITHER FROM THE STATE OF THE PARTS, OR THE CONSTITUTION.

There are three states of the constitution influencing the nature of ulcers: an irritable state, in which all the actions of the animal economy are more rapid, than in health; an indolent state, in which they are unusually languid; and, lastly, a diseased state, by which they are affected.

An irritable, and an indolent ulcer cannot in general be distinguished from each other by mere appearances, though they may be so in a few instances. Mr. Home informs us, that the disposition of an ulcer, like the disposition of a constitution, can only be accurately ascertained by determining the actions, which arise from the different impressions made upon it.

The same gentleman notices, that the following appearances at once shew the ulcer to be of an irritable kind. The margin of the surrounding skin being jagged, and terminating in an edge, which is sharp and undermined. The bottom of the ulcers being made up of concavities of different sizes. There being no distinct

appearance of granulations, but, a whitish spongy substance, covered with a thin, ichorous discharge. Every thing, that touches the surface, gives pain, and very commonly makes it bleed. The discharge is altered from common pus to a thin fluid, in proportion to the degree of irritability communicated to the sore by constitutional causes.

The pain of an irritable sore in general gradually becomes less. When it is not constant, but comes on in paroxysms chiefly in the evening, or night-time, with great violence, convulsive motions of the limb are apt to occur, and extend to various other parts. Mr. Home refers this symptom to irritation communicated along the course of the nerves, and producing an action in them, attended with a violent contraction of the muscles, which they supply.

When the above-mentioned signs of an irritable ulcer are not present, we must form a judgment of the nature of the sore from listening to the history of the case, the effects of various applications, &c. When this kind of information cannot be obtained, Mr. Home recommends the treatment to begin on the supposition of the ulcer being of an irritable nature.

When an ulcer occurs just over the malleolus externus, it is generally of an irritable kind, in consequence of the nature of the part, on which it is situated, quite independently of any constitutional, or local disposition to irritability. Mr. Home conceives, that the periosteum, which here lies immediately under the skin, becomes the seat of the ulcer, is the cause of its being very difficult to heal, and gives it the irritable appearance. The fact, that sores, situated on the ligament of the patella, and over the periosteum of the anterior surface of the tibia, assume a similar appearance, and are equally difficult to heal, made the above gentleman more confirmed in his sentiment.

In treating ulcers in general, the surgeon will find it exceedingly advantageous to be acquainted with the effects of a great many different external applications; for, a very few cases will continue to heal more, than for a certain time, under the same treatment. The necessity of changing the applications, after they have been continued for a certain time, is strikingly illustrated by the fact, that leaving off a powerful application, and employing one, which at first would have had no effect, often does a great deal of service. When the change is made to a medicine of powers, equal to those of the previous one, the benefit will be more lasting, than in the preceding circumstance.

Mr. Home compares the principle of

this occurrence, with that, by which change of air, even of a very salubrious air, for one that is less so, often produces an infinite improvement of the health.

OF APPLICATIONS TO IRRITABLE ULCERS.

1. Mr. Home recommends applications, in the form of vapour, as being particularly useful, by their quality of allaying irritation, and soothing pain.

The steam of warm water is productive of benefit in this way, though seldom used by itself. Its good effects are increased, when it is mixed with spirits.

Mr. Home speaks also in favour of the benefit derived from fomentations containing opium; such as, the tincture of opium sprinkled on flannel, wrung out of hot water; or the application of flannels, wet with a warm solution of the extract of opium, or with a decoction of poppy heads. A decoction of chamomile flowers, the tops of wormwood, or hemlock leaves, may also be employed for the same purpose.

Mr. Home points out particular irritable ulcers, however, which are rendered more painful by warm applications, and he states, that, the sores, alluded to, are generally attended with a mottled, purple discolouration of the limb, for some way from them, and a coldness of the lower part of the leg, and that they are often disposed to mortify, which event is promoted by warmth.

2. As for moist applications, the poultice made of linseed meal is the most simple and most easily made, and, as it does not necessarily require any addition of oil, is to be preferred, when this disagrees with the sore.

Mr. Home does not say much in favour of the use of the extract of lead in poultices; for, though he allows, that it often answers very well, he adds, that it also frequently disagrees with the ulcer, and, if long used, is apt to bring on the lead-colic.

A decoction of poppy-heads is said to be a very good liquor for making poultices.

The carrot-poultice is also found to agree with a great many irritable sores.

The great objection to poultices, in these cases, being the weight of such applications, the limb should always, if possible, rest upon the poultice, and not the poultice upon the limb. When the weight cannot be avoided, and is hurtful, a lighter application should be chosen.

If poultices be employed, their use is to be continued, as long as the granulations are small, and the ulcer is rapidly diminishing in size, and this even till the cicatrization is complete.

When the granulations become large, and loose in their texture, poultices should be left off.

When the weight of poultices prohibits their use, Mr. Home advises the trial of lint, dipped in one of the following lotions, and covered with a pledget of some simple ointment: a solution of the extract of opium; a decoction of poppies; the tincture of opium; a decoction of cicuta; the aqua lithargyri acetati composita; or a diluted solution of the argentum nitratum.

3. Powdered applications are generally too stimulating for irritable ulcers. Carbon has been found useful; so has powdered extract of opium, mixed with an equal quantity of carbon, or linseed flour. However, opium occasionally affects the constitution, in consequence of absorption, and it has been known to excite violent inflammation, ending in mortification.

4. Ointments are not often proper applications for irritable ulcers; as they are always, more or less rancid, and generally disagree with the skin of persons, most subject to such diseases.

Mr. Home mentions cream, as being a very useful application, particularly in cases, in which warmth is found to do harm. The same gentleman recommends, as a substitute for it, an ointment, composed of hog's lard, purified by being repeatedly washed in spring water, and then mixed with a small quantity of white wax, and rose water.

The observations, made respecting solutions of lead, apply to the unguentum cerussæ acetatæ.

5. The pressure of bandages is generally hurtful to irritable sores, though a slight degree of it proves serviceable to certain ulcers, which are somewhat less irritable, and arise from weakness.

OF ULCERS IN PARTS, WHOSE ACTIONS ARE TOO INDOLENT TO FORM HEALTHY GRANULATIONS, WHETHER THIS INDOLENCE ARISES FROM THE STATE OF THE PARTS, OR OF THE CONSTITUTION.

Such is the next division of ulcers adopted by Mr. Home in his treatise on the subject. The indolent ulcer forms in its appearance a complete contrast to the irritable one. The edges of the surrounding skin are thick, prominent, smooth, and rounded. The surface of the granulations is smooth and glossy. The pus, instead of being of a perfect kind, is thin and watery, being composed of a mixture of pus and coagulating lymph. The lymph consists of flakes, which cannot be easily separated from the surface of the sore. The bottom of the ulcer forms quite a level, or nearly so, and, as Mr. Home

very accurately remarks, the general aspect conveys an idea, that, a portion of the skin and parts underneath has been for some time removed, without the exposed surface having begun any new action to fill up the cavity.

When, however, the indolence of the ulcer is not so strongly marked, the sore does not correspond to the preceding description, but resembles in appearance the ulcer, which possesses an inferior degree of irritability, and can only be discriminated from it by receiving no benefit from soothing applications.

The odd circumstances of some indolent sores having the appearance of irritable ones is, in some degree, explained by ulcers always being influenced by changes in the constitution, and accidental circumstances affecting the parts.

Most of the ulcers, which are to be seen in the London hospitals, are of the indolent kind. An indolent disposition in the ulcer may proceed altogether from the long existence of the disease, and, hence, Mr. Home very justly observes, it is immaterial, whether at first it was healthy, weak, or irritable, for, if not cured within a certain time, it becomes indolent, with the exception of a few of the irritable kind, which never change their nature.

Indolent sores do form granulations; but, these, every now and then, are all on a sudden absorbed, and, in the course of four and twenty hours, the sore becomes as much increased in size, as it had been diminished in as many days, or weeks. This absorption of the granulations arises principally from their not being of a healthy kind; but, the event is promoted by changes in the weather, anxiety, fatigue, &c.

The object in the treatment of indolent ulcers is not simply to produce a cure, but to render such cure as permanent as possible. This can only be accomplished by altering the disposition of the granulations, and rendering them strong enough to stand their ground after the ulcer is filled up.

When an ulcer, which has existed six months, is dressed with poultices for a week, the granulations, at the end of this time, will have in part filled up the hollow of the sore, but, they will be found, large, loose, and glossy. Should the poultice be now discontinued, and some proper stimulating application used for another week, the granulations will be found, at the expiration of this time, to have become smaller, more compact, redder, and free from the glossy appearance. The ulcer, when healed by the latter application, will not be so likely to break out again,

as when healed with large, loose, flabby, glossy granulations.

Mr. Home states, that the number of indolent sores, which heal under the use of stimulating applications, and do not break out again, compared with similar cases, treated with mild dressings, are as four to one.

APPLICATIONS TO INDOLENT ULCERS.

1. Medicines in the form of vapour, cannot heal indolent sores, so that the cure shall be lasting. It is only when these ulcers assume a foul appearance, and are in a temporary state of irritation, that such applications can be advantageously employed.

In general, patients on their first admission into hospitals with sore legs, have their ulcers in a temporary state of irritation from neglect, exercise, excesses, &c. Hence, it is generally found advantageous, for the first few days, or even a week, to have recourse to poultices and fomentations.

I believe, that any common fomentation, whether of chamomile, poppy-heads, or mere warm water, answers equally well. The time for using it, is while a fresh poultice is preparing, and this latter application should be changed twice a day.

2. Moist applications, such as poultices, are to be employed, when fomentations are proper, and they may be made of bread, oatmeal, or linseed.

Mr. Home describes a species of indolent ulcers, which occur in patients of debilitated constitutions, which put on a sphacelated appearance, without any apparent cause, even after they have made some progress towards a cure, and in this way spread to a very large size. Some of these ulcers, if judged of from their appearances, would be ranked as irritable ones; but, as soothing applications do not agree with them, they are not to be classed with the latter kind of sores. They are said to occur particularly in seamen, and soldiers, who have been long at sea, and have been termed *scorbutic* ulcers. Mr. Home represents them, however, as not being necessarily connected with the scurvy, and being often met with in patients, who have not been on the sea. This gentleman states, that these ulcers are not of necessity joined with any specific disease; but are common to all kinds of patients, whose constitutions have been impaired, either by salt provisions, warm climates, or drinking.

From some trials, first made by Dr. Harness, and afterwards by Mr. Home, it

appears, that these particular ulcers, when in a sphacelated state, are benefited by employing the gastric juice of ruminating animals, as an external application. It makes the sloughs fall off, and the sore assume a better appearance. Some pain follows on its being first applied, and it is to be regarded as a stimulating application.

Mr. Home mentions, that in the West Indies, such ulcers are advantageously dressed with the fresh root of the cassada, grated into a pulp. Lime-juice has also been found a useful application, and solutions of vitriol and alum have been recommended.

When indolent ulcers are not attended with certain peculiarities, a solution of the *argentum nitratum* is one of the best of the watery applications. It stimulates the granulations, and makes them put on a more healthy appearance, and its strength may be increased according to circumstances. An ulcer, which as first cannot bear this solution above a certain strength, without pain, and without the granulations being absorbed, becomes able, after the application has been used, about ten days, or a fortnight, to bear it twice as strong, without such effects being produced: a proof of the granulations having acquired strength.

The tincture of myrrh is often employed as an application to indolent ulcers. Hunezowsky has praised a decoction of the walnut-tree leaves, and soft covering of the walnut, for the same purpose. (*Acta Acad. Med. Chir. Viadob. Tom. 1. 1788.*) Mr. Home gives his testimony in favour of both the latter dressings.

The diluted vitriolic acid, and the expressed juice of the pod of different species of pepper in a recent state, are mentioned by Mr. Home as having been used as applications to indolent ulcers: the latter one in the West Indies.

This gentleman recommends also a scruple of nitrous acid, mixed with eight ounces of water, as a very useful medicine for external use. The strength must be increased or diminished, according to circumstances. Mr. Home has found, that this application promotes, in a very uncommon manner, the progress of the cure.

The first application of diluted nitrous acid gives a good deal of pain, which lasts about half an hour, and then goes off.

When an indolent ulcer heals with the diluted nitrous acid, the process of skinning is accomplished with more rapidity, than when other applications are employed; and the new skin is said to be more completely formed. The acid coagulates the pus as soon as it is secreted.

Mr. Home says, that several patients, who had ulcers dressed with the diluted nitrous acid, were allowed to walk about, without finding the progress of the cure retarded, although no bandage to support the limb was made use of. This gentleman, informs us, also, that in ulcers of the leg, attended with an exposure of a piece of bone, which is neither acted upon by the absorbents, nor deprived of life, so as to form an exfoliation, so that the ulcer is kept from healing, the application of diluted nitrous acid to the bone, removes the earthy part, and excites the absorbents to act upon the remaining animal portion.

3. The only application, in the form of powder, adapted to indolent ulcers, is, according to Mr. Home, the *hydrargyrus nitratus ruber*. It is only to be occasionally used for ulcers of the most indolent kind.

4. Ointments are represented as being particularly proper applications for the sores under consideration.

The idea of the air having bad effects on ulcers exposed to it, is now disbelieved. That air has no irritating property of this kind, is proved by the fact, that, when the abdomen of an animal is filled with it, no inflammation is excited. When the cellular membrane is loaded with it, in cases of emphysema, the parts do not afterwards inflame. Nor, do ulcers in the throat, as Mr. Home justly remarks, heal less favourably than others, although they are of necessity always exposed to the air.

Whatever ill effects arise, may probably be explained by the consequences of evaporation, which converts the soft pus into a scab. The granulations are, in all probability, most favourably circumstanced, when they are covered with their own matter, which should only be now and then removed, in order that such applications may be made, as will stimulate them to secrete a more perfect pus. From what has been just stated, it must be obvious, that indolent ulcers should not be frequently dressed, and that if they are so, and the dressings are stimulating, the practice will do harm. Changing the dressings once in twenty-four hours is deemed quite sufficient, unless the quantity of matter is very great, which very seldom happens in these cases.

One part of the *unguentum hydrargyri nitrati* mixed with three of hog's lard, is one of the best applications. Its strength, however, must be increased after being used, for some time, as a dressing for the same ulcer.

The *unguentum hydrargyri nitrati* has the effect of quickly removing the thick-

ening of the edges of indolent ulcers, and the surrounding dark red colour of the skin. It seems also to have particularly great power in making the granulations become small and healthy, and of course, the ulcer is less likely to break out again.

With some ulcers, however, this ointment is found to disagree.

The unguentum resinæ flavæ, and the unguentum elemi, mixed with the balsam of turpentine, or that of copaiba, are other common applications to indolent sores. Mr. Home states, that the resins and turpentine are not so powerful, as the acids and metallic salts, in giving the granulations a healthy appearance, and a disposition to resist being absorbed.

Cases attended with a degree of indolent thickening, are such as are most likely to be improved, by camphorated ointments.

In numerous cases, the applications, whatever they are, soon loose their effect, and others should then be substituted for them. The past and present states of the sore are always to be considered. Although, the ulcer may be in its nature indolent, it is liable to temporary changes, from constitutional causes, and hence, a temporary alteration in the treatment becomes proper.

5. Bandages are undoubtedly of the most essential service in healing many kinds of ulcers: but their efficacy is so great in curing numerous indolent sores, that they are considered by some as the principal means of cure.

Among the advocates for the employment of the roller, Mr. Whately is one of the most zealous. The following extracts will convey to the reader a tolerably good idea of this gentleman's opinions.

"The efficacy of *pressure* in counteracting the effects of the dependant posture, was indeed known to the father of English surgery; and the use of the laced stocking was recommended to him for this purpose; nor can there be any doubt, that, the good effects of it in his hands, were very manifest. His ideas, however, seem not to have been much regarded by succeeding surgeons. We find but little said by the writers on surgery, on the effects of pressure in the cure of ulcers on the lower extremities, previous to the appearance of Dr. Underwood's treatise. Yet, I am aware, that there always have been practitioners, who were acquainted with the importance of this mode of treatment, and have adopted it in their practice. I had, myself, an opportunity of seeing the extraordinary success attending it, during my apprenticeship in the country. It is matter of fact, however, that the practice is very far from being general.

Even in one of the latest publications on the subject, and this too by a surgeon of the first eminence, the effect of pressure is not much relied upon for the cure of these complaints. It is, indeed, there stated, in several passages, not only that no benefit is derived from compression in several species of these ulcers, but that many ulcers are rendered worse, more painful, and more unhealthy in their appearance by its use (as observed in Mr. Home's Remarks on Ulcers of the Legs.) That there are certain conditions of an ulcer, which will not bear compression, I have allowed, and have endeavoured to point out the proper treatment, to bring on a fit state for the application of that pressure: but that an experienced surgeon should pass over so slightly this most essential part of the cure, and even speak of it as *frequently* injurious, is a circumstance hardly to be attributed to any other cause than that of a careless and ineffectual application of the bandages. For my own part, having now been for twenty years constantly in the habit of treating a very large number of these cases, I can speak so confidently of the good effects of pressure, properly applied, that I can venture to affirm, that he who doubts its efficacy, has never given it a fair trial.

"In the cases which are added to this essay, (says Mr. Whately) very little variety of dressing was used; the cure was almost always trusted principally to the pressure made on the limb, under the exceptions particularly specified in the work. My success has been so uniform, that I cannot but be anxious to see this practice become established and generally followed. Nothing but a conviction, that in promoting this end, I am really doing an important service to my fellow creatures, could have induced me to appear before the tribunal of the public, conscious as I am of my incompetency as a writer. But may I not hope, that the plain tale of a practical man will be heard, though not told with the graces of elegant language?

"In whatever manner this attempt be received, I cannot doubt but that the practice here recommended must, in the end, prevail, notwithstanding it has this great obstacle to contend with, that surgeons must condescend, for the most part, to apply the bandages with their own hands. The clumsy and ineffectual manner, in which this business is too frequently done, can never be expected to produce the desired effect. I am certain, that if the necessary pains be taken, according to the direction here laid down, such effects will uniformly follow, as must convince the unprejudiced mind, that to

have recourse to the operation of tying varicose veins, and the application of a great variety of remedies, can be very rarely, most probably never necessary. I can safely declare, that all such cases, as are described by Mr. Home to be cured by this operation, have readily yielded, under the proper management of pressure alone.

"Since these papers were preparing for the press, I have seen with pleasure Mr. Baynton's new method of treating these complaints. Every thing that is there said on the efficacy of his method, may be considered as confirming the doctrine laid down in the following pages. His mode, however, of making the pressure with adhesive plaster, appears to me inconvenient, and on several accounts objectionable. I have no doubt but that the proper application of compresses and flannel rollers, would, in every case recorded by him, have produced similar good effects. The instances of success by this method, after the supposed failure by the roller, I can only attribute to this, that the pressure made with the plasters was applied by his own hands, whereas that with the roller, was probably, as is usual, so made, that the effect intended by it could not possibly have been obtained. No surgeon, who will not be at the trouble of applying them himself, can be a judge of what may be effected by the proper management of the roller and compresses."

The following is the calamine cerate, which Mr. Whately has usually employed :

℞. Axung. Porcin. depur. lib. iij.

Empl. Lithargyr. lib. iss.

Lap. Calam. præp. ap. lib. j. M.

"To this formula, (says Mr. Whately,) I shall add another for making a cerate, which nearly resembles the unguentum tripharmacum of the old Dispensatory, but being less oily, it makes a much more adhesive plaster. It should be spread on rag, or silk, as an external covering to the dressing on lint, where a tow plaster cannot be conveniently used; as in wounds of the face or hands, a bubo, or any other sore, where an external plaster cannot be readily retained in its situation by a bandage. This plaster is likewise so mild, that it never irritates the skin. I have found it also a very useful plaster in fractures. The following is the formula :

℞. Empl. Lithargyr. lib. j.

Axung. Porcin. depur. unc. vj.

Aceti unc. iv. M."

With respect to the proper method of applying the roller and compresses, Mr. Whately offers the following remarks :

"I have said, that the flannel rollers should be four inches wide, to allow for

shrinking in washing; by which I would have it understood, that when they are made of that width, they are a little too wide: especially for those whose legs are small. The best width for a flannel roller, designed for those who have slender legs, is three inches; but for those, whose legs are of a large size, they should be always three inches and a half in width. They must therefore be at first torn a little wider, that they may be of their proper width when repeatedly washed. It will likewise be found, that rollers made of fine, soft, and open flannel, will answer much better, than those made of coarse or hard flannel.

"For those who have full sized legs, the length of six yards is but just sufficient to answer all the purposes intended by a roller; but in those who have very small legs, five yards is a sufficient length. Care should be taken that the rollers be washed in very hot water, and they should be hung up to dry immediately on being washed. If these precautions be not attended to, repeated washing them will, in some kinds of flannel, make them as narrow as tape, by which they will be rendered almost useless. They should be often washed, as they are much softer, and of course sit easier, when quite clean, than when they are soiled.

"In applying a roller, (says this gentleman) the first circle should be made round the lowest part of the ankles as near as possible to the heel; the second should be formed from thence round the foot; the third should be passed again round the foot quite to the toes. The roller should then be passed from the foot round the ankle and instep a second time to make the fourth circle. In doing this, it should be brought nearer (but not over) the point of the heel than it was at the first time of going round this part. The fifth circle should pass over the ankles again, and not more than half an inch higher up the leg than the fourth circle. The sixth, seventh, eighth, and ninth circles should ascend spirally along the small of the leg, at the exact distance of three-fourths of an inch from each other. Having proceeded thus far up the leg, we may begin to increase the distances of the circles from each other; they may succeed each other upward to the knee at the distance of from one to two inches, according to the size and shape of the leg. At that part where the calf of the leg commences, it is generally necessary to let the upper edge of the roller be once, twice, or thrice, turned downwards for about half the circumference of the leg, in order to make the roller lay smooth between the middle of the calf, and the small of the leg. When

the roller has been thus applied as far as the knee, there will be a portion of it to spare, of perhaps a yard in length; this remainder should be brought down by spiral windings, at greater distances from each other than those which were made on the ascent of the roller. The windings should in general be completed in the small of the leg, where the roller should be pinned.

"In many cases, it is necessary to apply the roller *over the heel*. It should be brought as low as possible round the ankle; as in the former description. From thence, the second circle of the roller should pass from the instep over one side of the heel, and be brought over the other side of the heel to the instep again. The third circle should be passed round the ankle a second time, but still nearer to the heel than the first circle was. The roller should after this be brought back to the foot, and passed round it to make the fourth circle. A fifth circle should be again made (though it is not in all cases absolutely necessary) round the foot, to the toes. To make the sixth circle, the roller should be brought back, and passed round the ankle again. The seventh, eighth, ninth, tenth, and eleventh circles should ascend spirally at the *exact distance* of three-fourths of an inch from each other; these distances commencing at the sixth circle. The roller should then be carried to the knee, and be brought down again to the small of the leg, as described in the former instruction.

"In applying the compresses, it is necessary in every instance to put them on one by one, and not all in a mass, though they be of a proper size and number. They should be crossed in different directions; the largest of them should in no case be longer than just to meet on the opposite side of the leg, to which they are applied. I have in many instances seen the compresses applied by the patients of such a length as to go round the leg like a roller, and be fastened together with pins. This method generally wrinkles and blisters the skin, and by no means answers the purpose of making a compression on the part where it is most wanted. I never suffer a pin to be used in the compresses. If the same compresses in any case be applied two days together, they should always be turned on the contrary side at each re-application, in order to prevent wrinkles on the skin."

Mr. Whately notices two objections made by Mr. Baynton to rollers. "The first is, that it is difficult to retain the roller on the parts to which it is applied; the second is, that it gives pain to the

patient." Mr. Whately's experience, however, warrants him in saying, that a flannel roller will, in almost every instance, keep the exact position it was first placed in, for a much longer time than is necessary. "I have seen these rollers (says Mr. Whately, many hundred times keep their situations without any variation whatever for two days; and that too without the least restraint upon exercise. This has happened in those cases, where from the distance of the patient, or from the circumstance of his being nearly cured, I have wished to dress the leg only every forty-eight hours. I must go a step further, and observe, that I have seen repeated instances in which these rollers have remained in their situation for three or four days, and even nearly for a week without being applied afresh. In short, it is one of the best properties of a flannel roller, that it is easily retained in its situation, when well applied. In every instance, in which it is necessary to use one, I could pledge myself to apply it in such a manner, as should prevent its altering its position for two days. The method I should use, I have already described; in addition to which, nothing more would be necessary, even in those cases where the shape of the leg is peculiarly unfavourable to the retention of a bandage, than the insertion of a few pins.

"In answer to the second objection, I observe, that I have invariably found, that when a flannel roller has been applied in the manner here described, and has not been drawn unnecessarily tight, it gives no pain. It sits nearly as easy as a common stocking, and allows a very free motion and exercise of the limb. It has been stated in this work, that the application of the compresses makes the necessary degree of pressure on the ulcer, and thereby prevents the necessity of drawing the roller so tight over the other parts of the leg, as would have been necessary were the compresses not used.

"There is another circumstance which Mr. Baynton considers as giving his method a great advantage over the roller, which is, that by means of the plaster, the edges of the sore may be made to approximate in such a manner, that the cicatrix, or new-formed skin, will be less after a cure performed by this method than by any other. In almost all these cases, before the cure is attempted, the leg is more or less enlarged by swelling; and as this swelling is entirely removed by compression, it readily allows the skin to approximate on the healing of an ulcer. Added to this, there is a process

in nature always going on in healing an ulcer or wound in any part of the body, (whether there be a loss of substance or not,) by which a cicatrix is always considerably less than the previous size of the sore. This effect occurs in all cases, whether the patient be cured by the horizontal position, a roller, or by strips of adhesive plaster. The size of this cicatrix will likewise vary in different cases where the ulcers have been of the same size, by whichever of these three methods they be cured. It will be larger in those ulcers which are accompanied with strong adhesions of the adjoining parts, than in those where such adhesions have not been produced; and this effect will take place to the greatest degree where the ulcers are situated over the tibia, and by long continuance have produced immoveable adhesions of the cellular substance to the adjoining periosteum. The adhesive plaster, when applied as a bandage, will without doubt leave as small a cicatrix as any other method of cure; but, for the reasons already assigned, I do not believe that the cicatrix will in any case be smaller than that produced by a roller. In every case cured by the latter method, I have found the cicatrix very small, when compared with the previous size of the ulcer."—(See *Practical Observations on the Cure of Wounds and Ulcers on the Legs, without Rest*; by Thomas Whately, 1799.)

6. We shall next introduce an account of Mr. Baynton's plan of curing old ulcers of the leg, by means of adhesive plaster. Were I to say, that any particular method of dressing such sores is entitled to superior praise, I should certainly decide in favour of this gentleman's practice. I have seen it most successful myself, and I hear it highly spoken of by numerous professional friends, in whose unprejudiced judgment I place much reliance.

Mr. Baynton acquaints us, that the means proposed by him will, in most instances be found sufficient to accomplish cures in the worst cases, without pain or confinement. After having been repeatedly disappointed in the cure of old ulcers, Mr. Baynton determined on *bringing the edges of old ulcers nearer together by means of slips of adhesive plasters*. To this he was chiefly led, from having frequently observed, that the probability of an ulcer continuing sound, depended much on the size of the cicatrix, which remained after the cure appeared to be accomplished; and from well knowing, that the true skin was a much more substantial support and defence, as well as a better covering, than the frail one,

which is obtained by the assistance of art. But, when he had recourse to the adhesive plaster, with a view to lessen the probability of those ulcers breaking out again, he little expected, that an application so simple would prove the easiest, most efficacious and most agreeable means of treating ulcers.

Although the first cases, in which Mr. Baynton tried this practice, were of an unfavourable nature, yet he had soon the satisfaction to perceive that it occasioned very little pain, and materially accelerated the cure, while the size of the cicatrices were much less than they would have been, had the cures been obtained by any of the common methods.

At first, however, the success was not quite perfect; as, in many instances, he was not able to remove the slips of plaster, without removing some portion of the adjacent skin, which, by occasioning a new wound, proved a disagreeable circumstance, in a part so disposed to inflame and ulcerate, as in the vicinity of an old sore. He therefore endeavoured to obviate that inconvenience by keeping the plasters and bandages well moistened with spring-water, for some time, before they were removed from the limb. He had soon the satisfaction to observe, that the inconvenience was not only prevented, but that every succeeding case justified the confidence he now began to place in the remedy. He also discovered, that moistening the bandages was attended with advantages which he did not expect; while the parts were wet and cool, the patients were much more comfortable in their sensations, and the surrounding inflammation was sooner removed, than he had before observed it to be.

By the mode of treatment here recommended, Mr. Baynton found, that the discharge was lessened, the offensive smell removed, and the pain abated in a very short time. But, besides these advantages, he also found, that the callous edges were in a few days level with the surface of the sore; that the growth of fungus was prevented, and the necessity of applying painful escharotics much lessened, if not entirely done away. Mr. Baynton gives the following description of his method.

"The parts should be first cleared of the hair, sometimes found in considerable quantities upon the legs, by means of a razor, that none of the discharges, by being retained, may become acrid, and inflame the skin, and that the dressings may be removed with ease at each time of their renewal, which, in some cases, where the discharges are very pro-

fuse, and the ulcers very irritable, may, perhaps, be necessary twice in the twenty-four hours, but which I have, in every instance, been only under the necessity of performing once in that space of time.

"The plaster should be prepared by slowly melting, in an iron ladle, a sufficient quantity of litharge plaster, or diachylon, which if too brittle, when cold, to adhere, may be rendered adhesive by melting half a drachm of resin with every ounce of the plaster: when melted, it should be stirred till it begins to cool, and then spread thinly upon slips of smooth porous calico, of a convenient length and breadth, by sweeping it quickly from the end, held by the left hand of the person who spreads it, to the other, held firmly by another person, with the common elastic spatula used by apothecaries; the uneven edges must be taken off, and the pieces cut into slips, about two inches in breadth, and of a length that will, after being passed round the limb, leave an end of about four or five inches. The middle of the piece so prepared, is to be applied to the sound part of the limb, opposite to the inferior part of the ulcer, so that the lower edge of the plaster may be placed about an inch below the lower edge of the sore, and the ends drawn over the ulcer with as much gradual extension as the patient can well bear; other slips are to be secured in the same way, each above and in contact with the other, until the whole surface of the sore and the limb are completely covered, at least one inch below and two or three above the diseased part.

"The whole of the leg should then be equally defended with pieces of soft calico, three or four times doubled, and a bandage of the same, about three inches in breadth, and four or five yards in length, or rather, as much as will be sufficient to support the limb from the toes to the knee, should be applied as smoothly as can be possibly performed by the surgeon, and with as much firmness as can be borne by the patient, being first passed round the leg, at the ankle-joint, then as many times round the foot as will cover and support every part of it, except the toes, and afterwards up the limb till it reaches the knee, observing that each turn of the bandage should have its lower edge so placed as to be about an inch above the lower edge of the fold next below.

"If the parts be much inflamed, or the discharge very profuse, they should be well moistened, and kept cool with cold spring-water poured upon them as often as the heat may indicate to be necessary,

or, perhaps, at least, once every hour. The patient may take what exercise he pleases, and it will be always found, that an alleviation of his pain and the promotion of his cure will follow as its consequence, though, under other modes of treating the disease, it aggravates the pain, and prevents the cure.

"These means, when it can be made convenient, should be applied soon after rising in the morning, as the legs of persons affected with this disease are then found most free from tumefaction, and the advantages will be greater than when they are applied to limbs in a swollen state. But at whatever time the applications be made, or in whatever condition the parts be found, I believe it will always happen, that cures may be obtained by these means alone, except in one species of the disease, which seldom occurs, but that will hereafter be described. The first application will sometimes occasion pain, which, however, subsides in a short time, and is felt less sensibly at every succeeding dressing. The force, with which the ends are drawn over the limb, must then be gradually increased, and when the parts are restored to their natural state of ease and sensibility, which will soon happen, as much may be applied as the calico will bear, or the surgeon can exert; especially if the limb be in that enlarged and incompressible state, which has been denominated the scorbutic, or if the edges of the wound be widely separated from each other."

Mr. Baynton afterwards takes notice of the breaking of the skin, near the ulcers; a circumstance, which sometimes proved troublesome, and arose partly from the mechanical effect of the adhesive plasters, and partly from the irritating quality of the plaster. Mr. Baynton, however, only considers such sores of serious consequence, when they are situated over the tendon of Achilles, in which situation they are sometimes several weeks in getting well. This gentleman recommends, with a view of preventing these ulcers, a small shred of soft leather to be put under the adhesive plaster.

Mr. Baynton next adds, "that cures will be generally obtained without difficulty, by the mere application of the slips and bandage; but, when the parts are much inflamed, and the secretions great, or the season hot, the frequent application of cold water will be found a valuable auxiliary, and may be always safely had recourse to, where the heat of the part is greater, than is natural, and the body free from perspiration." (See *A*

Descriptive Account of a New Method of Treating Old Ulcers of the Legs, by Thomas Baynton, Surgeon at Bristol. Edit. 2. 1799.)

OF ULCERS ATTENDED WITH SOME SPECIFIC DISEASED ACTION, EITHER CONSTITUTIONAL, OR LOCAL.

1. *Ulcers which yield to Mercury.*

Here we shall exclude from consideration venereal ulcers, as this subject is treated of in the article *Venereal Disease*. At present, we shall only notice such sores, as are produced by other diseases of the general system, or of the parts, and are capable of being cured by mercury.

Perhaps, there is no greater source of error in the whole practice of surgery, than the supposition, that a sore, when it yields to mercury, must be a syphilitic one. Surgeons, however, who run into this absurdity, can hardly be imagined to be unaware, that so potent a medicine must have effects on numerous diseases of very different descriptions. Mr. Home very truly remarks, that many ulcers, unconnected with the venereal disease, which receive no benefit from other medicines, heal under a mercurial course, or yield to mercurial applications. In some cases, the ulcer remains in the same state, while mercury is used; but, begins to look better, as soon as the medicine is discontinued, in consequence of the beneficial change, produced in the system by the mercurial course. In these cases, mercurial frictions are the best, because they occasion least impairment of the constitution, in consequence of the stomach continuing undisturbed, and capable of digesting well.

Another description of ulcers, noticed by Mr. Home, as deriving benefit from mercury, occur on the instep and foot, have a very thickened edge, and are attended with a diseased state of the surrounding skin, so as to bear some resemblance to elephantiasis. They are frequently observed affecting servants, who live in opulent families, in an indolent and luxurious way. Mr. Home states, that fumigations with the hydrargyrus sulphuratus ruber heal these ulcers, and resolve in a great degree the swelling of the surrounding parts. In some instances, an ointment of calomel and hog's lard; in others, the camphorated weak mercurial ointment, is the best application.

Many diseased ulcers, particularly superficial ones, with a thickened edge,

may be healed, when they are dressed with a solution of one grain of the hydrargyrus muriatus, in an ounce of water, containing a little spirit.

2. *Ulcers, which are curable by Hemlock.*

Mr. Home places more reliance on hemlock, as an external, than an internal remedy, for ulcers. The ulcers, which usually receive benefit from hemlock applications, look like those of an irritable sort; but, the surrounding parts are thickened, in consequence of some diseased action. Such sores occur near the ankle; which joint is at the same time enlarged. Sometimes, but not so often, they take place over the ligaments of the knee. On account of their situation, and the swelling of the joint, they may be suspected to be scrophulous, though they are more sensible, than strumous ulcers usually are. The sores, just described, are rendered less painful, their diseased disposition is checked, and the swelling of the joint diminished, by hemlock. Several irritable scrophulous ulcers are also particularly benefited by this medicine.

Mr. Home gives the preference to hemlock poultices, unless their weight should be objectionable, in which cases, he advises lint to be dipped in a decoction of the herb, and put on the sore.

Of the ointment, made with the inspissated juice, Mr. Home seems to say little, in regard to its efficacy.

3. *Ulcers which may be cured by Salt Water.*

Mr. Home takes notice of other specific ulcers, which yield to this application, after resisting other remedies. Poultices, made with sea-water, are often employed; but, this gentleman, seems to prefer keeping the part immersed in the water in a tepid state, about a quarter of an hour, twice a day.

When sea-water poultices bring out pimples, in cases of scrophulous ulcers on the legs and feet, Mr. Home informs us, that this disagreeable circumstance may be obviated by diluting such water with an equal quantity of a decoction of poppies. After a time, the salt water may be tried by itself again. While each fresh poultice is preparing, the part should also be immersed in such water warmed.

When there is a tendency to anasarea, or when there is an unusual coldness in the limb, unattended with any propensity to mortification, tepid salt-water may be used with infinite advantage.

4. *Ulcers, which may be cured by the Argentum Nitratum.*

Mr. Home notices, under this head, an ulcer, which does not penetrate more deeply, than the cutis; but, spreads in all directions, producing ulceration on the surface of the skin, and often extending nearly through its whole thickness. The part, first affected, heals, while the skin beyond is in a state of ulceration.

Of this description are, a leprous eruption, mostly seen in men impressed in Ireland; a disease of the skin induced by buboes, which have continued a great while after the venereal virus has been destroyed; and the ring-worm.

All these diseases are most easily cured by applying to them a solution of the argentum nitratum.

The leprous eruption is communicated by contact, and makes its appearance in the form of a boil. This is converted into an ulcer, which discharges a fetid fluid, by which the surrounding skin is excoriated, and the ulceration is extended over a large surface. The pain is the most severe, and the discharge greatest, in hot weather. The parts first diseased heal, while others are becoming ulcerated, and the disease is always rendered worse, by spirituous liquors, salt provisions, and catching cold.

Mr. Home remarks, that the disease in the skin, produced by the effects of very irritable buboes, in constitutions broken down by mercury, is attended with ulceration of a more violent, deep, and painful kind, than the foregoing distemper. The progress of this disorder is, in other respects, very similar to that of the leprous eruption.

Although the ring worm only occurs in the form of an ulcer in warm climates, a mild species of the affection takes place in summer-time in this country. It seems to be infectious; though it often occurs without infection. It commences with an efflorescence, which is attended with very trivial swelling, and spreads from a central point. The circumference of the efflorescence becomes raised into a welt, while the rest assumes a scurfy appearance. The welt becomes covered with a scab, which falls off, and leaves an ulcerated ring, in general, not more, than a quarter of an inch wide. The outer margin of this ring continues to ulcerate, while the inner one heals, so that the circle gets larger and larger. The discharge consists of a thin, acrid fluid, which seems to have a great share in making the disease spread.

For all the three preceding diseases,

a solution of the argentum nitratum is strongly recommended by Mr. Home.

5. *Ulcers, which yield to Arsenic.*

The sores, which are named *noli me tangere*, derive great benefit from this powerful remedy. Mr. Home observes, that they are nearly allied to cancer, differing from it in not contaminating the neighbouring parts by absorption, and only spreading by immediate contact.

From some cases, which fell under Mr. Home's observation, he discovered, that arsenic was not only efficacious as an external, but also as an internal remedy. I shall not unnecessarily enlarge upon this subject in the present place, as the reader may refer to the articles *Arsenic*, *Cancer*, and *Noli Me Tangere*, for additional information, relative to the uses of this potent mineral in the practice of surgery.

Mr. Home is an advocate for its employment, both internally and externally, for ulcers of untoward appearance on the legs. The *fungated* ulcer is particularly pointed out by this gentleman as being benefited by arsenic. This ulcer occurs on the calf of the leg, and on the sole of the foot. From its surface, a fungus shoots out, which is entirely different from common granulations. The new formed substance is radiated in its structure, the bottom of the ulcer being the central point, and the external surface, which is continually increasing, the circumference. The substance of this fungus is very tender, and readily bleeds. The first stage of the disease sometimes has the appearance of a scrophulous affection of the metatarsal bones; but, the parts seem more enlarged, and, when the skin ulcerates, a fungus shoots out, and betrays the nature of the case.

One species of the fungated ulcer is capable of contaminating the lymphatic glands; the other is not so. The first is represented by Mr. Home as being incurable by arsenic, or any other known medicine.

The second yields to this remedy. Mr. Home uses a saturated solution, made by boiling white arsenic in water, for several hours, in a sand heat. He gives from three to ten drops internally; and, for outward use, dilutes a dram with two pints of water, making it afterwards gradually stronger and stronger, till it is of double strength. The application may either be made in the form of a poultice, or by dipping lint in the lotion.

The best and safest preparation of arsenic, both for internal and external use, is the *kali arsenicatum*. The mode

of employing it may be learnt by turning to the articles *Arsenic*, *Aqua Kali Arsenicati*, *Noli Me Tangere*, &c.

6. *Ulcers attended with Varicose Veins.*

A certain kind of ulcer is very apt to occur on the inside of the leg, and is equally difficult to cure, and liable to break out again. It has the look of a mild, indolent, sore; but, the branches and trunk of the vena saphena are enlarged, and this varix of the veins keeps the ulcer from healing. The sore is seldom deep, usually spreads along the surface, and has an oval shape, the ends of which are vertically situated. There is a pain affecting the limb rather deeply, extending up in the course of the veins, and exasperated by keeping the leg a long while in an erect posture.

This is a kind of ulcer, which derives immense benefit from a tight roller, applied from the toes to the knee, although the direct operation of the pressure of the bandage on the sore is itself productive of no particular good.

Mr. Home found, however, that many patients could not bear to wear laced stockings, or tight bandages, and that some received no relief from them. Hence, this gentleman was led to consider what else could be done for the cure of the varicose state of the veins. He represents, that, in consequence of the size of the vena saphena, and its numberless convolutions, the return of blood from the smaller branches is so impeded, as to retard the circulation in the smaller arteries, and to interfere with their action in forming healthy granulations. The coats, and valves of the veins also become thickened, so that the latter parts (the valves) do not do their office of supporting the weight of the column of blood.

These reflections induced Mr. Home to think, that some benefit might be obtained by taking off a part of the pressure of this column of blood, by making a ligature round the vena saphena, where this vessel passes over the knee-joint. Thus the cavity of the vein at this part would be obliterated, and a kind of artificial valve would be formed.

This gentleman recommends the following way of performing the operation: "As the veins are only turgid in the erect posture, the operation should be performed while the patient is standing; and if placed upon a table, on which there is a chair, the back of the chair will serve him to rest upon, and he will have the knee-joint at a very convenient height for the surgeon. The leg to be

operated upon must stand with the inner ankle facing the light, which will expose very advantageously the enlarged vena saphena passing over the knee-joint. While the patient is in this posture, if a fold of the skin, which is very loose at this part, is pinched up transversely, and kept in that position by the finger and thumb of the surgeon, on one side, and of an assistant on the other, this fold may be divided by a pointed scalpel, pushed through with the back of the knife towards the limb to prevent the vein being wounded; much in the same way, as the skin is divided in making an issue. This will expose the vein sufficiently; but, there is commonly a thin membranous fascia confining it in its situation; and, when that is met with, the vein had better be laterally disengaged by the point of the knife. This is most expeditiously done by laying hold of the fascia with a pair of dissecting forceps, and dividing it; for it is difficult to cut upon parts, which give little resistance, and there is a risk of wounding the vein. After this a silver crooked needle, with the point rounded off, will readily force its way through the cellular membrane connected with the vein, without any danger of wounding the vessel, and carry a ligature round it. This part, or, indeed, what may be considered as the whole of the operation, being finished, the patient had better be put to bed, so as to allow the vein to be in its easiest state, before the ligature is tied, and then a knot is to be made upon the vein: this gives some pain; but, it is by no means severe. The edges of the wound in the skin are now to be brought together by sticking plaster, except where the ligature passes out, and a compress and bandage applied so as to keep up a moderate degree of pressure on the veins, both above and below the part included in the ligature." (*Home on Ulcers*, p. 296, edit. 2.)

It appears that A. Paré proposed and performed an operation, similar to the one described by Mr. Home. See *A. Paré's Works*, translated by Johnson; folio edition, page 319.

For information on the foregoing subject, consult *Underwood's Surgical Tracts on Ulcers*, &c. 1799; *B. Bell's System of Surgery*; *Baynton's Descriptive Account of a new Method of treating Old Ulcers of the Legs*, 1799, edit. 2; *Whately's Practical Observations on the Cure of Wounds and Ulcers on the Legs, without Rest*, 1799; *Practical Observations on the Treatment of Ulcers on the Legs, to which are added, some Observations on Varicose Veins and Piles*, by Everard Home, F. R. S. 1801, edit. 2.;

Principles of Surgery, by John Bell, Vol. 1. 1804; Hunter on the Blood, Inflammation, &c.

UNGUENTUM ACIDI VITRIOLICI.—*℞.* Acidi Vitriolici \mathfrak{zj} . Adipis Suillæ præparatæ \mathfrak{zj} .—These are to be well mixed together in a glass mortar.

This ointment is said to have been used by Dr. Duncan, of Edinburgh, for curing the itch. It has the character also of being able to reduce some chronic swellings of the joints. Mr. Naylor, of Gloucester, has employed frictions with this ointment, containing a good deal of camphor, for the purpose of reducing the swelling of the thyroid gland, in cases of bronchocele.

As the vitriolic acid is particularly destructive of vegetable substances, the parts to which this ointment is applied, should always be covered with flannel instead of linen.

UNGUENTUM CALCIS HYDRARGYRI ALBÆ.—*℞.* Calcis Hydrargyri Albæ \mathfrak{zj} . Adipis Suillæ præparatæ \mathfrak{ziss} . Misce.—Useful for several cutaneous diseases.

UNGUENTUM CANTHARIDIS.—*℞.* Cantharid. Pulv. \mathfrak{zj} . Aquæ Distillatæ \mathfrak{zviij} . Unguent. Resinæ Flavæ \mathfrak{zviij} . Boil the water with the cantharides, till one half of the fluid has evaporated. Then strain the rest, to which add the ointment of yellow resin. Evaporate the mixture in a water bath, saturated with sea-salt, until it is of the consistence of an ointment.

UNGUENTUM CERÆ.—*℞.* Ceræ Albæ \mathfrak{ziv} . Spermat. Ceti \mathfrak{zij} . Olei Olivæ \mathfrak{Hj} . These are to be melted with a slow fire, and then briskly stirred till cold. This, spread on lint, serves as a simple dressing for wounds, ulcers, &c.

UNGUENTUM CERÆ CUM ACETO.—*℞.* Ceræ Albæ \mathfrak{ziv} . Olei Olivæ \mathfrak{Hj} . Aceti Distillati \mathfrak{zij} . The vinegar is to be gradually mixed with the two first ingredients, after these have been melted together. Dr. Cheston recommends this ointment for superficial excoriations, cutaneous eruptions, &c.

UNGUENTUM CERUSSÆ ACETATÆ.—*℞.* Cerussæ Acetatæ \mathfrak{zij} . Ceræ Albæ \mathfrak{zij} . Olei Olivæ \mathfrak{Hss} . Rub the acetated ceruse (previously powdered) with part of the olive oil. Then add it to the wax melted with the rest of the oil. Stir the mixture until cold. This is a very good saturnine application, in cases which require it to be made in the form of an ointment.

UNGUENTUM CICUTÆ.—*℞.* Foliorum Cicutæ recentium, Adipis Suillæ præparatæ, sing. \mathfrak{ziv} . The cicuta is to be bruised in a marble mortar, after

which, the lard is to be added, and the two ingredients thoroughly incorporated by beating. They are then to be gently melted over the fire, and after being strained through a cloth, and the fibrous part of the hemlock well pressed, the ointment is to be stirred till quite cold. To cancerous or scrophulous sores, this ointment may be applied with a prospect of advantage. (*Pharm. Chirurg.*)

The Pharmacopœia of St. Bartholomew's Hospital directs the unguentum cicutæ to be made as follows:—*℞.* Foliorum Cicutæ \mathfrak{Hj} . Adipis Suillæ \mathfrak{Hss} . Boil the leaves in the melted hog's-lard, until they become crisp. Then strain the ointment.

An hemlock ointment might be more conveniently made, by mixing the succus cicutæ spissatus, with any common salve.

UNGUENTUM DIGITALIS.—*℞.* Foliorum Digitalis Purpureæ recentium. Adipis Suillæ præparatæ, sing. \mathfrak{ziv} . This ointment may be made in the same manner as the unguentum cicutæ, and tried in the same cases as the latter.

UNGUENTUM ELEMI COMPOSITUM.—*℞.* Elemi \mathfrak{Hj} . Terebinthinæ \mathfrak{zix} . Sevi Ovilli præparati \mathfrak{Hj} . Olei Olivæ \mathfrak{zij} . Melt the elemi with the suet; remove them from the fire, and mix them immediately with the turpentine and oil. Then strain the mixture.—Sometimes employed for dressing ulcers, which stand in need of stimulating applications.

UNGUENTUM GALLÆ CAMPHORATUM.—*℞.* Gallarum Pulveris Subtilissimi \mathfrak{zij} . Camphoræ \mathfrak{zss} . Adipis Suillæ præparatæ \mathfrak{zij} . Misce.—This is a very good application to piles, after their inflammatory state has been diminished by the lotio aq. litharg. acet. and leeches.

UNGUENTUM HELLEBORI ALBI.—*℞.* Hellebori Albi Pulv. \mathfrak{zj} . Adipis Suillæ præparatæ \mathfrak{ziv} . Olei Limonis \mathfrak{Dss} . Misce.—This ointment will cure the itch, and several other cutaneous diseases. Tinea capitis will sometimes yield to it.

UNGUENTUM HYDRARGYRI FORTIUS.—*℞.* Hydrargyri purificati \mathfrak{Hj} . Adipis Suillæ præparatæ \mathfrak{zxxiii} . Sevi Ovilli præparati \mathfrak{zj} . First rub the quicksilver with the suet, and a little of the hog's-lard, until the globules disappear; then add the remainder of the lard, and make an ointment.—This is the common, strong, mercurial ointment. Of its uses we need say nothing in this place.

UNGUENTUM HYDRARGYRI CAMPHORATUM.—*℞.* Unguenti Hydrargyri \mathfrak{zj} . Camphoræ \mathfrak{zss} . Misce.—This is

often recommended to be rubbed on thickened, indurated parts, with a view of exciting the action of the absorbents. Rubbed along the course of the urethra, it is very serviceable in diminishing and removing chordee.

UNGUENTUM HYDRARGYRI MITIUS.—℞. Unguenti Hydrargyri fort. ℥j. Adipis Suillæ præparatæ ℥ij. Misce.—The weaker mercurial ointment is often rubbed on indurated, thickened parts and tumours, when the object is merely to promote their absorption; and, it is not advisable to employ the unguentum hydrargyri fort. lest a salivation should be induced.

UNGUENTUM HYDRARGYRI NITRATI.—℞. Hydrarg. Purificati ℥j. Acidi Nitrosi ℥ij. Adipis Suillæ præparatæ ℥ij. Dissolve the quicksilver in the nitrous acid; and whilst the solution is yet hot, mix with it the hog's-lard, previously melted, but beginning to congeal, by being exposed to the air. This ointment is a celebrated application to the inside of the eyelids, in cases of chronic ophthalmia, and also to specks on the cornea. When blended with a little olive oil, it also forms a very eligible stimulating dressing for numerous kinds of sores. It is very efficacious in curing tinea capitis, and many other herpetic and cutaneous diseases.

UNGUENTUM HYDRARGYRI NITRATI RUBRI.—℞. Hydrargyri Nitrati Rubri ℥iss. Ceræ Albæ ℥iv. Olei Olivæ ℥viij. Misce.—This is a most common application to indolent ulcers, and sores in general, which require being stimulated.

UNGUENTUM LITHARGYRI ACETATI.—℞. Aquæ Lithargyri Acetati ℥v. Adipis Suillæ ℥ij. Ceræ Albæ ℥iv. Melt the ingredients together, and continue to stir them till cold.—This is an excellent saturnine ointment for ulcers with inflamed edges, and it may be employed with great advantage as a simple dressing in numerous instances.

UNGUENTUM OPHTHALMICUM.—℞. Adipis Suillæ præparatæ ℥ss. Tutie præparatæ, Bol. Armen. sing. ℥ij. Calcis Hydrarg. Albæ ℥j. Misce.—This is Janin's celebrated ophthalmic ointment, which may be used for the same diseases of the eye and eyelids, as the unguentum hydrargyri nitrati. It must be at first weakened with about twice its quantity of hog's-lard.

UNGUENTUM PICIS.—℞. Picis, Sevi Ovilli præparati, sing. ℥ss. Melt and then strain them.

UNGUENTUM PICIS COMPOSITUM.—℞. Unguenti Picis, Unguenti Cerussæ, Acetati, sing. ℥ss. Misce.

The two preceding ointments are ap-

plicable to cases of tinea capitis, and some eruptive complaints. Also to some kinds of irritable ulcers.

UNGUENTUM PICIS CUM SULPHURE.—℞. Unguenti Picis, Unguenti Sulphuris, sing. ℥iv. Misce.—This is the most common, and, I believe, the most efficacious, application for curing tinea capitis.

UNGUENTUM RESINÆ FLAVÆ.—℞. Resinæ Flavæ, Ceræ Flavæ, sing. ℥ij. Olei Olivæ ℥ij. Melt the resin and wax with a slow fire; then add the oil, and strain the mixture while hot.—This is a common application to ulcers, which stand in need of being gently stimulated.

UNGUENTUM SÂMBUCI.—℞. Florum Sambuci, Adipis Suillæ, singulorum ℥ij. The hog's-lard being melted, boil the elder-flowers in it till they become crisp, then strain the mixture.

UNGUENTUM SPERMATIS-CETI.—℞. Spermatis-Ceti ℥vj. Ceræ Albæ ℥ij. Olei Olivæ ℥viij. Melt them together with a slow fire, and then stir them briskly till cold.—This is the common white dressing, so extensively used by surgeons as a simple salve.

UNGUENTUM SULPHURIS.—℞. Adipis Suillæ ℥ss. Florum Sulphuris ℥iv. Misce.

UNGUENTUM TUTIÆ.—℞. Tutie præparatæ, Unguenti Spermatis-Ceti, q. s. Misce.—Used for smearing the borders and inside of the eyelids, in cases of chronic ophthalmia, &c.

UNGUENTUM TUTIÆ COMPOSITUM.—℞. Tutie præparatæ, Lapidis Calaminaris præparati, sing. ℥vj. Camphoræ ℥ij. Unguenti Sambuci ℥ij. Misce.—This formula is contained in the Pharmacopœia of St. Bartholomew's Hospital. It may be applied, in some cases, to the inside of the eyelids, also to piles; certain ulcerations, excoriations, &c.

UNGUENTUM ZINCI CALCINATI.—℞. Florum Zinci ℥j. Unguentum Spermatis-Ceti ℥ij. Misce.—Sometimes used in the same affections of the eye and eyelids, in which the unguentum hydrargyri nitrati, and the unguentum ophthalmicum, are employed.

UNGUIS. (*A Nail*.) Some surgical authors have applied this term to a collection of pus, or matter in the eye, when the abscess has appeared, through the cornea, to be shaped like a finger nail.

UNGULA. (*A Hoof*.) A collection of matter in the eye, shaped like a hoof.

UNION BY THE FIRST INTENTION.—When the opposite surfaces of a wound are brought into contact, and grow together at once, without suppurating, union by the first intention is said to have taken place. When wounds

heal by suppurating, granulating, &c. they are sometimes surgically described as getting well by the second intention. See *Wounds*.

URETHRA, STRICTURES OF. Mr. Hunter informs us that most obstructions to the passage of the urine, if not all, are attended with nearly the same symptoms. Few persons take notice of the first symptoms of a stricture, till they have either become violent, or other inconveniencies have been the consequence. A patient may have a considerable stricture, and yet be unconscious, that his urine does not freely come away; he may often have, in consequence of a stricture, a tendency to inflammation and suppuration in the perinæum, without feeling any obstruction to the passage of his urine, or suspecting that he has any other complaint.

There are three kinds of strictures; viz. the true permanent one, which arises from an alteration in the structure of a part of the urethra; the mixed case, consisting of a permanent stricture and a spasm; and, thirdly, the true spasmodic stricture.

In all these obstructions, Mr. Hunter remarks, that the stream of water becomes small in proportion to the stoppage; but, though this symptom is probably the first, it is not always observed by the patient. In some instances, the water is voided only in drops, and then it cannot escape notice. In other cases, the stream of urine is forked, or scattered. Under such circumstances, Mr. Hunter recommends the passage to be examined with a bougie; and, if one of a common size can be readily introduced, the difficulty of voiding the urine is likely to depend on a diseased enlargement of the prostate gland, which should, therefore be examined. See *Prostate Gland*.

The spasmodic stricture may be known by its being only of a temporary duration. This kind of case, and more particularly the permanent stricture, are generally attended with a gleet. The latter complaint is often for a long while suspected as being the only one, and the surgeon finds all his efforts, to effect a cure, fruitless.

In diseases of the urethra, and also of the prostate gland and bladder, there is commonly an uneasiness about the perinæum, anus, and lower part of the abdomen. (*Hunter*.)

The first progress of the contraction is, in general, very slow; but, when once it has so far increased, that the urethra is not wholly relaxed by the force of the urine, its subsequent advances are more rapid, and new symptoms are perceived.

The urine is voided more frequently does not pass without a considerable effort, attended with pain, and a straining sensation continues, after the bladder is emptied. If the patient accidentally catches cold, drinks a glass of spirituous liquor, acid beverage, or punch, commits an excess in drinking wine, or removes quickly from a warm to a cold climate, the urine will, perhaps, pass only in drops, or be entirely obstructed. These causes induce, in the contracted part, a spasmodic action, by which it is closed. Cold, externally applied to the body, has so great an effect upon a spasmodic stricture, than a patient, who can make water without the smallest difficulty in a warm room, is often quite unable to void a drop, on making the attempt in the open air. However, on returning to a warm room, and sitting down a little while, he becomes able again to expel the urine. The symptoms of a stricture are more frequent in persons, who lead a sedentary life, than in others who lead an active one. (*Home*.)

Strictures in the urethra, being attended with a discharge and pain in making water, especially after any excess, are frequently regarded and treated as a gonorrhœa. These two symptoms often come on a few hours after connexions with women; the degree of inflammation is very slight; the discharge is the first symptom, and is more violent at the commencement, than at any other period. The inflammation subsides in a few days, leaving only the discharge, which also frequently disappears in five or six days, whether any means are employed or not, for its removal. (*Home*.)

What renders a stricture particularly apt to be mistaken for a gonorrhœa, is the circumstance that, in both diseases, the pain in making water is experienced about an inch and a half from the orifice of the glans penis.

In a more advanced stage, the strictured part of the urethra is always much narrower, than the rest of the canal. However, it retains the power of becoming contracted and relaxed. In the contracted state, the passage is closed up; in the relaxed, the urine can pass through it in a small stream.

The spasmodic contraction must act with considerable force, since the urine cannot even pass in a small stream, and a small bougie, which, in a relaxed state of the urethra, met with no resistance, can now be scarcely introduced at all. Also, if the bougie be allowed to remain for a few minutes in the stricture, it is not unfrequently grasped so tightly by the spasmodic contraction, that, when

an attempt is made to withdraw it, some force is requisite to succeed. The bougie when examined, seems as if it had had an impression made round it by a piece of packthread. (*Home.*)

In old cases of stricture, the muscular coat of the bladder becomes thickened and stronger, than natural, in consequence of more force being necessary to propel the urine through the obstructed part. The bladder, in this thickened state, does not admit of the most dilation, so that the patient is obliged to make water very frequently, and he is unable to pass the whole night without making this evacuation once or twice. (*Home.*)

A nocturnal emission of the semen is another very common symptom of a stricture; and some patients seem to have no other complaint attendant on the affection of the urethra.

A periodical discharge is sometimes brought on by cold, or other occasional causes. The inflammation extends to the bladder; the frequency of making water is very much increased, and the urine very turbid. It is voided for twelve, or twenty-four hours, once or even twice every hour; and, when allowed to stand, it deposits a substance in the form of powder, consisting of coagulable lymph. This is the slightest kind of attack.

Sometimes the bladder is inflamed in a greater degree, and secretes pus, which is discharged with the urine. In a still more violent attack, the discharge is similar to the white of an egg, and particularly adhesive. Mr. Home states, that it has been discovered by examinations after death, to be the vitiated secretion of the prostate gland. When the inflammation of the bladder becomes still worse, the affection sometimes extends to the peritoneum, and the patient dies.

Since strictures of long standing always impede the passage of the urine, the bladder acts with augmented force to overcome the resistance. In this manner, the stricture is kept in a continual state of irritation, and made to contract in a greater degree.

In a few cases, indeed, the diseased part of the urethra is rendered quite impervious; and the patient's life is preserved by the urethra ulcerating, at some point within the obstruction, and fistulous openings taking place in the perinæum. See *Fistule in Perinæo*.

Strictures are frequently attended with constitutional symptoms, one of the most common of which, in warm climates, is a complete paroxysm of fever. The cold fit is very severe; this is followed by a

hot fit, and then a very profuse perspiration. During the rigor, nausea and vomiting generally occur, and at this period the patient has occasion to make water frequently, seldom experiencing at the same time any strangury. When the fit is tolerably complete, the patient suffers, in general, only one; in the opposite circumstance, two; but, a greater number rarely happen. Such febrile paroxysms are not frequent in cold countries; but do every now and then take place, particularly in consequence of exposure to cold, excesses, and the introduction both of common and armed bougies.

With regard to the formation of strictures, Mr. Home has noticed, that the membrane of the urethra, like every other muscular structure, is liable to a spasmodic contraction, in which state the canal loses the power of relaxing itself again; till the spasm is removed. This spasmodic stricture is only a wrong action of the urethra; and, if the parts could be examined in their relaxed state, there would be no appearance of disease.

A part of the urethra, once disposed to become preternaturally contracted, generally becomes more and more affected in this manner, and, at last, becomes permanently narrower. The case now becomes both a permanent stricture and a spasmodic one; being so far permanent, that it is always narrower, than the rest of the canal, and so far spasmodic, that it may become contracted in a still greater degree.

When the contraction is not considerable, it appears, on examination after death, to be merely a narrowing of the urethra; but a permanent stricture, in a more advanced state, usually consists of a ridge, which forms a projection in the passage. (*Home.*)

Mr. Hunter informs us that the disease generally occupies no great length of the passage; at least, that this was the case in most of the instances, which he had seen. In these the contraction was not broader, than if it had been produced by surrounding the urethra with a piece of packthread; and in many it had a good deal of the appearance, which one may fancy such a cause would produce. Mr. Hunter states, however, that he had seen the urethra contracted for above an inch in length, owing to its coats, or internal membrane, being irregularly thickened, and forming a winding canal.

A stricture does not always arise from an equal contraction of the urethra all round; for, in some instances, the contraction is only on one side. This con-

traction of one side of the canal only throws the passage to the opposite side, which often renders the introduction of a bougie difficult. The contracted part is whiter, than any part of the urethra, and is harder in its consistence. In some few cases, there are more strictures, than one. Mr. Hunter mentions his having seen half a dozen in one urethra, and he observes, that a stricture is frequently attended with small tightnesses in other parts of the urethra.

Mr. Hunter remarks, that every part of the urethra is not equally subject to strictures, the bulbous portion being much the most subject to the disease. A stricture is sometimes situated on this side of the bulb, but very seldom beyond it, that is, nearer the bladder. Mr. Hunter never saw a stricture in that part of the urethra, which passes through the prostate gland; and the bulb, besides being the most frequent seat of this disease, is also subject to it in its worst forms. (*Hunter.*)

Mr. Home has measured the length of the urethra in different subjects, and examined the diameters of the several parts of the passage. Strictures, according to this gentleman, occur most commonly just behind the bulb of the urethra, the distance from the external orifice being $6\frac{1}{2}$, or 7 inches. The situation, next in the order of frequency, is about $4\frac{1}{2}$ inches from the orifice of the glans. The disease does also occur at $3\frac{1}{2}$ inches, and, sometimes, almost close to the external orifice. The two parts of the urethra, most frequently affected with strictures, are naturally the narrowest. Sometimes the very orifice of the urethra is contracted, and the circumstance often leads to an erroneous supposition, that the whole canal is naturally formed of the same size. The prepuce also is observed to be particularly often affected with a natural phymosis, in persons, who have strictures in the urethra.

In almost all the cases, which Mr. Home has met with, there has been one stricture, about seven inches from the external orifice, whether there were any others, or not.

With respect to the causes of strictures, some writers have imputed the disorder to the effects of the venereal disease, and often to the method of cure. Mr. Hunter, however, entertained very strong doubts, whether strictures commonly, or even ever, proceeded from these causes; though he acknowledges, that since most men have had venereal complaints, a refutation of the above opinion is very difficult. Mr. Hunter was led to think, that strictures did not commonly arise

from venereal causes, from reflecting that strictures are common to most passages in the human body. They often take place in the œsophagus; the intestines, particularly, the rectum; the anus; the prepuce, so as to produce phymosis; and in the lachrymal duct, so as to occasion a fistula lachrymalis. Strictures sometimes take place, when there have been no previous venereal complaints. Mr. Hunter mentions his having seen an instance of this kind in a young man, nineteen years of age, who had had the complaint for eight years, and which therefore began, when he was only eleven years old. He was of a weak, scrophulous habit. Mr. Hunter had also seen a stricture in a boy only four years old, and a fistula in perinæo in consequence of it. Strictures happen as frequently in persons, who have had the gonorrhœa in a slight degree, as in others, who have had it in a severe form.

Many believe, that strictures arise from the use of injections in the treatment of the gonorrhœa; but, Mr. Hunter thought, that this opinion was founded on prejudice, and he states, that he had seen as many strictures after gonorrhœas, which had been cured without injections, as after those, which had been treated with these latter applications.

Mr. Hunter also disbelieved the idea, that strictures are a consequence of ulcers in the urethra; for, ulcers hardly ever occur in this passage, except when there are strictures. It is now generally admitted, that, in gonorrhœa, no sores exist in the urethra.

TREATMENT OF STRICTURES, WITH COMMON BOUGIES, ON THE PRINCIPLE OF DILATATION.

Mr. Hunter remarks, that the cure of strictures may be accomplished, either by a dilatation of the contracted part, or a destruction of it by ulceration, or escharotics. The dilatation is accomplished by means of bougies; but, Mr. Hunter considered, that a cure, thus effected, was seldom or never more, than temporary. The removal of the stricture by ulceration, may also be done with bougies; its destruction with caustic used formerly to be done through a cannula, contrived for the purpose; but, is now performed by means of what are termed *armed bougies*.

The cure by dilatation is principally mechanical, when effected by bougies, the powers of which are generally those of a wedge. However, Mr. Hunter remarks, that their ultimate effect is not always so simple as that of a wedge upon inanimate matter; for, pressure makes

living parts either adapt themselves to their new position, or else recede by ulceration. Bougies, of course, either dilate strictures, or make them ulcerate.

The disease has generally made considerable progress, before the patient seeks surgical assistance, and the stricture may be so advanced, that a small bougie cannot be made to pass, without a great deal of trouble. If the end of a small bougie, let it be ever so small, can be introduced through the stricture, the cure is then in our power. However, a small bougie frequently cannot be passed in the first instance, and even not after repeated trials.

Often, when the stricture is very considerable, a great deal of trouble is given by occasional spasms, which either resist the introduction of a bougie altogether, or only allow a very small one to pass. At other periods, however, a larger one may be introduced. In these circumstances, Mr. Hunter mentions, that he was sometimes able to get the point of a bougie to enter, by rubbing the outside of the perinæum with the finger of one hand, while he pushed the bougie on with the other. The same eminent practitioner also often succeeded by letting the bougie remain a little while close to the stricture, and then pushing it on. Sometimes, the spasms may also be taken off by dipping the glans penis in cold water.

Although, in cases of permanent strictures, the bougie may not pass at first, yet, after repeated trials, it will every now and then find its way. In this manner, future attempts become more certain and easy.

However, the success of the subsequent trials, to introduce a bougie does not always depend on the instrument having been once, or twice passed. Sometimes, it can be introduced to-day; but, not to-morrow; and, in this state, the case shall continue for weeks, notwithstanding every trial we can make. Mr. Hunter observes, however, that, in general, the introduction of the bougie becomes gradually less difficult, and, therefore, that we ought not to despair of success in any case.

When the passage is very small, it is not easy to know, whether the bougie has entered the stricture, or not: for bougies, so slender as those, which must be at first employed, bend so very easily, that the surgeon is apt to fancy, that they are passing along the urethra, while they are only bending. Mr. Hunter advises the surgeon to make himself, at first, acquainted with the situation of the stricture, by means of a common-sized bougie. Then he is to take a smaller one, and when its point arrives at the stricture, the

instrument is to be gently pushed forward; but, only for a short time. If the bougie has passed further into the penis, the surgeon may know how far it has entered the stricture by taking the pressure off the bougie. For, *if it recoil*, he may be sure, that *it has not passed*; at least, has not passed far; but, only bent. On the contrary, *if it remain fixed, and do not recoil, it has certainly entered the stricture*.

Mr. Hunter informs us, however, that the preceding remarks are not so applicable, when a very small bougie is employed, which may become bent, without our being aware of the circumstance.

A bougie may frequently be introduced a very little way, for instance, only one-tenth of an inch, and then it bends and cannot be pushed further. To determine whether this is the case, Mr. Hunter says, it is necessary to withdraw the bougie and examine its end. If the end be blunted, we may be sure that the bougie has not entered at all; but, if it be flattened, for an eighth, or tenth, of an inch, be grooved, or have its outer waxen coat pushed up to that extent; or, if there be a circular impression made upon the bougie, or only a dent on one side, made by the stricture; we may be sure, that the instrument has passed as far as these appearances extend. It then becomes necessary to introduce another of exactly the same size, and in the same manner, and to let it remain as long as the patient can bear it, or convenience will allow. By repetitions of this plan, the stricture will be overcome.

Mr. Hunter remarks, that the time, which each bougie ought to remain in the passage, must be determined by the feelings of the patient; for, if possible, no pain should ever be given. If the patient should experience very acute pain when the bougie is passing, it ought not to be left in the urethra above five, or, at most, ten minutes; or, not so long, if the pain be exceedingly severe. Each time of application should afterwards be lengthened so gradually as to be imperceptible to the feelings of the patient, and the irritability of the parts. Mr. Hunter affirms, that, he has known many patients, who could not bear a bougie to remain in the passage ten, or even five minutes, till after several days, and even weeks, but, who in time were able to wear the instrument for hours, and this, at last, without any difficulty. The best time for keeping a bougie in the urethra, is when the patient has least to do; or, in the morning, while he is in bed, if he can introduce the instrument himself.

Mr. Hunter next observes, that the bougie should be increased in size, ac-

cording to the facility, with which the stricture becomes dilated, and the ease, with which the patient bears the dilatation. If the parts are very firm, or very irritable, the increase of the size of the bougie should be very slow, so as to allow them to become gradually adapted to the augmented size of the instrument. But, if the sensibility of the parts will allow, the increase of the size of the bougie may be somewhat quicker, but, never more sudden, than the patient can easily bear. The surgeon must continue to increase the size of the bougie, till one of the largest size can freely pass; nor should the use of this be discontinued till after three weeks, or a month, in order that the dilated part may have time to become habituated to its new position, and lose its disposition to contract again. However, Mr. Hunter believed, that the permanency of a cure, effected on the principle of dilatation, could seldom be depended upon.

CURE OF STRICTURES BY ULCERATION.

This is also accomplished by means of a bougie, and the plan may be tried both when the instrument can, or cannot, be introduced through the stricture. In the first instance the method is less proper; because the stricture admits of being dilated.

In order to cure a stricture by making it ulcerate, the bougie is to be introduced as far through the contracted part as possible, and the size of the instrument is to be augmented, as fast as the sensations of the patient can well bear. In this manner, ulceration will be produced in the part, which is pressed, and, Mr. Hunter remarks, that the cure will be more lasting because more of the stricture is destroyed, than when the parts are simply dilated. This eminent surgeon notices, however, that few patients will submit to this practice, and that few, indeed, would be able to bear it, since it is apt to bring on violent spasms in the part, attended with a very troublesome retention of urine.

If the smallest bougie cannot be made to pass a stricture, by using some degree of force, dilatation becomes impracticable; and, as the stricture must be destroyed, something else must be tried.

In many cases, says Mr. Hunter, it may be proper to get rid of the stricture by making it ulcerate, or, in other words, be absorbed. Bougies, intended to excite ulceration, need not be so small, as in the foregoing cases, as they are not designed to be passed through the stricture;

and, in consequence of being of the common size, they may be more surely applied to the parts, causing the obstruction. The force, applied to a bougie, in this case, should not be great; for, a stricture is the hardest part of the urethra; and if a bougie is forcibly pushed on, its end may slip off the stricture, before ulceration has commenced, and make a false passage for itself in the corpus spongiosum urethræ.

In trying to cure strictures by ulceration, the utmost attention must be paid; and, if the patient does not make water better, notwithstanding the bougie passes further, the surgeon may be sure, that he is forcing a false passage.

When the stricture has so far yielded, as to allow a small bougie to be introduced, the treatment is then to be conducted on the principle of dilatation.

Mr. Hunter observes, that whenever a bougie of a tolerable size, passes with ease, and the parts and the patient have become accustomed to it, the surgeon need no longer attend for the purpose of introducing it. The patient may now be allowed to introduce bougies himself; and when he can do this with ease, the business may be trusted to him, as he can make use of the instruments at the most convenient times, so that they may be, more frequently, and longer, applied. In the mean while, the surgeon should only pay occasional visits. Mr. Hunter adds, that, this practice of the patient, under the surgeon's eye, by which means, the former learns the art of introducing bougies, is the more necessary, since strictures are diseases, which commonly recur; and, therefore, no man, who has ever had a stricture, and is cured of it, should rely on the cure as lasting; but, should always be prepared for a return, and always have some bougies by him. He should not go a journey, even of a week, without them; and the number should be according to the time, which he is absent, and the place, to which he is going; for, in many parts of the world, he cannot be supplied with them.

To prevent the inconvenience of a bougie slipping out, or the mischief of its gliding into the urethra, a soft cotton thread must be tied round the end of the bougie, which is out of the urethra, and then round the root of the glans. This last part of the thread should be very loose. The projecting portion of the bougie should also be bent down upon the penis, by which means, it is rendered less troublesome, and more secure. (*Hunter on the Venereal Disease.*) When a considerable part of the bougie remains out

of the urethra, surgeons usually clip a piece of it off.

CURE OF STRICTURES BY THE ARGENTUM NITRATUM.

Wiseman makes mention of the plan of curing strictures in the urethra by means of caustic. He observes, that, when the obstruction is a caruncle, and you cannot pass it, you may well conclude it is callous: "in which case, you may pass a cannula into the urethra to that caruncle, and, whilst you hold it there steady, you may convey a grain of caustic into the cannula, and press the caustic to it; and, whilst you hold it there, you will perceive its operation, by the pressing forward of the cannula."

About the year 1752, Mr. Hunter attended a chimney-sweeper, who had a stricture. Not finding, that any benefit was derived from the use of common bougies, for a space of six months, Mr. Hunter, unaware of the above passage in Wiseman, conceived, that the stricture might be destroyed by escharotics, and the first attempt, which he made, was with red precipitate. He put some salve on the end of a bougie, and then dipped it in red precipitate. The bougie, in this state, was passed down to the stricture; but, Mr. Hunter found, that it brought on considerable inflammation all along the inside of the passage, as he thought, in consequence of the precipitate being rubbed off, while the bougie was passing to the stricture. Mr. Hunter then introduced a silver cannula down to the stricture, and passed the bougie with precipitate, as before, through the tube. As the patient, however, did not make water any better, and the smallest bougie could not be introduced through the stricture, he suspected, that the precipitate had not sufficient power to destroy the obstruction. Mr. Hunter was, therefore, induced to fasten a small piece of the argentum nitratum on the end of a piece of wire with sealing-wax, and introduced the caustic through the cannula to the stricture. After having made the application three times, at intervals of two days, he found, that the man voided his urine much more freely, and, on applying the caustic a fourth time, the cannula went through the stricture. A bougie was introduced for a little while afterwards, till the man had completely recovered.

Having experienced such success in the foregoing example, Mr. Hunter was encouraged to apply his mind to the invention of some instrument, better suited to the purpose, than the above contrivance. He succeeded in devising an im-

proved instrument, although he acknowledges, that it was not perfectly adapted to strictures in every situation in the urethra. He remarks, that the caustic should be prevented from hurting the unaffected part of the urethra by introducing the active substance, through a cannula, down to the stricture; and it should be capable of protruding a little beyond the end of the cannula, by which means it will only act upon the stricture. The caustic should be fixed in a small portcrayon, and it is necessary to have a piece of silver of the length of the cannula, with a ring at one end, and a button at the other, of the same diameter as the cannula. The button forms a kind of plug, which should project beyond the end of the cannula in the urethra, so as to make a rounded end; or, Mr. Hunter says, the portcrayon may be formed with this button at its other end. The cannula, with the button, is to be passed into the urethra, and when it reaches the stricture, the silver plug should be withdrawn, and the portcrayon with the caustic introduced in its place; or, if the plug and portcrayon are on the same instrument, then it is only necessary to withdraw the plug, and introduce the portcrayon with the caustic. The plug, besides giving a smooth rounded end to the cannula, answers another good purpose, by preventing the tube from being filled with the mucus of the urethra, when the instrument is passing inward, which mucus would be collected in the end of the cannula, dissolve the caustic too soon, and hinder its application to the stricture.

When the stricture was beyond the straight part of the urethra, Mr. Hunter owned, that it was difficult to apply caustic to the disease through a cannula.

A better mode of applying lunar caustic to strictures, was afterwards devised by Hunter, and has since been extensively introduced into practice by Mr. Home. This gentleman directs us to take a bougie of a size, that can be readily passed down to the stricture, and to insert a small piece of lunar caustic into the end of it, letting the caustic be even with the surface, but surrounding every where laterally by the substance of the bougie. This should be done some little time before it is required to be used; for, the materials, of which the bougie is composed, become warm and soft by being handled in inserting the caustic; and, therefore, the hold, which the bougie has of the caustic, is rendered more secure after the wax has been allowed to cool and harden. The bougie thus prepared, is to be oiled and made ready for use; but, before passing it, a common bougie

of the same size is to be introduced down to the stricture, in order to clear the canal, and to measure the exact distance of the stricture from the orifice of the urethra. This distance being marked upon the armed bougie, it is to be passed down to the stricture, as soon as the other is withdrawn. The caustic, in its passage, is scarcely allowed to come into contact with any part of the membrane, because the point of the bougie, of which the argentum nitratum forms the central part, always moves in the middle line of the canal; and, indeed, the quickness, with which it is conveyed to the stricture, prevents an injury of the membrane lining the passage, when the caustic accidentally touches it.

In this mode the caustic is passed down with little, or no irritation to the lining of the urethra, it is applied in the most advantageous manner to the stricture, and can be retained in that situation sufficiently long to produce the desired effect.

The reasons urged in favour of the employment of bougies armed with the lunar caustics, are: that a permanent cure is effected, which common bougies cannot accomplish; that the pain, arising from the application of the argentum nitratum to the stricture, is very inconsiderable; and that neither pain, nor inflammation are found to ensue. The meaning of these remarks, however, is to be received as a general one, liable to exceptions. Indeed, Mr. Home himself has candidly acknowledged, that some inconveniences occasionally follow the use of armed bougies. But, what practice, however judicious and eligible, is altogether free from occasional ill-consequences? Mr. Home remarks, that against treating strictures of the urethra with caustic bougies, numerous objections have been adduced, and many bad consequences have been attributed to the practice, without any real foundation; "for, whatever, *a priori*, might be supposed the effects of so violent an application, to a membrane so sensible and irritable, as the urethra, and I will admit, that it is very natural to conceive they would be very severe, the result of experience, the only thing to be relied on, evinces the contrary. The pain that is brought on, is by no means violent; and neither irritation, nor inflammation, is found to take place.

"That cases do occur, in which strictures have produced so much mischief, and rendered so great an extent of the canal diseased, that the use of the caustic has proved unsuccessful, is certainly true; and several of these cases have fallen within my own knowledge. But, when

it is stated, that none, even of these, were made worse by its use; that no bad consequences attend it; and that no other mode, at present known, is equally efficacious; any occasional want of success, cannot be considered as an objection to this mode of practice.

"But if the apprehension of violent effects from the caustic, however ill-founded, cannot be removed, let the alternative be considered; namely, the only operation previously in use, where a stricture cannot be dilated by the bougie.

"In those cases, we are obliged to have recourse to means certainly more severe and violent, laying open with a knife the diseased urethra, and passing through the divided parts a flexible gum catheter into the bladder. This I have done myself, and have frequently seen it performed by Mr. Hunter, and it always succeeded; neither bringing on so much inflammation as was expected, nor being attended with any symptoms of irritation.

"This practice has by other surgeons been carried still further; the portion of diseased urethra has been dissected out, and entirely removed; nor has so severe an operation always brought on untoward symptoms; and patients have recovered.

"If the membrane of the urethra when diseased, is capable of suffering so much injury, without any consequent symptoms of irritation, it cannot be doubted that it will bear with impunity to be touched, in a very partial manner, several different times with lunar caustic."

Mr. Home afterwards informs us, that, "having met with a number of facts, from which a general principle appears to be established, that the irritable state of a stricture is kept up, and even increased, by the use of the bougie, but lessened and entirely destroyed by the application of lunar caustic; I am desirous to communicate my observations upon these facts, and to recommend the use of the caustic, in many cases of irritable stricture, in preference to the bougie.

"As the use of the caustic, upon this principle is, I believe, entirely new, and is contrary to every notion, that had been formed upon the subject, it will require something more, than general assertion, to gain even the attention of many of my readers, still more their belief; I shall therefore detail the circumstances, as they occurred, by which I conceive the propriety of this practice, to be established; and afterwards make some observations upon the principle on which it depends.

"My connexion in practice with Mr. Hunter, afforded me opportunities of attending to cases of stricture, in all their

different stages; many of them brought on during a long residence in India, attended with great irritability, and exceedingly difficult of cure.

"One case of this kind (which Mr. Home has related) admitted the passing of a small bougie; but, in the course of three years, very little was gained by a steady perseverance in the use of that instrument, either in dilating the canal, or palliating the symptoms of stricture; this made me look upon the bougie as less efficacious, than I had always been taught to believe it. I was willing, however, to consider this as an uncommon case, depending more on the peculiarities of the patient's constitution, than on the nature of the disease: but, I found, on a particular enquiry, that several other gentlemen, from India, were under circumstances nearly similar; the bougie only preventing the increase of the stricture, but being unable to dilate it beyond a certain size; and when it was left off, the stricture in less than two months returned to its former state of contraction.

"What plan ought to be followed in such cases, I was then unable to determine; but, that the bougie could not be depended on was evident. During this suspense, the following case came under my care.

"In August, 1794, a gentleman consulted me for some symptoms, which had been considered as indicating the presence of gonorrhœa; but, as they did not yield to the common treatment in the usual time, he was induced to take my advice respecting the nature of his complaint. In the necessary enquiry, to obtain a perfect history of the case among other things it was stated, that, nineteen years before, there was a stricture, which became very troublesome, and that Mr. Hunter, by the desire of the patient, had applied the caustic, by which the stricture was removed, and never afterwards returned. He said that he was one of the first persons on whom the caustic had been used. From this account, I was naturally led to believe that the stricture had gradually returned, and was now increased so much as to produce the present symptoms; a discharge being almost always a symptom of stricture, when it is much contracted; but, upon examining the canal, a bougie of full size, passed on to the bladder without the smallest impediment. I therefore took up the case as an inflammation in the urethra; and large doses of the balsam copaiva, given internally, effected a cure.

"The circumstance of a stricture having been removed nineteen years before, and not returning, made a strong impres-

sion on my mind; and made me desirous to ascertain, whether this practice could be employed in cases of stricture in general, and the cure produced by it, equally permanent. A short time afterwards, I had an opportunity of trying it in the following case.

"A captain in the East India Company's service, in September, 1794, applied to me for assistance. His complaints were, great irritation in the urethra and bladder, constant desire to make water, and an inability to void it, except in very small quantities. These symptoms had been at first supposed to arise from gonorrhœa, afterwards rendered more severe by catching cold; but, not yielding to the usual remedies for gonorrhœa, they were investigated more minutely, and a stricture was discovered in the urethra. The mode of treatment was now changed, and the bougie employed; but, its use aggravated all the symptoms, and brought on so great a degree of irritability in the bladder and urethra, that there was an alarm for the patient's life, which was the reason for applying for my assistance.

"Besides the local symptoms, this patient had those of quick pulse, white tongue, hot and dry skin, loss of appetite, a total want of sleep, with frequent attacks of spasm on the bladder and urethra. A very small flexible gum catheter was passed, and the water drawn off, in quantity about a pint, which gave him great relief; this was repeated morning and evening, to keep the bladder in as easy a state as possible; but, in other respects, he continued much the same.

"As the present symptoms were brought on by the use of the bougie, little good was to be expected from that instrument; and where the urethra had been so easily irritated, and was disposed to continue in that state, there was no prospect of the use of a bougie afterwards effecting a cure. These circumstances I explained to the patient; and mentioned, in proof of my opinion, the case, in which so little had been effected in three years.

"I then proposed to him a trial of the caustic, with a view to deaden the edge of the stricture, as the only probable means of effecting a cure. The degree of irritation was already great; I was, however, led to believe, that the application of the caustic was not likely to increase it; since, by destroying the irritable part, it might lessen, and even remove the spasmodic affection; but, if, contrary to my expectation, the irritation continued, we still should be able to draw off the water, as the slough formed by the caustic would prevent the edge of the

stricture from acting, and obstructing the instrument.

"The application of the caustic was, upon these grounds, determined on; and it was applied in the following manner.

"I passed a common bougie, nearly the size of the canal, down to the stricture, to ascertain its exact situation, and to make the canal of the urethra as open as possible. The distance was then marked upon a bougie armed with caustic of the same size, which was conveyed down as quickly as the nature of the operation would admit. It was retained upon the stricture, with a slight degree of pressure; at first, there was no pain from the caustic, but a soreness from pressure; in less than a minute, a change was felt in the sensation of the part, it was at first a heat, succeeded by the burning pain peculiar to caustic; as soon as this was distinctly felt, the bougie and caustic were withdrawn, having remained in the urethra about a minute altogether. The soreness, he said, was unaccompanied by irritation along the canal, and he thought the uneasiness in the bladder diminished by it. He described the pain as resembling very exactly the first symptoms of gonorrhœa. This sensation lasted half an hour after withdrawing the bougie.

"The caustic was applied about one o'clock in the forenoon, and he passed the day more free from irritation than he had been since the beginning of the attack, which had lasted six days. In the evening, the water was drawn off, with more ease than the night before. He passed a tolerable night, and the next day, continued free from irritation. On the third day, the caustic was again applied in the forenoon; the painful sensation was less than on the former application, lasted a shorter time, and in an hour after the armed bougie was withdrawn, he made water freely for the first time since the commencement of his indisposition. He said the irritation in the bladder, was removed, and he felt very well. His appetite returned, he slept very well, and continued to void his urine with ease.

"In this state nothing was done till the fifth day, leaving always a day between the applications of the caustic.

"On this day a common sized bougie went readily into the bladder; it was immediately withdrawn, and the cure was considered as complete; no bougie was afterwards passed, lest it might bring back an irritation upon the passage. I met this gentleman twelve months after, and he assured me, he

had continued perfectly well, and I have since learned, that, in three years, there has been no return.

"From the result of this case, I was encouraged to hope that the caustic might be applied to strictures in the urethra with more confidence, than I had hitherto believed, since it evidently did not bring on, or increase the general irritation, but, on the contrary seemed to allay it."

The foregoing case, together with another one, which Mr. Home has related in his book on the present subject, convinced this gentleman, that he had discovered an effectual mode of treating such strictures, as do not admit of being relieved by the common bougie. Hence, he adopted the use of armed bougies, as a general practice: but, he has not concealed the circumstances, under which the method has not proved successful. Mr. Home informs us, that "In some constitutions, where the patients have resided long in warm climates, every time the caustic is applied to a stricture, a regular paroxysm of fever, called by the patient an ague, takes place; and this has been so violent as to render it impossible to pursue this mode of practice. Of this I have met with two instances. I consider this disposition to fever, as the effect of climate, and not of any natural peculiarity of constitution; for the brother of one of these patients laboured under the same disease, but as he had not been in warm climates, it was removed by the caustic without his experiencing such attacks.

In *gouty* constitutions, attacks of the gout have in two instances brought on spasmodic constrictions, after the stricture had been removed by caustic. This, however, cannot be called a failure of the caustic. It only shews, that gout can affect strictures, and re-produce them.

"In some patients, the strictures are so obdurate that the use of the caustic is necessary to be continued for a longer time, than the parts can bear its application, or even that of the bougie passing along the urethra; irritation therefore comes on and stops the progress of the cure, and when the same means are resorted to again, the same thing takes place. The cases of failure of this kind that I have met with, some of which may yet ultimately be cured, if the patients will take the necessary steps for that purpose, amount in all to six.

"In some patients, the stricture is readily removed by the caustic, but, in a few weeks, contracts again. The stricture being wholly spasmodic, the caustic, by

taking off the spasm, is allowed to pass through, and cannot completely destroy the stricture. Of this kind, I have met with one instance, which I must consider as a failure, as I have hitherto been unable to get the better of it.

"In those cases, where the caustic gradually removes the stricture, and brings the urethra to a size, that allows the patient to make water perfectly well, if there is any return, it is not to be attributed to the failure of the caustic, but to the want of proper management, either from the caustic being too small, or its use left off too soon; but, all such cases are, I believe, within the power of being cured by the caustic, if its use is recurred to when that is found necessary."

For the generality of strictures in the urethra, which certainly do not occupy more extent of the canal, than if caused by a piece of packthread being tied round it, the bougies, armed with the lunar caustic, should be preferred. But, there are instances, in which the urethra is diminished in diameter, for an inch or more: in these cases, I cannot help considering the employment of common bougies most advantageous, that is to say, when they can be introduced through the stricture, so as to cure it on the principle of dilatation.

We shall conclude this part of the subject of strictures, with inserting some of the general directions given by Mr. Home how to arm the bougie, and apply the lunar caustic to strictures.

In arming a bougie, it will be difficult to get a piece of caustic of a proper shape and size for the purpose, unless it be cast in a small cylindrical mould. "In this state (says Mr. Home) it is to be procured from Mr. Savigny, instrument-maker, in King-street, Covent-Garden; and, if these pieces are thicker, than the bougie can readily enclose, by putting them in water, the outside quickly dissolves, so as to diminish their size, as much as is required. The piece of caustic, so prepared, is to be cut into small portions, about a quarter of an inch in length, and an orifice being made in the end of a bougie, the caustic is to be inserted into it, and the bougie rolled, so as to be made perfectly smooth, taking care, that the sides of the caustic are every where covered, and only the end exposed.

"This (continues Mr. Home) was the mode, in which I armed bougies, when I first took up this practice; but, it happened, that, in two or three instances, the caustic was left in the urethra; that canal, when in a very irritable state, grasped the bougie, and pulled the caustic out; I was therefore led to consider how such an

accident might be prevented, and applied to the makers of bougies for that purpose. Mr. Pass, the late headle of the Surgeons' Company, who dealt in bougies, discovered a very ingenious and effectual mode of securing the caustic. In forming the bougie, a piece of wire, the size of the caustic, is rolled up along with it, passing into the substance for half an inch; when the bougie is nearly finished, the wire is withdrawn, and the caustic inserted in its place; after this, the bougie is rolled again, so that the sides of the caustic become firmly cemented to the linen, by means of the composition of the bougie, and when cold, cannot be separated by any force. In this way bougies are now generally armed.

"After the bougie has been thus prepared, the distance of the stricture from the external orifice is to be measured, and the canal cleared by passing a common bougie, fully as large as that which is armed. The armed bougie, with the distance marked upon it, is then to be introduced, and applied to the stricture; when it is brought in contact with the obstruction, it is to be steadily retained there, with a moderate degree of pressure at first, and less as it is longer continued, since the bougie becomes soft by remaining in the urethra, and readily bends, if the pressure is too great. The time it is to remain depends a good deal upon the sensations of the patient, and the length of time the parts have been diseased; but on the first trial, it should be less than a minute, as it then commonly gives greater pain than on any subsequent application. The pain produced by the caustic is not felt so immediately as it would be natural to expect; the first sensation arises from the pressure of the bougie on the stricture; a little after, there is the feeling of heat in the parts; and lastly, that of pain.

"As soon as the caustic begins to act, the surgeon, who makes the application, is made sensible of it by the smaller arteries of the parts beating with unusual violence, which is very distinctly felt by the finger and thumb, that grasp the penis.

"The pain that is brought on by the caustic, lasts for some time after it is withdrawn; but this period differs in almost every patient, being sometimes extended to half an hour, and sometimes only a few minutes.

"The kind of pain is heat and soreness, which is not severe, not being accompanied by the peculiar irritation, upon so many occasions experienced by patients who have strictures; an irritation that cannot be described, which is most insup-

portable, and is too often brought on by dilating strictures with the bougie. After the caustic has been withdrawn, it is desirable, that the patient should make water before he uses exercise, as the parts are commonly more tranquil after having done so; but sometimes no water will flow at the first effort. When that is the case, it should not be urged, as it is not of any material consequence. It happens not unfrequently, that at the first time of making water, some blood passes along with it. This is rather favourable; as, when the parts bleed, the stricture usually proves to be so far destroyed, that at the next trial the bougie passes through it. Every other day, appears in general to be as often as it is prudent to apply the caustic. I have, however, done it every day, in very obstinate cases, where the parts are less sensible, without any detriment.

"The bougie, which is passed down to prepare the way for the caustic, and measure the distance for the armed bougie, must be made of soft materials, that it may readily receive an impression from the part against which it is pressed, and its colour should be light, so as to admit of those impressions being more distinctly seen. With the assistance of such bougies, I am able to discover the size and shape of the orifice of the stricture; to ascertain with accuracy the progress of the caustic upon it; to see whether it is on one side of the canal, or equally all round; and to apply the caustic accordingly.

"When the soft bougie passes through the stricture, by leaving it in the canal a few minutes, it can be known whether the stricture is completely destroyed or only relaxed; in the last case, there is an impression on the side of the bougie.

"So necessary is the information, which is acquired in this way, to enable the surgeon to prosecute the cure of stricture by means of the caustic, that without it I should have been unable to pursue this mode of practice. I should have wanted a sufficient degree of confidence to carry me on, which nothing but an accurate knowledge of what had been already done, could have given, and, in no other way, is that to be acquired." (*Home on Strictures.*)

CURE OF STRICTURES BY THE KALI PURUM.

Mr. Whately, in his publication on strictures, has endeavoured to shew, that they are not merely contracted fibres of the urethra, but really diseased portions

of the membrane lining that canal, with a continued disposition to increased contraction. Hence, this gentleman seems to conceive, that the application of a remedy, calculated both to remove the diseased affection, and to dilate the contracted part, might perfectly cure the complaint, without putting the patient to the inconvenience of wearing a bougie. Mr. Whately affirms, that such a remedy is caustic, when judiciously used. Hitherto the lunar caustic has been chiefly employed; but, this gentleman states, that it has been his good fortune to discover a more efficacious, and at the same time, a less painful and hazardous remedy for the disease in question. The kali purum is the application alluded to, which Mr. Whately says, if used in the manner, and with the precautions about to be described, will be found to possess singular efficacy in curing the complaint. He avows, that he has already had so much experience of it, and that he is so perfectly convinced of its superiority over the lunar caustic, as well as over the common bougie, that he now uses it in a considerable number of the cases, which come under his care. Of its safety he is also as well convinced, as of its efficacy; for, if used with circumspection, experience shews, that there is little danger of its producing any disagreeable effect.

However, if the kali purum be applied while the parts are in a highly inflamed, or irritable state, or (Mr. Whately adds) tending to gangrene; if the habit be bad, and the patient very far advanced in years; we may expect the most mischievous effects from the application; and this practitioner censures the use of any kind of caustic under such circumstances, for strictures in the urethra, as dangerous in the extreme.

Mr. Whately represents, that if the patient be affected with fever, or any other acute disease; if he be much indisposed from any cause; if, in particular, he have a gonorrhœa, attended with much inflammation and irritation in the urethra; if the prepuce, glans, or any other part of the penis, or the parts adjoining to it, be swelled and inflamed; if the urethra, and especially, the strictured part of it, be so irritable, as not to bear the touch of a bougie; the use of the caustic is for the present forbidden. Mr. Whately also enjoins great caution in applying this remedy to persons advanced in years. Even when no objections of the above kind exist, the caustic should not be resorted to in the first instance. Mr. Whately maintains, that in every case of stricture, before venturing to employ the caustic, we ought to be able to pass into the bladder

a bougie, of at least a size larger, than one of the finest sort. This is necessary, both to enable us to apply the caustic to the whole surface of the stricture, and to relieve a retention of urine, should it occur during the use of the caustic.

When a bougie of the preceding description can be introduced, without occasioning pain, faintness, or great dejection of spirits, the use of caustic may commence immediately, when none of the above described objections exist.

When the urethra is very irritable, Mr. Whately recommends a common bougie to be introduced every day, and kept in the urethra; at first, for a few minutes only; but, by degrees, for a longer time; till the irritability of the parts has been sufficiently lessened.

When the urethra is rendered so impervious by a stricture, that a small bougie cannot be passed into the bladder, which viscus is also in a painful inflamed state, Mr. Whately asserts, that caustic, in any form, or quantity, must not be immediately employed; but, that the stricture should be first rendered capable of allowing a bougie a little larger, than one of the finest size, to be introduced into the bladder. When this is done, the urine is more freely evacuated, and the consequent irritation and inflammation of the bladder lessened, if not removed, together with the danger of a retention of urine. Caustic may then be advantageously conveyed into the centre of the stricture.

Mr. Whately considers the practice of at once thrusting down, in this sort of case, an armed bougie, considerably larger than the narrowest part of the contracted canal, as most dangerous, and horridly painful. For, says this gentleman, it frequently happens, that nearly the whole of the urethra anterior to the bulb, is so much contracted by numerous and uncommonly rigid strictures, that, it is impossible, by any art whatever, to dilate the passage to its natural size. If, therefore, the canal, whilst, in such a state, be rudely torn open by a large caustic bougie, hemorrhage, pain, dangerous suppressions of urine, inflammation, mortification, and death itself, must sometimes inevitably ensue,—even before the caustic can be applied to the principal seat of the disease. In cases, like the one just mentioned, the first step, preparatory to the use of the caustic, should be, according to Mr. Whately, to dilate the strictured part of the urethra; for which purpose, he advises the slow and gentle introduction of a fine bougie, with its point inclined to the lower side of the canal, in order to avoid the large lacunæ, situated

on its upper part. When the surgeon, by steady perseverance and dexterity, has succeeded in getting a fine bougie through the worst stricture into the bladder, the instrument should be worn, for a few hours, every day, till the passage is sufficiently dilated to admit a larger one.

Mr. Whately, after explaining, that the kali purum ought not to be applied to strictures of the urethra, till a bougie of a proper size can be passed into the bladder; after having pointed out the methods to be taken, before applying this caustic; and enumerated certain cases and circumstances, in which its employment is interdicted; next proceeds to describe the mode of practice, which it is the particular object of his book to recommend.

For the purpose of arming a bougie, Mr. Whately advises us to put a small quantity of kali purum upon a piece of strong paper, and to break the bit of caustic with a hammer into small pieces of about the size of large and small pins' heads. In doing this, care should be taken not to reduce it to powder. Thus broken, it should be kept for use in a phial, closed with a ground stopper. The bougie should have a proper degree of curvature given to it, by drawing it several times between the finger and thumb of the left hand.

Mr. Whately next acquaints us, that before the caustic is inserted into the bougie, it is necessary to ascertain the exact distance of the stricture, (to which the caustic is to be applied) from the extremity of the penis. For this purpose, the bougie, which should be just large enough to enter the stricture with some degree of tightness, ought to be gently introduced into the urethra; and when its point stops at the stricture, which it almost always does, before it will enter it, a notch is to be made with the finger-nail, on the upper or curved portion of the bougie, on the outside of the urethra, exactly half an inch from the extremity of the penis. When the bougie is withdrawn, a small hole, about the sixteenth part of an inch deep, should be made at the extremity of its rounded end. A large blanket-pin two inches and a half in length, with the head struck off, will answer the purpose; the hole being made with the point of the pin. The extremity of the bougie should then be made perfectly smooth with the finger and thumb, taking care, that, in doing this, the hole in its centre be not closed. Some of the broken caustic should then be put on a piece of writing paper, and a piece less in size, than the smallest pins' head, should be selected; the particle, indeed, says

Mr. Whately, cannot be too small for the first application. Let this be inserted into the hole of the bougie with a pocket-knife, spatula, or some such instrument; and pushed down into it with the blunt end of the pin, so as to make the caustic sink a very little below the margin of the hole. To prevent the kali from coming out, the hole should then be contracted a little with the finger, and the remaining vacancy in it is to be filled with hog's lard. This last substance, (continues Mr. Whately) will prevent the caustic from acting on the sound part of the urethra, as the bougie passes to the stricture. When the bougie is quite prepared, let it be first oiled, and immediately afterwards introduced, by a very gentle motion, with the curvature upwards, as far as the anterior part of the stricture, upon which the caustic is to be applied. In doing this, the end of the bougie, that is held by the finger and thumb, should be a good deal inclined towards the abdomen, on the first introduction of the instrument, in order to preserve its curvature. After it has passed about five inches, this end should be gradually brought downwards, as the bougie passes on, till it forms a right angle with the body. The bougie is known to have arrived at the stricture by the resistance made to its progress.

As soon as the bougie has reached the anterior part of the stricture, it should rest there for a few seconds, that the caustic may begin to dissolve. It should then be pushed very gently forward, about one-eighth of an inch; after which, there should be another pause, for a second, or two. The bougie should then be carried forward in the same gentle manner, till it has got through the stricture. The sense of feeling will generally inform the operator when the point of the bougie has proceeded so far; but, the notch in the bougie is to be an additional guide, by becoming very near the orifice of the urethra, when the end of the instrument has just got through the stricture.

The bougie should now be immediately withdrawn by a very gentle motion to the part, at which it was first made to rest awhile. Then it should be very slowly passed through the stricture a second time; but, without letting the bougie stop in its passage. If the patient complain of pain, or be faint, the bougie should be immediately withdrawn; but, if these effects are not produced, we may repeat the operation of passing and withdrawing the bougie through the stricture once or twice more, before we finish the operation, which will take up, in the whole, about two minutes.

The first application of the kali purum,

in this manner, gives, according to Mr. Whately's account, a very little pain. A slight scalding in making water, and a trifling discharge, during the first day or two, however, are commonly produced.

At the end of seven days, the application of the caustic is to be repeated in the same manner. When the first application has enlarged the aperture of the stricture, which may be known by passing a bougie through it, of the same size as that by which the caustic was conveyed, the bougie used in the second operation, should be a size larger, than the one, used in the first; but it must not be too large to pass through the stricture. If the patient had no pain on the first application, the bit of kali purum may also be trivially larger. At the end of seven days more, the armed bougie should be introduced a third time. At this, and all future applications, the bougie should be increased in size, in proportion as the aperture in the stricture becomes dilated. The quantity of caustic, however, is never to be increased in a ratio to the size of the bougie. In no cases whatever does Mr. Whately apply more of the kali purum at a time, than a piece about the size of a common pin's head. Twelve bits of the largest size, which this gentleman ever uses, weigh one grain.

When there are several strictures, the kali purum should be generally applied to only one at a time.

An interval of seven days is what Mr. Whately generally allows to elapse between the applications of the caustic. The rule, however, may now and then be deviated from; but, the kali purum ought never to be re-applied, till the action of the last application has completely ceased. In a few instances, the interval may only be five days; in some others, it may be eight, nine, or even a longer space.

In the above method of using the kali purum, Mr. Whately represents, that this substance is equally diffused over every part of the strictured surface, and only *abrades* the membrane of the stricture, without producing a slough. The *degree* of this abrasion, he says, may be increased, or lessened, as circumstances dictate, by paying attention to the quantity of the caustic.

The foregoing account will suffice for conveying an adequate idea of Mr. Whately's method. I am sorry I cannot add my favourable opinion of the practice. To *abrade*, without destroying, is to me perfectly unintelligible. Nor can I conceive, that a liquid caustic (for so it is represented as becoming) can be applied with the accuracy to strictures, which Mr. Whately seems to suppose happens. The

generality of strictures are also like such mere contractions, which one may suppose would be produced by tying a piece of packthread round the urethra. For these, the lunar caustic bougies seem best; and, when the stricture occupies some extent of the passage, common bougies are the most eligible.

The works, which contain the chief information on the subject, which we have just been treating of, are: *A Treatise on the Venereal Disease, by John Hunter. Practical Observations on the Treatment of Strictures in the Urethra and Oesophagus, by Everard Home, in 2 vols. An improved Method of treating Strictures in the Urethra, by Thomas Whately, Edit. 2, 1806.*

URETHRA, FALSE PASSAGE IN. One of the worst consequences of using catheters, and bougies, in an improper manner, is the rupture of the urethra, or the formation of a false passage by ulceration. With bougies, this accident is generally occasioned by trials to excite ulceration by the application of the end of the bougie to the stricture, when this instrument cannot be passed through it. When once the new passage has formed, whenever the bougie is introduced, it cannot be hindered from going into the false track, and its action on the stricture is altogether frustrated.

Mr. Hunter has advised the following operation to be practised in this kind of case. Pass a staff, or any such instrument into the urethra, as far as it will go, which will probably be to the bottom of the new passage, and this, we may be certain, is beyond the stricture. Feel for the end of the instrument externally, and cut upon it, making the wound about an inch long, if the disease be before the scrotum; and an inch and a half, or more, if in the perineum. If the new passage be between the urethra and body of the penis, you will most probably get into the sound urethra, before you come to the instrument, or new passage. If so, introduce a probe into the urethra, through the wound, and pass it towards the glans penis, or, in other words, towards the stricture. When it meets with an obstruction, this must be the stricture, which is now to be got through, and afterwards dilated. To complete the operation, withdraw the probe, and, instead of it, introduce a hollow cannula forwards to the stricture. Then introduce another cannula from the glans downward, till the two tubes are opposite each other, having the stricture between them. An assistant is now to take hold of the urethra on the outside, with his finger and thumb, just where the two cannulae meet, in order to keep them in their places. Through the

upper cannula next introduce a piercing instrument, which is to perforate the stricture, and enter the lower cannula. The piercing instrument is now to be withdrawn, and a bougie introduced through the first cannula and stricture, into the second cannula. The tubes are to be withdrawn, and the end of the bougie, in the wound, directed into the bladder, through the further portion of the urethra. It may also be necessary to lay the whole of the false passage open, in order to make it heal; for otherwise, it might still obstruct the future passage of bougies into the proper canal.

When the new passage is between the skin and urethra, the surgeon must extend his incision more deeply, for the purpose of finding out the natural passage. Then he is to proceed as above explained.

The longer the first bougie is allowed to remain in the canal, the more readily will the second pass. The bougies must be gradually increased in size, and used till the wound is healed. The only improvement, which seems proper to be made in this plan, is to employ hollow bougies, or flexible gum catheter, which might be worn longer than common bougies, as the patient could void his urine through them. (See *Hunter on the Venereal Disease.*)

URINARY ABSCESESSES. Extravasations of urine may be in three different states. This may be collected in a particular pouch; it may be widely diffused in the cellular membrane; or, lastly, it may present itself in a purulent form, after having excited inflammation and suppuration in the parts, where it is situated. This case is termed by the French writers an urinary abscess.

Such extravasations of urine always imply a rupture in some of the excretory passages for this fluid, either in the kidneys, or ureters, the bladder, or the urethra. This solution of continuity may be produced by a variety of causes. It is most frequently the effect of a forcible distention of these passages, in consequence of a retention of urine. Phlegmonous abscesses, formed in the thickness of the parietes of these passages, or along their course, may also occasion this rupture, by bursting internally. The solution of continuity may also be produced by a sword, or another foreign body that has penetrated the parts. There are likewise examples of effusions of urine depending upon the displacement of the cannula of the trocar, after the operation of puncturing the bladder. Several have been noticed, (and, indeed, they are very frequent) caused by false passages in the

urethra; and we have cases of similar effusions, following violent contusions of the perineum, attended with laceration of the urethra.

It is further observed, in *Les Œuvres Chirurgicales de Desault par Bichat*, Tom. 3, that the ravages, which the urine makes, when out of its natural receptacles, are usually greater, and more extensive, when this fluid is extravasated in the cellular membrane, than when it is effused into a particular pouch. The mischief is also less, when the excretory passage is free, than when it is closed by any obstacle, as in cases of retention. The more or less loose texture of the parts, in which such effusions happen, likewise makes a considerable difference in their progress and formation. With regard to the place, which they occupy, it is ordinarily determined by the situation of the rupture, by which the urine has escaped. When the pelvis, or infundibulum of the kidney, or the upper part of the ureter, gives way, the urine is commonly effused in the loins and the fossæ iliacæ, between the peritoneum and the adjacent parts. When the lower part of the ureter, or the bladder, near its lower portion, gives way, the extravasation is generally included within the pelvis.

But, when the rupture occurs in the anterior parietes of the bladder, near its upper part, and, especially, when it takes place at a time, when this organ is extremely distended and dilated, the urine becomes effused behind and above the pubes, sometimes ascends to the epigastric region, between the peritoneum and the abdominal muscles, and, after having followed the course of the spermatic vessels, it often makes its exit at the ring, and is extravasated in the groins and scrotum. If the rupture has happened in the urethra, the most common situation of the effusion is in the perineum and scrotum. The extravasation frequently extends to the penis and upper part of the thighs, and even sometimes propagates itself, under the skin of the abdomen, up to the hypochondria and sides of the chest. Such is the ordinary course of the urine, when extravasated out of the parts, which are destined to contain it; but, the slightest circumstance may alter this course, and produce sinuses in several other parts of the body.

In the animal economy, there is no fluid, the extravasation of which is so fatal, as that of the urine. If it is not promptly discharged, it soon excites a putrid supuration in the cellular membrane, which contains it, makes this part slough, causes a gangrenous inflammation of the skin, and almost always produces a mortifica-

tion of the parts, amongst which it flows.

While the extravasation of urine is confined to the interior of the pelvis, and lumbar and iliac regions, without manifesting itself externally, there is no certain sign of its existence. The circumstances, which may be recollected, however, joined with the symptoms, which the patient complains of, may lead to a suspicion of the extravasation. Thus, when in consequence of a retention of urine in the ureters, or bladder, the patient has suddenly experienced great relief, without any of the urine having been discharged the natural way; when he has at the same instant felt a kind of pricking in the loins, or pelvis; when to the ease, which lasted only a few hours, symptoms, more severe than the former ones, have succeeded, such as ardent fever, hiccough, vomiting, &c. there is reason for believing, that an internal extravasation has happened. The uncertainty in the diagnosis is here not much to be lamented, since art can do nothing for this kind of disorder, and, if there were the clearest proofs of its existence, we should be equally compelled to abandon the patient to the resources of nature, whose efforts are almost always ineffectual.

This uncertainty in the diagnosis disappears as soon as the extravasation becomes apparent externally. The case is then announced by symptoms, which hardly ever deceive. The preceding retention of urine; the sudden appearance of the swelling caused by this fluid; the rapid progress of this tumour; the kind of crepitation perceptible in it, like that which occurs in emphysema; the tension of the œdematous shining skin, as in leucophlegmasia; the diminution of the symptoms depending upon the retention; such are the first occurrences, which are observable, when the extravasation is somewhat considerable.

If the patient is not speedily assisted, and the urine continues to be extravasated, the tumour spreads more and more; the skin assumes a red violet colour; gangrenous eschars are formed, the separation of which gives issue to a very fetid sanies, in which the smell of urine is readily distinguishable. Portions of dead cellular membrane are presently discharged together with the sanies; the ulcer grows larger; and the dressings are continually wet with the urine.

The indications to be fulfilled are not the same in all cases of extravasations of the urine; they vary according to the situation of the breach of continuity in the urinary passages, and the particular situation and extent of the effusion. When the rupture has happened in the ureters,

and an urinary abscess is formed in the loins, the aid to be derived from surgery is limited to making an opening in the extravasation, as soon as it can be felt externally. It is then not in the power of art to re-establish the natural course of the urine, or to hinder this fluid from passing through the wound, so as to render it fistulous. However, there are some circumstances, in which a radical cure may be effectually attempted. For example, if the abscess were produced by a calculus lodged in the infundibulum, or ureter, and it could be felt, and taken hold of with a pair of forceps, introduced into the opening, the extraction of the foreign body might promote the healing of the ulcer, by rendering the natural channel for the urine free.

When the opening, by which the urine has become extravasated, exists in the bladder, or urethra, one indication, that does not present itself in the foregoing case, may be fulfilled, viz. the urine may be drawn off by means of a catheter passed into the bladder, and kept there. By this means we not only immediately stop the progress of the extravasation, but attack the very cause of the malady, by removing the obstacles, which oppose the natural course of the urine. The introduction of the catheter then is here a matter of the most urgent necessity. This operation is often attended with the greatest difficulties. Besides the ordinary obstruction of the canal, we have also to surmount the obstacles, which the urinary swellings situated in the course of the urethra, create to the passage of the instrument. When these tumours are considerable, they ought to be opened before the catheter is employed. The subsidence of the swellings would render catheterism more easy. Besides, Bichat and Desault were assured by daily experience, that with a little skill, exercise, and patience, the catheter may always be got into the bladder. If, however, the thing could not be done, ought we to puncture the bladder, or have recourse to the operation termed by the French *boutonnière*?

Desault was an advocate for neither of these proceedings: he thought it was a more simple and beneficial practice merely to make an external opening in the collection of effused urine. This measure would both afford an outlet for the urine, and arrest the extension of the extravasation. Besides such an opening is often indispensably requisite for the purpose of putting a stop to the symptoms depending upon the effusion and stagnation of the urine. But, if the catheter can be introduced, there may be cases, in which an opening would not only be useless, but

hurtful: for instance, when the swelling, caused by the urine, is of little extent, or when it is situated in the thickness of the parietes of the passage, or along its track, it almost always admits of dispersion by the simple employment of the catheter. It seldom happens, however, that this swelling, however small, ends in resolution; it almost always suppurates; but, as it breaks into the urethra, the matter escapes between this canal and the catheter, and renders the making of an external opening needless. Experience teaches us, also, that when the tumour is situated in the scrotum, or between the root of the penis and the symphysis pubis, even after the healing of incisions, made in these situations, a fistula will often remain, which is very difficult of cure. With the exception of these particular cases, Desault was an advocate for opening all urinary abscesses.

The manner of opening such collections varies according as the urine may be in one cavity, or widely effused in the cellular membrane. In the first case, a simple incision, the whole length of the cavity, will suffice for emptying and healing it. In the second, if the extravasation is extensive, the incisions must be multiplied. It would be absurd to spare the parts; for, all those, with which the urine has come into contact, seldom escape mortification. The incisions, which are made, hardly ever have the effect of saving them; but, by accelerating the discharge of putrid sanies and stagnant urine, they prevent the mischief, which would originate from their further lodgment. If these incisions, however, were practised a few hours after the extravasation, and before suppuration, the parts might be completely freed from urine and preserved. When the operation is at all delayed, their destruction is inevitable. The approach of mortification is indicated by the crepitation under the bistoury, resembling the kind of noise produced by tearing parchment. The extent and depth of the incisions must be proportioned to those of the abscess. When the extravasation occupies the scrotum, long deep scarifications should be made in that part, as well as in the skin of the penis, and in every place, where the urine is effused.

Practitioners, unaccustomed to see such diseases, would be alarmed at the extent of the sore produced by the separation of the eschars. Sometimes, the whole scrotum, skin of the penis, and that of the groins, perinæum, and upper part of the thigh, mortify, and the naked testicles hang by the spermatic cords, in the midst of this enormous ulcer. It is hardly conceivable how cicatrization could take

place over the exposed testicles; but, the resources of nature are unlimited. She unites the testicles and the cords to the subjacent parts, and drawing the skin from the circumference to the centre of the ulcer, she covers these organs again, and furnishes them with a sort of new scrotum. This statement is founded upon numerous cases, in which nature always followed this course. The cicatrization of the ulcer is even more expeditious, than might be expected, considering its extent. In all this business, what does art do? If the introduction of the catheter is excepted, which, indeed, is absolutely necessary for the radical cure, her assistance is very limited, and almost nothing, in the generality of instances; for when the patients are not exhausted by the tediousness of the disorder, when they are of a good constitution, and in the prime of life, they get well as quickly and certainly, with the aid of a good diet and simple dressings, as when they take internal medicines, and use a multiplicity of compound topical applications. The practice of Desault at the Hôtel-Dieu consisted in applying emollient poultices, until the sloughs were detached. The ulcer was then sometimes dressed with pledgets charged with styrax; but frequently mere dry lint was used, and continued till the cure was completed. If any complication occurred in the course of the treatment, suitable remedies were prescribed for it. Thus when prostration of strength, and tendency to sloughing existed, bark, cordials, and antiseptics were ordered. But, in every case, the catheter is the essential means of cure; without it, the treatment is almost always imperfect, and the ulcer will not heal without leaving several urinary fistulæ. (See *Œuvres Chirurgicales de Desault par Bichat*, Tom. 3, p. 277—287.)

URINARY CALCULI. Dr. Wollaston has divided urinary calculi into four species. 1st. The uric acid concretion. 2d. The fusible calculus, or phosphate of ammonia and magnesia. 3d. The mulberry calculus, or that consisting of oxalate and phosphate of lime. 4th. The bone-earth calculus, or that composed of the phosphate of lime.

As the symptoms of a stone in the bladder are detailed in another part of this Dictionary, it will only be necessary in the present place to refer the reader, for information upon that subject, to the article, *Lithotomy*.

The stone being a most severe affliction, and the operation extremely hazardous and painful, a variety of experiments have been instituted, for the purpose of discovering a solvent for urinary calculi. Hi-

therto, however, all the remedies and plans, which have been tried, have been attended with very limited, and, by no means, equivocal success, notwithstanding many persons may have been deceived into a contrary opinion.

The dissolution of the stones in the bladder, has been attempted by lithontriptic medicines, as they have been termed, and by fluids injected into this viscus.

From the experiments of Fourcroy, it appears, that almost every ingredient in calculi is dissolved by the caustic alkali; and various experiments have shewn, that the whole calculus yields to its powers. Lime-water has also been found a solvent of urinary calculi out of the body. It is obvious, however, that what is taken by the mouth is subject to many changes in the alimentary canal, and also the lymphatic, and vascular systems, and that, in this way, it must be exceedingly difficult to get such substances, (even were they not liable to alterations) in sufficient quantity into the bladder. Indeed, there are very few well authenticated facts of the urine being so changed, as to become a menstruum for the stone. Excepting the case of Dr. Newcombe, recorded by Dr. Whytt, the instance of Mr. Home is almost the only one. Though lithontriptic remedies, however, may not in general actually dissolve the stone in the living bladder, yet it is an incontrovertible fact, that they frequently mitigate the paroxysms of pain; and, to lessen such torture as that of the stone in the bladder, is surely an object of little importance.

Lime was long ago known as a solvent of urinary calculi, and different methods were employed to administer it with safety. One of these plans fell into the hands of a Mrs. Stevens, and her success caused great anxiety for the discovery of the secret. At last, Parliament bought the mystery for 5000*l*. In many instances, stones which had been unquestionably felt, were no longer to be discovered; and, as some persons were examined by surgeons of the greatest skill and eminence, both before, and after, the exhibition of the medicines, it is no wonder, that the conclusion was drawn, that the stones had been really dissolved. From the cessation of such success, and from its now being known, that the stones are occasionally protruded, between the fasciculi of the muscular fibres of the bladder, so as to become lodged in a kind of cyst, on the outside of the muscular coat, and cause no longer any grievances, surgeons of the present day, however, are inclined to suspect, that this must have happened in Mrs. Stevens' cases. This was certainly what

happened to one of the persons, on whom the above medicine was tried, as Dr. W. Hunter informs us. It is evident, that a stone, so situated, would not only produce no particular irritation, but would also be quite indiscoverable by the sound; for, in fact, it is no longer in the cavity of the bladder.

Mrs. Stevens first gave calcined eggshells alone; but, finding costiveness produced, she added soap. In time, she rendered her process more complicated, adding snails burnt to blackness, a decoction of camomile flowers, parsley, sweet fennel, and the greater burdock.

As soap was with reason supposed to increase the virtues of the lime, it led to the use of the caustic alkali, taken in a mucilage of veal broth. Take of alkali prepared, ℥vii ; of quick-lime ℥iv ; of distilled water ℔ij . Mix them well together in a large bottle, and let them stand for 24 hours. Then pour off the ley, filter it through paper, and keep it in well stopped phials for use. Of this the dose is from 30 drops to ℥ij , which is to be repeated, two, or three times a day. Mix the quantity to be used in the day, with three pints of plain broth, made of the lean part of veal, all the fat, or oily parts being separated from the liquor, by skimming them off when cold. Let the patient drink, within an hour, a pint of this broth three times a day; early in the morning, at noon, and in the evening. Continue this plan, for three or four months, living, during this course, on such things as least counteract the effect of the medicine. The common fixed alkali, or carbonated alkali, and the acidulous soda water, have of late been used as lithontriptics. Honey has also been given, and Mr. Home, surgeon at the Savoy, has recorded its utility in his own, and his father's cases. Bitters have likewise been tried.

Dismissing all theories, limewater, soap, acidulous soda water, caustic alkali, and bitters, are useful in cases of stone. Of the soap, as much may be taken as the stomach will bear, or as much as will prove gently laxative; but, of the limewater, few can take more, than a pint daily.

The acidulous soda water may be taken in larger quantities, as it is more agreeable. The acidulous salt is now prepared, so as to produce this water extemporaneously. It must be swallowed, however, while the salt is dissolving; as the carbonic acid gas escapes with great rapidity.

Medicines, taken into the stomach, having failed to dissolve urinary calculi, solvent injections have been introduced

through a catheter directly into the bladder. Fourcroy and Vauquelin ascertained, that a ley of potassa, or soda, not too strong to be swallowed, softens and dissolves small calculi, composed of the uric acid and urate of ammonia, when they are left in the liquid a few days. They have proved, that a beverage, merely acidulated with nitric or muriatic acid, dissolves, with still greater quickness, calculi, formed of the phosphate of lime, and of the ammoniaco-magnesian phosphate. They have made out, that calculi, composed of the oxalate of lime, which are the most difficult of solution, may be softened, and almost quite dissolved in nitric acid, greatly diluted, provided they are kept in the mixture a sufficient time.

We are then acquainted with liquids, which will dissolve calculi of various compositions; but, much difficulty occurs in employing them effectually in practice. For, although we can easily inject them into the cavity of the bladder, this organ is so extremely tender and irritable, that we cannot bear the contact of any fluid, except that which it is destined by nature to contain, and the action of such liquids upon it, as would be requisite for dissolving a stone in its cavity, would produce sufferings which no man could endure, and the most dangerous and fatal effects on the bladder itself. Another objection to this practice, also arises from the surgeon never knowing what the exact composition of a calculus is, before this body is extracted, and his consequent inability to determine what solvent ought to be tried. Upon this, however, it is unnecessary to lay much stress, since if the previous more weighty objections were done away, the latter difficulty, might, perhaps, be obviated.

URINARY FISTULÆ. By an urinary fistula, strictly speaking, is implied a deep, narrow ulcer, which leads into some of the urinary passages; but, this name is likewise applied to sinuses, which, without having any communication with these passages, terminate near some point of their course. Thus, in Desault's works (*Tom. 3, p. 287*), three kinds of fistulæ, in respect to the urinary passages, are noticed. The first sort is called a *blind external fistula*, because it opens only externally; the second, *blind internal*, because it has only one opening into the urinary passages; the third, is termed *complete*, being attended both with an internal opening into the urinary organs, and one or more external apertures.

Amongst the blind external fistulæ, only such as terminate near the canal of the urethra, are particularly noticed in Desault's works. All fistulæ of

this kind are originally owing to an abscess, that has formed in the vicinity of the urethra; and in the article, *Urinary Abscesses*, it has been explained, that these suppurations frequently originate from disease of that canal. Whatever may be the cause of these fistulæ, however, it is not unusual to find, that, after the pus has made its way towards the scrotum or perineum, and discharged itself outwardly, the ulcer is converted into a sinus, which resists all the efforts of nature to heal it. According to Desault, this kind of fistula may be kept up by a thinning and denudation of the parietes of the urethra; a very common disposition, when the abscess is situated about the root of the penis, and towards that part of the canal, which is situated over the scrotum, in consequence of the weight of this latter organ tending incessantly to separate it from the urethra. The opening of the fistula being too small; its orifice higher than its bottom; and its track being narrow and tortuous; may likewise occasion sinuses, and render the sore difficult to cure, by opposing the free exit of the matter. It may also be complicated with hardness and callosities, caries of the bones of the pelvis, disease of the tendons of the muscles of the perineum, &c. It is known, that these different complications operate as so many obstacles to the cure of sinuses. It is easy to distinguish these kinds of fistulæ from such as terminate near the rectum. Besides the symptoms which may be remembered to have occurred, and which are sufficient to point out the difference; a hardness, resembling a cord, that appears to run towards the urethra, may be felt when the finger is passed along the fistulous track. A probe, introduced into the fistula, follows the direction of this cord, and is at last stopped by the parietes of the urethra. It may also be ascertained, that the sinus has no communication with the urethra, by the following considerations: 1. No urine has escaped from the fistula, nor any purulent matter from the urethra. 2. A probe, when introduced into the sinus, cannot be made to touch a catheter passed into the urethra. These symptoms, however, are not infallible; for, in complete fistulæ, it sometimes happens, when the internal opening is small, and there is no obstruction in the urethra, that the whole of the urine is discharged through this canal. Frequently, also, the probe is stopped in the tortuosities of the fistulous track, and, when pushed against the parietes of the urethra, it does not always penetrate the internal opening, especially when this is small, and it is situated in some point of the de-

nuded portion of the canal, that does not correspond to the direction of the fistula. The issue of a larger quantity of pus, on slight pressure being made along the canal leaves no doubt of the existence of sinuses. With respect to other complications, such as callosities, caries of the bones, &c. they may be readily ascertained by their proper symptoms.

The indications to be fulfilled in the treatment of these fistulæ, depend upon a knowledge of the different complications. When the sinuses are kept up by a separation of the scrotum from the parietes of the urethra, Desault recommends exact compression to be made over the part, which method, he says, is sometimes sufficient to accomplish a cure. When this plan fails, he states, that the healing of the sinus may be promoted by practising an incision on one side of the scrotum, and carrying it as far as the denuded portion of the urethra. When sinuses exist, and they depend upon the smallness of the opening, or its unfavourable situation for the discharge of the matter, the aperture should be enlarged by making an incision into the main collection of pus. When there are callosities, which resist cataplasms, and the most active resolvents, Desault advises us to introduce into the fistulæ, trochees of minium for the purpose of destroying the indurated parts. When the bones are carious, and the tendons diseased, exfoliation must be awaited; and, in every instance the treatment should vary, according to the cause, upon which the fistula depends.

Incomplete internal urinary fistulæ, or, in other words, blind internal fistulæ, are seldom met with in the ureters and bladder. The quality of the cellular substance, which surrounds these parts, favours the effusion of the urine too much for the disorder, arising from a breach of continuity in them to be confined to a simple internal fistula. Such fistulæ, however, are often met with in the urethra. The bursting of an abscess into this canal; the rupture of the same canal in consequence of a retention of urine; a false passage; the healing of the external part of the wound made in lithotomy, while the internal part is not united; are all so many causes of this disease.

The diagnosis of these fistulæ, is deducible from circumstances, which may be recollected; together with a discharge of pus from the urethra, before, and sometimes after the issue of the urine; the pressure of a tumour in the course of the urethra, which tumour increases while the patient is making water, and afterwards disappears by pressure, at-

tended with a fresh discharge from the penis of matter blended with urine. This symptom alone is characteristic; for, an old gonorrhœa, complicated with indurations, may also keep up suppuration of the canal. The existence of pain gives no positive information; and nothing certain can be ascertained by the introduction of the catheter. It is true, the beak of this instrument may become entangled in the fistula; but, its entrance into the bladder may equally be opposed by a variety of other obstacles.

These internal urinary fistulæ cannot be cured, except by preventing the urine from getting into them and lodging there. The catheters employed should neither be too large, nor too small. If too large, they would exactly fill the canal, and the pus and urine, contained in the fistulæ, could not be discharged. If too small, the urine would insinuate itself between them and the sides of the urethra, and enter the fistulæ. Such inconveniences may be avoided by using a catheter of moderate size. Its employment must be continued till the ulcer is entirely healed. The inutility of medicated bougies, and other internal and external remedies, is too manifest to need any comment.

Of all urinary fistulæ, there are none more frequent than those which are termed *complete*. Their origin may be in the ureters, bladder, or urethra. Those which arise in the ureters, sometimes terminate in the colon, and the urine is discharged *per anum* mixed with the feces. But, most commonly, these fistulæ make their appearance externally, either in the lumbar, or inguinal regions. Those which communicate with the bladder, have also different terminations. When they proceed from the upper and inferior part of this organ, they ordinarily pierce the parietes of the abdomen above the pubes, and towards the navel. They also sometimes terminate in the groins. When they originate in the posterior parietes of the bladder, they sometimes tend into the cavity of the abdomen, where they almost always prove mortal; and sometimes into the intestines, if there should be adhesions between these and the bladder so as to favour this communication. When the opening in the bladder is near the bottom of this viscus, the fistula sometimes terminates in the rectum of the male, and the vagina of the female subject; but, most frequently, it ends in the perineum, in both sexes. With regard to the fistulæ, which originate in the urethra, they usually open externally in the perinæum, the scrotum, or the penis, and sometimes also in the rectum. It is not uncommon to see the

external opening of these fistulæ at a great distance from the internal one, and to find in the middle, and even the lower part of the thighs, the groins, parietes of the abdomen, and as high as the sides of the chest. Often there is only one opening in the urethra, while there are several situated externally more or less distant from one another.

Most of these fistulæ are the consequences of a retention of urine, and are owing to the same causes, as the diseases of which they are a symptom. Those which communicate with the rectum, in the male subject, sometimes depend upon this intestine having been wounded in the operation of lithotomy; and those, which open into the vagina, are often the effect of a violent contusion, caused by the head of the child in difficult labours, or of ulceration produced by pessaries, which are too large, and the margins of which are too sharp and irregular. Carcinoma of the rectum and vagina also give rise to fistulæ, by extending into the bladder.

The discharge of urine from the external orifice of the fistulæ is an unequivocal proof of its communication with the urinary passages; but this symptom does not always exist, and, it often happens, that, when the fistula is narrow, and there is no obstruction in the urethra, the urine more readily escapes the latter way than through the fistula. The kind of cord, which is felt in the track of the fistula, and which extends towards the urethra, is a very uncertain criterion of the communication with this canal. This symptom is common to all fistulæ complicated with callosities, whatever may be their nature in other respects. The fungus, which sometimes appears round the external orifice, is also observed in fecal fistulæ. The situation of this outer aperture scarcely affords any presumption on the nature of the fistula, since, in numerous cases, this opening is very distant from the urinary passages. When the fistula is narrow and tortuous, injections will not always pass into the bladder or urethra, but, become extravasated in the cellular substance. It is often difficult, sometimes even impossible, to find out the internal orifice of the fistula with a probe. When it communicates with the rectum, or vagina, the opening may sometimes be perceived with the finger, and occasionally, a staff introduced through the urethra, may also be felt in those parts. When the fistula originates in the bladder, the issue of the urine is continual; and when it arises in the urethra, the discharge of this fluid is only made, when the patient has occasion to make water. This distinguish-

ing sign is not constant, and, in Desault's works, mention is made of several cases, in which the urine did not issue from fistulæ communicating with the bladder, except when the patients endeavoured to empty that organ.

Fistulæ of the kidneys, or ureters, are entirely beyond the reach of art, unless they should be kept up by the retention of urine in the bladder, or the presence of a foreign body in the track of the fistula. The re-establishment of the natural course of the urine, and the extraction of the extraneous substance may, in such a case, effectually contribute to the cure. Here, however, we have no certain means of preventing the urine from entering the fistula. This is not the case with respect to fistulæ of the urethra, where we are, as it were, masters of that fluid. It is particularly in these latter disorders, that elastic gum catheters are attended with inestimable advantages.

When fistulæ of the bladder, or urethra, are the consequences of a retention of urine, produced by obstructions in this last canal, these obstructions often exist still: sometimes they have even increased since the formation of the fistula, which circumstance, in the majority of cases, renders the introduction of the catheter extremely difficult.

It is particularly when fistulæ terminate in the lower part of the bladder, that the utmost care must be taken to prevent the catheter from being stopped up by any foreign body, which would obstruct the urine, as well as to hinder the instrument from becoming displaced, or slipping out of the bladder. Perhaps, in this instance, instead of stopping up the catheter, it would be better to keep it constantly open, in order to prevent all accumulation of urine in the bladder, and the passage of this fluid through the fistula. But, when the fistula communicates with the urethra, no advantage would be derived from keeping the catheter open, and the treatment would be more painful and unpleasant to the patient.

In both cases, Desault recommends us to continue the employment of the catheter, not only until the fistula is cured, but also until the obstacles, which hinder the urine from passing the natural way, are removed. If, besides, there should exist any of the complications, spoken of in treating of blind external fistulæ, the methods there advised are to be pursued; but, in general, the catheter will suffice to effect the cure. Certain fistulæ, however, demand a particular mode of treatment. Such are those, which form

communications between the bladder and the rectum, or vagina.

Fistulæ of the bladder, communicating with the vagina, and produced by difficult labours, are almost always attended with loss of substance. The forcible contusion occasioned by the child's head on the anterior parietes of the vagina and bottom of the bladder, gives rise to the formation of sloughs, the separation of which sometimes leaves apertures large enough to admit the finger, and hence the cure is exceedingly difficult. In treating such fistulæ, there are two indications to be fulfilled; 1st. to keep the urine from passing into the vagina: 2dly. to keep the edges of the division as closely as possible together, so as to give them an opportunity of uniting.

The first of these indications demonstrates more and more the utility, and even the necessity of the catheter. In women, its introduction is easy; but in them it is more difficult to fix the instrument, than in men. Desault contends, however, that it is very essential to have it favourably fixed in the bladder, so that the urine may escape, immediately it arrives in this viscus. None of the means hitherto employed, seemed to Desault to answer this purpose completely. This eminent surgeon found, that the only effectual plan was to fasten the catheter to a point, that always retained the same position, with respect to the meatus urinarius. He used a kind of machine made after the manner of a truss, the circle of which was long enough to embrace the upper part of the pelvis, and had in its middle an oval plate to be placed upon the pubes. In the centre of this plate was a groove, to which a piece of silver was fitted, curved so that one of its end having an aperture in it, came over the vulva, on a level with the meatus urinarius. This piece of silver admitted of being fastened to the plate with a screw. After having introduced, and arranged the catheter in the bladder, so that its beak and eyes may be situated at the lowest part of this viscus, the end of the instrument is to be put through the aperture of the piece of silver, which slides in the groove of the plate, and it is afterwards to be fixed in the way already explained. By means of this machine, the catheter is invariably fixed, without incommoding the patient even when she is walking.

In this disease, large catheters with full sized apertures should be employed, so that the urine may more readily escape through the instrument, than fall into the vagina. In the early part of the

treatment, the catheters should also be left constantly open.

In order to fulfil the second indication, and keep the edges of the division as near together as possible, Desault advises us to introduce into the vagina, a soft kind of pessary, large enough to fill the vagina, without distending it. The introduction of this instrument changes the form of fistula from round to oval, which is the most favourable to its reunion; and it has also the advantage of closing the fistula, and hindering the urine from falling into the vagina. These fistulae often cannot be cured till after much time,—six months, and even a year.

When the rectum is wounded in the operation of lithotomy, an event that may be known both by the escape of the feces through the wound, and the introduction of the finger into the incision, or within the rectum, Desault advises us to divide at once the parts comprehended between the wound of the operation, the opening in the rectum, and the margin of the anus. This, he says, is the means of preventing the feces from passing into the bladder, and the urine into the rectum. This second operation allows the matter to escape readily, and cicatrization taking place from the bottom of the wound, in the direction outward, the patient is cured without any fistula; whereas this last grievance is almost inevitable, when the preceding plan is not adopted early. It deserves attention, that the catheter is then incapable of effecting a cure. It effectually prevents the urine from entering the fistulae; but, it cannot keep the feces from doing so, which would keep up the disease.

For Desault's particular method of dividing the parts, I must refer to his works. (See *Œuvres Chirurgicales de Desault par Bichat*, Tom. 3. p. 287—300.)

URINE, INCONTINENCE OF. This complaint is quite the reverse of a retention of urine; for, as in the latter affection, the urine is continually flowing into the bladder, without the patient having the power to expel this fluid; so, in the former, the urine flows out, without the patient being able to prevent the occurrence.

An incontinence of urine may originate from several causes. 1. From the irritation of the neck of the bladder by stones. 2. From a paralysis of the sphincter vesicae, while the contractile power of the muscular coat of the bladder remains in its natural state. 3. From laceration of the parts in the extraction of large stones, and a consequent paralysis of the sphincter after the wound has healed.

4. From the injury, which the parts suffer from pressure in difficult labours.

When an incontinence of urine proceeds from an irritation of the neck of the bladder by a stone, it can only be radically cured by the operation of lithotomy; though great relief may be given by mucilaginous and anodyne medicines, particularly, when given in the form of injections. In the other two cases, in which it is occasioned by a paralytic affection of the sphincter, we can only attempt the cure by such medicines as are proper in other paralytic cases, viz. the Peruvian bark, chalybeates, the cold bath, and other tonics; but, of all topical remedies, cold applications to the perineum are found to be the most effectual. The most powerful remedy of this kind is to dash cold water upon the part; though it is sometimes found useful to apply cloths dipped in vinegar and water, or a solution of saccharum saturni, in the acetous acid.

When no relief can be obtained by the above proposed remedies, we must then have recourse to some mechanical method of compressing the urethra, and thus preventing the continual dribbling of the urine, which must always be very disagreeable. A very proper instrument for this purpose is called a *jugum*, or yoke. It ought to be lined with silk or velvet; and, by means of the screw, the pressure may be made greater or lesser at pleasure. For women, we must make use of pessaries. These must be made of sponge, only of such a size as to be easily admitted, and, before it is introduced, it must be moistened with the finest olive oil, which, according to Mr. Latta, most effectually prevents it from becoming soon troublesome by excoriating the vagina. Pessaries, made of wood, can never be used in cases of this kind with effect; for, in placing them in the vagina, so as to compress the neck of the bladder, it is obvious they must at the same time press upon the rectum, and, on that account, prevent the natural passage of the feces. In some particular cases, even these palliative remedies prove ineffectual; for, when the disorder proceeds from an irritation on the neck of the bladder, the patient has such a continual desire to make water, that it is impossible to bear any confinement of it. We can then only employ proper receptacles for collecting it as it flows. In women these can only be by pieces of sponge, applied externally, and kept in that situation with a T bandage; but in men, other contrivances may be employed.

In the Medical Observations, we have some surprising instances of the efficacy

of blisters in removing this complaint. A girl of thirteen years of age, who, for four years, had been able to retain her water only a very short time in the day time, and not at all during the night, was cured in twenty-four hours by the application of a blister to the os sacrum. A man, thirty-two years of age was attacked by this disease, accompanied with a palsy of the lower extremities, in consequence of having taken some virulent quack medicines, probably of the mercurial, or arsenical kind. In twenty-four hours after the application of a blister to the os sacrum, he was able to retain his water for an hour, and in a week after, for two hours. In about a month, he was able to retain it for five hours, and, at last obtained a perfect cure. He also recovered in some degree the use of his limbs, which were paralytic. The like good effects were produced on a woman of fifty, in whom the disease had been brought on by a strain. In her it was likewise accompanied with a palsy of the lower extremities, and of this too she got the better. In a woman of forty-three, in whom the disease seems to have come on without any evident cause, the cure was accomplished, almost during the time that the blister was rising. In a young man, who had been attacked with the disease, after lifting a heavy load, a cure was accomplished in sixteen days. A man of forty-four years of age, who had been attacked by the disease, without any evident cause, was in like manner cured on the first application of a blister. This man had likewise symptoms of diabetes; but, the blister had no effect in removing them. A boy, ten years of age, had violent complaints in the urinary passage, which were supposed to proceed from an ulcer. "When about to make water, he was obliged to put himself in a prone posture, and then his urine generally came away by drops, with exquisite torture. At length, it began to come away insensibly during the night;" but, by the application of a blister, this incontinence was removed in less than forty-eight hours, the other symptoms remaining as they were. In all these cases, the blisters were very large, covering not only the os sacrum; but extending from side to side. (*Latta's System of Surgery, vol. 2.*)

URINE, RETENTION OF. Mr. Hey has very truly remarked, that a retention of urine in the bladder, when the natural efforts are incapable of affording relief, is, in male subjects, a disease of great urgency and danger. Persons, advanced in years, are more subject to this

complaint, than those, who are young, or middle aged. It is often brought on by an incautious resistance to the calls of nature; and, if not speedily relieved, generally excites some degree of fever.

It is sometimes attended with a considerable degree of fever, and an inflammatory affection of the bladder, which terminates in a discharge of purulent matter, and a fatal hectic.

The distinction, says Mr. Hey, which has sometimes been made, between a *suppression* and *retention* of urine, is practical and judicious. The former most properly points out a defect in the secretion of the kidneys; the latter, an inability of expelling the urine when secreted.

The *retention of urine* is, an inability, whether total or partial, of expelling, by the natural efforts, the urine contained in the bladder. The characteristic symptom of this disease, previous to the introduction of the catheter, is a distention of the bladder (to be perceived by an examination of the hypogastrium), after the patient has discharged all the urine, which he is capable of expelling.

As this complaint may subsist, when the flow of urine from the bladder is by no means totally suppressed, great caution is required to avoid mistakes on this subject.

Violent efforts to make water are often excited at intervals, and, during these strainings, small quantities of urine are expelled. Under these circumstances, the disorder may be mistaken for the stranguary.

At other times, a morbid retention of urine subsists, when the patient can make water with a stream, and discharge a quantity equal to that, which is commonly discharged by a person in health. Under this circumstance, Mr. Hey has known the pain in the hypogastrium, and distention of the bladder, continue till the patient was relieved by the catheter.

And lastly, it sometimes happens, that when the bladder has suffered its utmost distention, the urine runs off by the urethra, as fast as it is brought into the bladder by the ureters. Mr. Hey has repeatedly known this circumstance cause a serious misapprehension of the true nature of the disease.

In every case of retention of urine, which this gentleman has seen, the disease might be ascertained by an examination of the hypogastrium, taken in connection with the other symptoms. The distended bladder forms there a hard and circumscribed tumour, giving pain to the patient when pressed with the hand. Some obscurity may arise upon the examination

of a very corpulent person; but, in all doubtful cases, the catheter should be introduced.

Mr. Hey mentions, that he has seen but a few cases of the *ischuria renalis*, or complete suppression of the secretion of urine by the kidneys. The disease proved fatal in all his patients except one, in whom it was brought on by the effect of lead, taken into the body by working in a pottery. It subsisted three days, during a violent attack of the colica pictonum, and was then removed, together with the original disease. Mr. Hey found no difficulty in distinguishing this disorder, in any of the cases, from the *ischuria vesicalis*, though, for the satisfaction of some of his patients, he introduced the catheter. (*Practical Observations in Surgery*, p. 374, &c.)

Ischuria, or retention of urine, may be the effect of a great many different causes. We shall proceed to take notice of the causes, which are produced by a paralysis of the bladder; by inflammation of its neck; by foreign bodies in it; by pressure made on it by the gravid uterus; by an enlargement of the prostate gland; and by strictures in the urethra.

1. OF THE RETENTION OF URINE CAUSED BY A PARALYSIS OF THE BLADDER.

This complaint, to which persons advanced in life are particularly subject, may occur in subjects of any age, in consequence of a violent concussion of the spinal marrow, or (what is very common) if, after having taken a large quantity of drink at a time, a person should neglect to obey the calls of nature, and hold his urine too long. It is also observed to be a symptom of certain typhoid fevers, and, consequently, too great attention cannot be paid to the state of the bladder in such disorders. The retention of urine is easily ascertained to exist by the prominence, which it forms above the pubes; a prominence, which may be readily distinguished by its elasticity and circumscription from the general tension of the abdomen, so common in this disease. A retention of urine may either come on in a gradual or sudden manner. In the first sort of case, it begins by a kind of debility, which hinders the patient from completely emptying his bladder, so that, after having made water, he still feels an inclination to repeat the evacuation, and is compelled to make frequent efforts to do so. This inconvenience gradually increases; at length, none of the urine can be discharged; and the bladder rises higher than the pubes, above which part it forms a round circumscribed tumour, the size

and elasticity of which are more or less considerable.

In the second kind of case, or that which occurs suddenly, the retention of the urine is the first symptom, which the patient experiences, and his bladder becomes filled, and distended, in the same manner, as in the preceding case. Most frequently, the swelling, which this viscus forms, is at first not very painful, but, afterwards becomes very much so. Some patients make frequent efforts to expel their urine; others are more tranquil. This state lasts two, or three days, after which the urine begins again to escape from the urethra, sometimes by drops, sometimes in a stream, but, almost always, at the will of the patient. In some instances, as much urine is voided, as the fluid, which is drunk; yet, notwithstanding this, the bladder continues to be distended with urine, and to form an elevation above the pubes. This circumstance has frequently led practitioners into error, and some of them have even mistaken the swelling of the hypogastric region for an abscess. Collot mentions, that, in his time, this mistake happened very frequently, and that such supposed abscesses would have been often opened, had not the patients warned their medical attendants of the erroneous opinion. M. Sabatier informs us that he was consulted about a woman, who had been advised to resort to the mineral waters, with a view of dispersing a tumour, which had occurred in consequence of a difficult labour, and which swelling was supposed to be situated in the uterus. The tumour, however, was nothing else, than the bladder, distended with an accumulation of urine, since it disappeared as soon as a catheter was introduced. No suspicion had been entertained of the real nature of the case, in consequence of the patient having voided her urine in a voluntary manner, and reasonable quantity, for five, or six weeks, during which time the swelling had existed.

M. Sabatier makes mention of a case, inserted in a thesis by Dr. Murray, from which it appears, that the swelling of the bladder may become so considerable as to lead to mistakes of a still more serious nature. A delicate woman found her abdomen swell without any apparent cause, and without experiencing any inconveniences. She imagined, that she was pregnant. However, she was soon undeceived by the rapidity, with which her abdomen continued to enlarge, and by the considerable degree of anasarca affecting her lower extremities. The latter affection extended also to the arms, and face. The patient was considered to be dropsical; and a surgeon was sent for to tap her.

The fluctuation of a fluid in the abdomen was quite evident. Some diuretics were prescribed, before having recourse to the operation. While such remedies were put to a trial, the patient complained of having had a total retention of urine for three days; a symptom, which she had not previously suffered. The belly was elastic, and the veins on it were every where swollen. It was judged prudent to introduce a catheter, before employing the trocar. The surprise was very great when eighteen pints of urine were drawn off, and the swelling of the abdomen subsided. The next day, the catheter drew off twelve more pints of urine. The anasarca, which was entirely symptomatic, disappeared. The application of cold water re-established the tone of the bladder, so that, when three pints of urine had been drawn off by means of the catheter, the patient herself could spontaneously expel three or four others, with the aid of some degree of pressure on the hypogastric region. Dr. Murray endeavoured to ascertain, whether the woman got completely well; but, he could not trace this circumstance.

The retention of urine, produced by a paralysis of the bladder, and the swelling, which this viscus occasions above the pubes, may continue for a long while, without patients feeling any other inconvenience, than a sense of weight about the region of the pubes, and the frequent inclinations to make water, which accompany this state. M. Sabatier mentions his having seen patients, who had been attacked by the complaint for more than six months.

The disorder may be relieved by introducing a catheter into the bladder, by which means the urine has an opportunity of escaping. For an account of the manner of introducing this instrument, see *Catheter*.

It is not enough to empty the bladder, care must be taken to prevent the urine from accumulating again, and, consequently, the catheter, according to some, must be left introduced. Others are of opinion, that it is better to pass the instrument whenever the patient has any occasion to make water. According to Desault and Mr. Hey, the bladder regains its contractile power soonest, when the catheter is introduced as often as occasion requires, instead of being allowed to remain continually in the urethra.

When the retention of urine has lasted a considerable time, when the hypogastric region is painful, and the patient is feverish, venesection may be performed, and, in all cases, diluent beverages, of a slightly astringent nature, are to be prescribed. The intestines are to be emptied

with glysters, and the regimen is to be regulated by the condition, in which the patient happens to be.

For a certain length of time, things remain in this state. When the urine flows from the catheter in a rapid stream, which is projected to some distance, and when it also passes out between the catheter and the urethra, it is a sign, that the bladder has regained its power of contraction, and that it can empty itself, without the aid of the instrument. In this circumstance, the catheter is to be taken away, and the patient may gradually resume his occupations, and usual mode of life. When the urine only escapes through the catheter, and in a slow stream, the employment of this instrument is always requisite, and its use cannot be discontinued, without hazard of the bladder becoming distended again, and losing whatever degree of tone it may have recovered. However, a catheter cannot be suffered to remain in the bladder more than twelve days, or a fortnight. Some persons have in their urine so much mucus and earthy matter, that an incrustation would not fail to take place on the instrument, if care were not taken, every now then, to withdraw it and clean it. In other persons, the pressure, which the catheter makes on the part of the urethra, corresponding to the root of the penis, in front of the scrotum, occasions in this situation an inflammation, which ends in mortification, so that a slough about as large as a crown, takes place, followed by an opening with loss of substance, which opening remains fistulous during the remainder of the patient's life. The latter inconveniences do not attend the employment of flexible gum-catheters.

The time, which the bladder takes to regain the power of contracting, varies considerably in different cases. When the disease is accidental and sudden, it frequently goes off in a few days. When it has come on in a slow manner, it usually lasts about six weeks. The cure, however, is not to be despaired of, if the paralytic affection of the bladder should continue much longer. M. Sabatier says, that he has seen patients wear a catheter upwards of ninety days, and yet ultimately get completely well. When there is reason for believing, that the urine will come away of itself, the use of the catheter may be discontinued, great attention being paid to the state of the patient. When he makes water very slowly; when he is obliged to make frequent attempts; and when he feels a sense of weight about the neck of the bladder; this viscus has not recovered the whole of its tone, and the employment of the catheter is still ne-

cessary. Sabatier states, that he has often successfully recommended the catheter to be worn only in the night-time, when the patient could make water tolerably well in the day, and experienced the above complaints in the night.

When three or four months elapse, without the urine resuming its ordinary course, Sabatier informs us, that, we may be sure, that the tone of the bladder is lost for ever. In this unfortunate case, all that can be done is to advise the patient to make continual use of a flexible catheter, which he should be taught to introduce himself, whenever he has occasion. (See *De la Médecine Opératoire par Sabatier*, Tom. 2.)

Among the means deserving of trial, when the contractile power of the bladder does not return with the use of the catheter, I have to mention the tincture of cantharides; blisters applied to the sacrum, and kept open with the savine ointment; and cold washes to the hypogastric region.

2. OF THE RETENTION OF URINE, OCCASIONED BY INFLAMMATION OF THE NECK OF THE BLADDER.

This case makes its attack with the most urgent symptoms. Besides the inclination to make water, and the efforts, which such inclination causes, the patient is affected with a swelling of the bladder above the pubes, a deep-seated pain in that viscus and all the neighbouring parts. Fever, nausea, vomiting, a urinary smell in the breath, and perspiration, great restlessness, a difficulty of breathing, convulsions, and death, are the train of evils, which may ensue.

The present kind of retention of urine demands the employment of the antiphlogistic plan of treatment; particularly, of bleeding, diluent emollient beverages, glysters, the warm bath, and anodynes. When these are unavailing, the catheter should be resorted to, and its use should never be deferred so long as to afford any chance of the distention of the bladder occasioning a paralysis of this viscus. When the catheter cannot be introduced, the operation of puncturing the bladder is immediately indicated. See *Bladder*.

3. OF THE RETENTION OF URINE OCCASIONED BY FOREIGN BODIES IN THE BLADDER.

Several kinds of extraneous matter may be lodged in the bladder; for instance, stones, worms, pus, blood, &c. Here, we shall only treat of the retention of urine, originating from the presence of stones, or

of blood, because these causes are the most frequent.

One, or more stones in the bladder give rise to particular symptoms, explained in the articles *Calculus* and *Lithotomy*. They seldom occasion a total retention of urine. If such a case were to present itself, it might be easily understood by preceding circumstances. The complaint might be relieved, and this, perhaps, for a considerable time, by introducing a sound, which would push the stone away from the neck of the bladder, towards the fundus of this viscus. Instances are not uncommon, in which the patients, after having been tormented by the lodgment of stones in the bladder, became afterwards quite free from all kind of uneasiness. Sabatier makes mention of a clergyman, who was sounded by a very skilful surgeon, and who finding himself afterwards free from the pains, which he before suffered, thought, that the surgeon had been mistaken, when he said, that there was a stone in the bladder, and that lithotomy ought to be performed. The patient also bequeathed his body for dissection to the surgical practitioner, in order that the latter might reap instruction from the examination. The surgeon accepted this odd legacy; and, when the body was opened in the presence of numerous spectators, a large stone was found in the bladder.

Blood may descend from the kidneys into the bladder; or it may accumulate in this latter receptacle, in consequence of some injury, or ulceration of its inner coat. When the blood remains in a fluid state, it may be voided almost as easily as the urine itself. But, when it coagulates, the clots, which are formed, may obstruct the neck of the bladder, and occasion a retention of urine; a case, which is the more alarming, as the collection of blood generally cannot be drawn off by means of a catheter. However, one of a very large size should be introduced, in order to try whether the thing is practicable. When this method fails, authors advise a syringe to be fastened on and adapted to the outer end of the catheter, by which means the blood and urine are to be sucked, as it were, out of the bladder. Sabatier states, that this plan has been practised with success, in cases, which seemed almost desperate.

4. OF THE RETENTION OF URINE, CAUSED BY THE PRESSURE OF THE GRAVID UTERUS ON THE BLADDER.

Such pressure often occasions a difficulty of making water, and a retention of urine. Women relieve themselves by

leaning down on their knees and elbows, in which position, the uterus makes less pressure on the neck of the bladder. Some introduce one, or two fingers into the vagina, and push the uterus upward. Others must have the catheter introduced, particularly, about the period of parturition. When there are no other impediments to the passage of the catheter, than the cause of the disease, the instrument may easily be introduced.

When, however, the course of the meatus urinarius is rendered crooked, either in consequence of an old prolapsus uteri, or of the pressure occasioned during labour, the urine can only be drawn off by means of a catheter, with a rounded end, which instrument should be first introduced with its handle as much towards the belly as possible, after which, this part of the instrument is to be brought downward by a semicircular motion. (*Sabatier Médecine Opératoire, Tom. 2, p. 137.*)

5. OF THE RETENTION OF URINE CAUSED BY THE ENLARGEMENT OF THE PROSTATE GLAND.

When the swelling of the prostate gland is of an inflammatory kind, the retention of urine makes its appearance by symptoms, which always attend an inflammation of the neck of the bladder. This affection sometimes ends in an abscess, which bursts of itself. Some writers have considered about the propriety of making an incision into the suppurated gland; but, such a proceeding, perhaps, can never be at all justifiable, or prudent.

The diseased enlargement of the prostate gland has been treated of in another part of this Dictionary. See *Prostate Gland*. The retention of urine, occasioned by this disease, begins with a difficulty of making water, just such a kind of difficulty, as occurs when the bladder has been deprived of some of its contractile power, and receives relief from the use of slightly diuretic beverages. When the complaint becomes more urgent, and the urine cannot be any longer evacuated, the introduction of a catheter becomes indispensable. Although this operation is, in every respect, perfectly easy of accomplishment, it is not always attended with the desired success. The catheter passes in as far as it can; but, the urine is not discharged, because the end of the instrument, according to Sabatier, becomes entangled in the prostate gland, or between a swollen portion of this gland and the neck of the bladder, and does not reach to the situation of the urine. Hence, Sabatier recommends the employment of a ca-

theter with a very long beak. From the account, however, which we have delivered of the alteration produced in the course of the urethra by the morbid enlargement of the prostate gland, (see *Prostate Gland*), it appears, that the canal in question generally makes, in this case, a sudden turning upward, just before it approaches the bladder, consequently, when a catheter has its end bent a little more upward, than usual, it is best adapted for passing into the bladder, in the affection under consideration. When the surgeon has succeeded in introducing a catheter, it is to remain introduced, till the bladder has recovered its tone, or contractile power, just as was recommended in the case of paralysis of this viscus. When, however, all efforts to pass a catheter are quite ineffectual, the only remaining resource is to puncture the bladder above the pubes. (See *Bladder, Puncture of*.) The operation should never, in this case, be done through the perinæum, or rectum, as the very great size, which the diseased prostate gland sometimes attains, would be an obstacle to making a puncture in either of these situations. Puncturing the bladder, however, is only a temporary means of relief, unless this organ recovers its contractile power, or the surgeon succeeds in introducing a catheter through the urethra. When neither of these circumstances occurs, the cannula of the trocar must not be withdrawn.

The objections, which immediately present themselves to leaving in the cannula, for any considerable time, are: the irritation of the extraneous body: the fear of calculous incrustations forming both on the outside and inside of the cannula; and the hazard of not being able to find out again the track into the bladder, when the instrument is ever withdrawn. However, Sabatier confirms, that the cannula may sometimes be successfully allowed to remain in the bladder. Collot adduces two instances in which he found this method very serviceable. Sabatier also refers to another example of similar success, related in a thesis by Murray. An incision had been made above the pubes, in order to be more easily able to introduce the trocar into the bladder. The wound inflamed, suppurated, and was in a healing state; but, as the urine could not be voided through the urethra, the cannula was left in the puncture. Things had gone on in this manner more than a year, when Dr. Murray saw the patient. The man was sixty years of age, and enjoyed very good health. He was in the habit of taking a stopper out of the cannula, every four hours. The wound had healed very

well all round the tube, and was quite free from redness.—(*Sabatier, Médecine Opératoire, Tom. 2. p. 140.*)

6. OF THE RETENTION OF URINE PRODUCED BY STRICTURES IN THE URETHRA.

From the account, which is given of strictures in another part of this Dictionary, (see *Urethra, Strictures of*,) it appears, that almost every stricture, how bad soever it may be, is capable of being rendered still worse, and the morbid part of the urethra, more impervious by a spasmodic affection. Going out of a warm into a cold situation, drinking and other kinds of intemperance, will often bring on an irritable state of the canal, attended with a spasmodic action of the strictured part, an increased difficulty of voiding the urine, and even a total retention of this fluid. The patient makes repeated efforts to relieve himself; but hardly a drop of urine is discharged. In the mean while, the bladder becomes filled, and ascends above the pubes; the abdomen grows tense and painful; fever comes on; the countenance looks red; the brain becomes affected; and circumstances assume an extremely urgent appearance.

In this case, antiphlogistic means should be adopted, without delay. The patient ought to be bled, if nothing in his constitution and age prohibits this evacuation, which it may even be proper to repeat. He should also be put into the warm bath, and fomentations should be continually applied to the hypogastric region. Slightly diuretic beverages may be prescribed; and leeches put on the perinæum. The principal means, however, from which the greatest benefit may be expected, is a liberal dose of the tinctura opii, together with an anodyne glyster. When such measures fail in enabling the patient to empty his bladder, and this viscus is becoming more and more distended, an immediate attempt should be made to introduce a small flexible elastic gum-catheter, through the stricture or strictures into the bladder, which object may be frequently accomplished, when due care, perseverance, and gentleness are not neglected.

Sometimes when a small flexible catheter cannot be introduced, a fine bougie admits of being passed into the bladder, and, on being withdrawn, the urine follows, and is discharged.

When all the preceding plans prove unavailing, and the danger arising from the retention of urine, continues to increase, the only remaining resource is to puncture the bladder. The cannula of the

trocar should then be left in the wound, till the strictures are either cured, or at least till the urine seems to resume its natural course through the urethra.

Useful information on the subject of retention of urine, may be found in *De la Médecine Opératoire, par Sabatier, tom. 2. Hey's Practical Observations in Surgery. Desault's Parisian Chirurgical Journal. Home's Practical Observations on the Treatment of Strictures, &c. vol. 2. 1803.*

UTERUS, INVERSION OF. This case may either be complete, or incomplete. When it is incomplete, only the fundus of the uterus passes through the os tincæ. When the inversion is complete, the uterus becomes entirely turned inside out, passing through the opening in its cervix, dragging along with it a part of the vagina, and descending more or less far down, sometimes even between the patient's thighs.

The inversion of the uterus mostly arises from the manner in which the placenta is extracted after delivery. Just after parturition, the parietes of the uterus have not had time to become contracted, and the mouth of this viscus is as capacious as it can possibly be. It is easy of comprehension, how it may happen, that, when things are thus disposed, the uterus may follow the after-birth, which is attached to the parietes of this organ, and thus become inverted. The event is particularly liable to happen; 1st, When a premature attempt is made to extract the placenta. 2dly, When the funis is pulled outward, without any care being taken to support the uterus by the fingers of the left hand. 3dly, When the operator draws the after-birth outward in too rough and forcible a manner. It is true, that the placenta is sometimes so adherent, that its extraction is very difficult, and some risk must be encountered of dragging down the uterus with it. However, this unpleasant occurrence may generally be avoided by taking care to separate the placenta, by introducing one's fingers into the cavity of the uterus.

The inversion of the uterus, following parturition, should not always be ascribed to unskilfulness on the part of the practitioner. The accident frequently happens, notwithstanding every precaution to prevent it, either because the patients make too violent efforts to deliver themselves; or because the uterus is enlarged and heavy; or else in consequence of some natural disposition in the uterus, which disposition can neither be foreseen nor prevented. Ruysch has seen an inversion of the uterus take place, after the expulsion of the placenta, although the delivery had occurred in the most favourable way.

This disposition is very common in persons, who have once been afflicted with an inversion of the uterus. Amand makes mention of a case, in which a woman, who had had an inversion of the uterus in her first delivery, and who had been cured of it by this practitioner. The same patient was attended by Amand again in her next accouchement, and another inversion of the uterus, quite as bad as the first, would certainly have happened, had not Amand, on perceiving the disposition to the accident, introduced his finger into the cavity of the uterus, in order to separate the placenta from its attachments, before making any attempt to extract it.

Besides the causes of the inverted uterus, which are connected with parturition, there are some others, which have no concern with it whatsoever. Ruysch, Mauriceau, and Lamotte, were of opinion, that the inversion of the uterus could only happen at the time, when the placenta was extracted, or a little while afterwards. The occurrence seemed to them quite impossible at any other period, both because the substance of the uterus is very thick and solid, and its mouth is very contracted. However, Sabatier remarks, that there are many facts, which prove that this disease may depend on internal causes, and that it may affect women who have had no children, as well as others, who have had them. Polypi of the uterus are causes of this kind. As their pedicle is attached to the fundus of the uterus, and is very firmly inserted into it, they may easily drag it downward, when its texture is lax and soft, particularly, as their action, arising from their weight, is continual and uniform. We may also reckon among the causes, the hemorrhages, to which women are subject, both because they relax the texture of the uterus, and because they are usually attended with an acute pain, which makes the diaphragm and abdominal muscles contract, and act upon the uterus with all their power.

When an inversion of the uterus takes place after delivery, there are symptoms, by which it may easily be known. The uterus, when in its natural situation, presents itself in the hypogastric region in the form of a round circumscribed tumour; but, when it has fallen downward, and become inverted, the above tumour cannot be found, and, a vacancy may be felt in the situation, which it ought to occupy. When the inversion is incomplete, an examination with the fingers detects in the vagina a tumour, shaped like the segment of a sphere, having a smooth surface, and being surrounded

with the cervix uteri, as with a kind of collar, round which the finger may easily be passed, either between the kind of collar and the uterus, or between the collar and the vagina. When the inversion of the uterus is complete, there is in the vagina, and sometimes quite protruded, a tumour, apt to bleed, of an irregularly round shape, with a smooth surface, and hanging by a neck, which is surrounded by the above circular, thick, fleshy, substance, consisting of the os uteri itself. In the incomplete inversion, patients feel acute pain in the groins, and kidneys, an oppressive sense of heaviness in the hypogastric region, and a tenesmus, which, compelling them to make violent efforts, forces the uterus down more and more, and produces a total inversion of it. To such symptoms are often added hemorrhages, which are more or less copious. But, when the inversion is complete, the pain is more acute, the loss of blood more considerable, and the patient is often affected with peculiar weakness, which is frequently followed by cold sweats, convulsions, and delirium.

The reduction of the uterus is the only method, by which the above described sufferings can be appeased, and it ought to be put in practice the more quickly, in proportion to the urgency of the symptoms. When these are pressing, the least delay may be followed by the worst consequences. Some women, indeed, perish in a few hours, and, when they live longer, the reduction becomes exceedingly difficult, because the uterus and its cervix are continually becoming more and more contracted.

Sabatier censures the advice to put some linen between the hands and the uterus, in making the reduction, as an unnecessary measure, and one, which deprives the operator of the information to be derived from the organ of touch, relative to the progress of the operation. The manner of proceeding can hardly be determined by any precepts. It must be regulated by existing circumstances; and the trial should not be abandoned as long as the patient's strength will allow a perseverance. Perhaps, however, if the tumour should be in an inflamed state, it might be prudent, before attempting to reduce it, to take away blood, put the patient in the warm bath, use emollient applications, exhibit anodyne medicines, &c.

When the inversion of the uterus is complete and the reduction has not been accomplished in due time, an endeavour must be made to quiet the spasms and pain arising from the accident, and the surgeon must await what nature will do

for the patient. Many die; while others survive, subject to an oppressive sense of weight, and frequent hemorrhages, which bring on great emaciation. Sabatier informs us of his having seen two patients, who had had an inversion of the uterus, during six months, and who were still able to go about their family affairs. The same author says, he has heard of some other persons, who have had an inversion of the uterus several years.

One of the most afflicting consequences, which may result from an inversion of the uterus, is so considerable an inflammation of the part, as to induce a danger of its mortifying. In this circumstance, some have proposed to extirpate the uterus; an operation, however, that has not been attended with any degree of success, as the majority of patients, on whom it has been practised have died. However, there are instances recorded of women having recovered after such an operation. Vieussens has related a case of this kind, in which a ligature was applied round the neck of the swelling, and the part below amputated.

The practice of extirpating the inverted uterus, through apprehension of the part mortifying, however, cannot be reprobated in terms too strong. The only alleged reason for having recourse to the operation, is the very considerable degree of inflammatory swelling, which affects the part. But, it is not altogether impracticable to bring the uterus into a state again, in which the inconveniences, arising from its inversion, would be very supportable, so that an operation might be avoided, which is always attended with extreme danger. Even supposing mortification were to take place, the indication would be to appease the bad symptoms, and promote the separation of the sloughs by suitable applications. Rousset has recorded an example, in which the latter mode of practice was adopted with success.

Some writers have not been content with advising the extirpation of the uterus, when it is entirely inverted, very painful, and irreducible, in consequence of the contracted state of the cervix of this organ; but, they have also thought such a proceeding proper in cases of a complete prolapsus, when the part is much swollen and inflamed. Instances have been adduced, illustrative of the success of this operation. However, it is now generally thought, that most of these examples are invalid, as polypi, growing from the uterus, frequently attain so considerable a size, that they protrude out of the vagina, so as to have occasionally been mistaken for the uterus itself. These

have been extirpated with a ligature, with most beneficial consequences to the patient.

There is no doubt, however, that in a few instances, the uterus has been amputated, and the patient has recovered.

Although it is easy to distinguish the inversion of the uterus, which happens soon after delivery, it is not so to make out the nature of such cases, as happen in other circumstances, notwithstanding the presence of the same kind of symptoms. As cases of the latter kind are exceedingly uncommon, and, consequently, they are not at all expected, mistakes are the more liable to be made. A very little attention suffices for discriminating an inversion of the uterus from a polypus, with which it has sometimes been confounded. In short, the pedicle of a polypus is always narrow; the tumour is not very sensible, and is irreducible; whereas the uterus forms a semi-spherical swelling, sometimes a little oblong, but, always broader above, than below. It is very sensible, and may be easily reduced.

The reduction of the inverted uterus is also the only step, which can be taken, whether the accident has arisen from the weight of a polypus, or from hemorrhages. However, this proceeding is generally useless, when the disease originates from obesity. In the latter case, as the cause still continues in full force, it in general soon displaces the uterus in the same way, as before, and a pessary is the only means, to which the patient can resort. This instrument is to be worn, rather with a view of supporting the weight of the abdominal viscera, which pushes the uterus down into the vagina, as well as the fundus, through the cervix of the womb, than with any design of preventing the inversion. (*Sabatier, Médecine Opératoire, tom. 2.*)

UTERUS, POLYPI OF. (See *Polypus*.)

UTERUS, PROLAPSUS OF. This may take place in three different degrees. When the prolapsus occurs only in its first or second degree, the uterus is situated in the vagina, where may be felt a pyriform tumour, round which it is easy to pass the end of the finger. At the lower part of this tumour, an opening, placed transversely, may also be distinguished. In the first, or slightest degree, the uterus is situated higher up, than in the second. When the disease has proceeded to the third, or last degree, the uterus is completely protruded out of the vulva. In the latter circumstance, it always drags down the vagina, which becomes doubled on itself, and it also draws down a part of the bladder, which is con-

nected with the upper part of the latter tube. It also sometimes happens, that some of the abdominal viscera insinuate themselves into the kind of cul-de-sac, formed by the vagina, and they then considerably increase the size of the tumour. The swelling, occasioned by a complete prolapsus of the uterus, is of an oblong, nearly cylindrical form, and it terminates below, in a narrow extremity, in which a transverse opening, the os tincæ, may be discerned, from which the menses are discharged, at the periods prescribed by nature. The cylindrical shape of the tumour is the more apt to lead to mistakes, as the vagina, being doubled on itself, and exposed to the effects of the air, sometimes assumes an appearance very similar to that of the skin. Hence, women, afflicted with a complete prolapsus uteri, have sometimes been regarded as hermaphrodites, in consequence of the tumour having been mistaken for a penis. Saviard has recorded an instance, in which this kind of error was made.

The inconveniences, arising from the first and second degrees of prolapsus uteri, are a sense of heaviness in the pelvis, and a degree of uneasiness in the kidneys. These complaints are aggravated, when the patient sits up or walks about. On the contrary, they diminish, and even entirely subside, when the patient has remained a certain time in bed.

The symptoms, attending a complete prolapsus uteri, are of a more severe nature. The patient experiences a greater sense of heaviness in the pelvis, and pain and dragging in the loins. She is troubled with tenesmus, and sometimes feels acute pain in the tumour itself, which is subject to inflame, and ulcerate, in consequence of its depending posture, the friction, to which it is exposed, and the irritation of the urine, as this fluid runs over it.

The uterus, when only affected with the first or second degree of prolapsus, may be easily reduced. Indeed, it often resumes its natural situation, when the patient is put in a position, in which she lies on her back, with her loins raised a little higher, than her chest. When this method is insufficient, the fingers may be introduced into the vagina, for the purpose of accomplishing the reduction. The patient suffers no pain, at the time when the reduction is performed, which, for the most part, takes place spontaneously.—By the latter circumstance, a prolapsus uteri may be discriminated from polypi, either of the uterus, or vagina, which tumours do not admit of being reduced, which are in shape, broader below, than

above, and which present no aperture, similar to the os tincæ.

When the uterus is affected with a complete prolapsus, the reduction is not so easy of accomplishment. The great number of parts, which the displaced viscus drags downward with it, and the tumefaction, which sometimes follows, render it necessary to take some preparatory measures, before trying to replace the part in its natural situation. For this purpose, the patient should be kept in bed, be put on a low regimen, be bled, take purgative medicines, use the warm bath, and drink diluent beverages, while emollient applications are to be made to the part itself. This plan of treatment has often been attended with complete success, in cases of prolapsus uteri, of long standing and considerable size. Ruysch was against making any attempt to reduce the uterus, while this part was inflamed and swollen. He also thought, that the operation should be postponed when the uterus was in an ulcerated state. However, Sabatier observes, that, as this complication is only an accidental one, and merely arises from the friction, to which the tumour is exposed, and the irritation of the urine, the plan of immediately replacing the part cannot be attended with any danger. On the contrary, since the cause which produces and keeps up the ulceration will cease, as soon as the reduction is accomplished, it follows, that, the sores will soon heal after the uterus is put into its natural situation again.

When we reflect on the position of the uterus, on the strength of the ligaments, destined to support it, and on the manner in which the vagina is connected with the surrounding parts, we cannot easily conceive, how the womb can become so much displaced, as it is in cases of complete prolapsus. It is still more difficult to comprehend, how the uterus can become displaced during pregnancy, even when this viscus has attained its utmost state of distention. However, this sort of case has frequently happened. Sabatier remarks, that he could adduce several examples, and quotes an instance from the *Traité des Accouchemens de Portal*.

The prolapsus uteri, which occurs during pregnancy, demands the utmost care. The part is capable of being reduced, while the patient is in the early stage of pregnancy. When pregnancy has far advanced, or the disease is of long standing, the reduction is difficult. Perhaps, says Sabatier, it may be more prudent in these circumstances, to let the uterus continue protruded than to disturb the mother and

fœtus with reiterated attempts to reduce the part. The uterus, however, should not be left to itself; but be well supported with a suitable bandage, and the patient ought to be kept in her bed. When the prolapsus uteri occurs at the very period of delivery, every attempt at reduction is both useless and dangerous. In this case every exertion should be made to promote the delivery of the fœtus, by gradually dilating the os tincæ, which should, at the same time, be carefully supported. The extraction of the placenta also requires a great deal of caution, and it should be accomplished by introducing a hand into the uterus, with the palm turned away from the cavity of this viscus, towards the outside of the placenta, which is to be gradually separated by proceeding from one of its edges towards its centre.

In cases of complete prolapsus uteri, Ruysch was an advocate for leaving the expulsion of the fœtus, if alive, to be effected by nature; and the same writer advises us to be content with supporting the os tincæ. But, when the child is dead, he recommends extracting it with one hand, while the uterus is supported with the other. Sabatier, however, entertains different sentiments. The expulsion of the child is not less the effect of the contraction of the diaphragm and abdominal muscles, than of the womb itself. Hence, it is easy to conclude, that when either of these agents fails in co-operating, the delivery becomes either very difficult, or impossible. This is exactly what happens in the present case; for, the uterus having fallen down, can no longer be compressed by the action of the diaphragm and abdominal muscles. Sabatier sets down the practice, advised by Ruysch, as an exceedingly dangerous one; because, the efforts, made by the mother to deliver herself, would have a tendency to render the prolapsus uteri more complete, and thus increase the dragging of all those parts, with which this organ is connected. Sabatier, also, cannot discern the reason why Ruysch should recommend the line of conduct to differ, according to the different state of the child. This is, probably, quite passive in parturition, and contributes not in the least to its own expulsion. Sabatier, therefore, contends, that the treatment should not be at all influenced by the consideration of the child being dead or alive.

In whatever degree a prolapsus uteri has taken place, it is not sufficient to have reduced the part. The prolapsus would soon recur, if it were not prevented by

the employment of astringent injections and pessaries. (See *Pessary*.)

UTERUS, RETROVERSION OF. A retroversion of the uterus is said to happen, when the fundus of this viscus, carried by its own weight, and forced downward by the action of the diaphragm and abdominal muscles, becomes situated between the sacrum and posterior part of the vagina, while the cervix uteri becomes inclined towards the symphysis pubis. This kind of case was not understood till about the middle of the preceding century. Sabatier states, that Gregoire, a member of the college of surgery at Paris, first mentioned it in his private instructions in midwifery. Walter Wall, an English surgeon, who had attended Gregoire, suspected that he had met with a retroversio uteri in a woman, some months advanced in pregnancy, and he called in Dr. Hunter, in order to have the advantage of his advice. The woman was attacked with an obstinate constipation, and retention of urine, and died in about a week. A large tumour was found occupying the whole of the pelvis, and pushing the vagina against the os pubis. It had been found impracticable to push the swelling back into the abdomen, although the patient had been put on her knees and elbows, while one hand had been introduced into the vagina, and two fingers of the other hand into the rectum. Some curiosity was entertained, concerning what state things would be found in. Opening the body shewed, that the bladder, which was exceedingly full of urine, occupied almost the whole anterior part of the abdomen, in the same manner as the uterus does in the last month of pregnancy. When the bladder had been emptied, that part of it, in which the ureters terminate, and which is connected with the vagina and cervix uteri, was found raised up, as high as the upper aperture of the pelvis, by a large tumour, which filled the whole cavity of the pelvis, and was found to be the uterus. A catheter, when passed into the vagina, could be made to lift up the latter viscus, and the upper part of the tumour. This portion of the swelling, on which the bladder lay, consisted of the cervix uteri, while the fundus of this organ was situated downwards towards the os coccygis and anus. The uterus had attained such a magnitude, that it could not be taken out of the pelvis, before the symphysis pubis was divided, and the two ossa innominata were pulled asunder. It was found impossible to assign any cause for the manner, in which the uterus had become displaced, as the patient had been making no exertion, had

met with no fall, and had only been frightened at something just before the complaint commenced.

Dr. Hunter, struck with the singular nature of the case, thought it deserving of attention among medical men, and he made it the subject of a lecture, which he delivered to his pupils in 1754. He was afterwards consulted by several persons, who were afflicted with the retroversio uteri; but, not in so acute a way, as in the above instance. All the patients were in the third month of pregnancy, and first suffered a difficulty of making water, succeeded by a retention of urine, and afterwards by constipation. Dr. Hunter always emptied the bladder by means of a catheter and glysters, which measures sometimes effected a cure, the uterus spontaneously resuming its natural position. In every instance, the accident disappeared, when pregnancy was more advanced, and the uterus had acquired larger dimensions. Success was not always obtained; for in some cases, in which Dr. Hunter was consulted too late, the trials to replace the uterus proved fruitless, and the women died. Dr. Hunter was so firmly convinced of the impossibility of saving patients, circumstanced in the above manner, unless extraordinary means were resorted to, that he thought one should endeavour to diminish the size of the uterus, by introducing a trocar into the body of this viscus, through the posterior parietes of the vagina, so as to let out the water of the amnios, the relative quantity of which is known to be greater, in the early, than in the advanced, stage of pregnancy.

Such a puncture might certainly be the means of the uterus resuming its natural position; but, there would be considerable danger of its exciting the contraction of the uterus, and causing abortion. No risk of this kind would be encountered by puncturing the bladder above the pubes. In this manner, a free passage would be afforded for the escape of the urine, and the reduction of the uterus might be effected.

Mr. Lynn, a surgeon in Suffolk, has seen the bladder burst, and the urine become extravasated in the abdomen, in a case of a retroversion of the uterus, in consequence of the patient's refusal to submit to the preceding operation. The woman was forty years of age, of a relaxed habit, mother of several children, and had been pregnant four months. She had been for some time before afflicted with a prolapsus of the vagina. The swelling had been a few days reduced, when, in consequence of tripping, she felt something become displaced in her abdomen, and fall to-

wards the lower part of her back. She was immediately attacked with constipation, retention of urine, nausea, and pain in her belly. The means, which were employed, not proving effectual, Mr. Lynn suspected, that a retroversio uteri had happened, and introduced his fingers into the vagina, in order to ascertain the fact. His fingers were stopped by a tumour, as large as a child's head. The swelling occupied the back part of this passage, and descended as low as the perinæum. Being certain, that the uterus was displaced, he attempted to reduce it. The patient was put into various positions, and the fingers of one hand were introduced into the vagina, while those of the other were passed into the rectum. The use of the catheter was not forgotten; but, it could not be introduced far enough to reach the urine. Glysters were stopped at the very beginning of the rectum. The abdomen was exceedingly tense, especially, in the hypogastric region. A proposal was made to puncture the bladder; but, the patient refused to submit, and preferred being left to her fate. On the seventh day of her illness, she was very much reduced; and became affected with nausea, and hiccough, the forerunners of the mortification, which was about to happen. At length, she felt something give way in her abdomen, and, the ease, which succeeded, revived her hopes. These, however, were not of long duration; for, after being delivered of the fœtus, she sunk and died the next morning. On opening the body, the bladder was found to have sloughed and burst at several points, and two pints of urine were consequently extravasated in the abdomen.

We may conclude, from what has been stated, that the retroversio uteri is an exceedingly dangerous affection. However, it is not invariably fatal, particularly, when the patient receives succour, before the disorder has made much progress. It only occurs in the early months of pregnancy, and in women, whose pelvis is very wide, while its brim is very contracted. If the uterus, which occupies a pelvis of this conformation, should be pushed back by a distended state of the bladder, and pressed against the sacrum, while the soft parts yield, the viscus, in question, becomes, as it were, wedged, and is incapable of changing its position. In this immoveable state, it presses upon the surrounding parts, and these upon it, so that a very serious train of bad symptoms are the consequence.

The first care of a practitioner, consulted in a case of retroversio uteri, should be to empty the bladder and large intestines, and to relax the parts by every pos-

vible means. Then, he should immediately proceed to replace the uterus, by placing the patient in a suitable posture, and making methodical pressure in the rectum and vagina. Should he be so fortunate as to succeed, the patient is to be kept in bed, her bowels are to be kept open, and she is to be advised always to obey the calls of nature the first moment she feels any inclination to make water. She is also to be enjoined to avoid all kinds of exertion, and wait, till the gradual enlargement of the uterus removes the possibility of this viscus descending into the pelvis. (*Sabatier, Médecine Opératoire, Tom. 2.*)

UVA URSI. The author of the *Pharmacopœia Chir.* remarks, that this plant, which was first brought into notice by De Haen, has been generally considered as a powerful remedy in calculus; but that it has not been proved, in any instance, to possess the properties of a solvent. The late Dr. Austin, however, recommended it upon the principle of its lessening the irritability of the bladder, and diminishing that secretion of diseased mucus, which, he supposed, greatly to contribute to the augmentation of the stone.

Mr. Bell, of Edinburgh, strongly recommends it in that state of a gonorrhœa where the irritability of the bladder is excited in a high degree, and where the urine is loaded with a viscid matter. In these cases, he directs the powder to be given in doses of a scruple or half a dram, three times a day. A remedy of this sort is certainly a great desideratum in surgery.

Dr. Saunders directs three drams of uva ursi to be macerated in a pint of hot water, and two or three ounces of the strained liquor to be given three times a day. (*Pharm. Chirurg.*)

UVULA, AMPUTATION OF. The uvula is subject to several kinds of enlargement, in which it becomes longer and more bulky, than natural, or in which it merely has its length increased. In consequence of such changes, it acts as an impediment to swallowing, and speaking, or else causes a disagreeable tickling at the root of the tongue, with which it comes into contact, and thus it may excite frequent retchings, and an annoying cough.

When things have attained this state, medicines are often ineffectual, and the only plan of relief consists in amputating a portion of the uvula, a very simple operation, which has been advised to be done in various ways.

The ancients recommended taking hold of the uvula with a pair of forceps, and cutting off the piece below the blades of

the instrument. Celsus remarks: *Neque quidquam commodius est quam vosella apprehendere, sub eaque, quod volumus, excindere.* Fabricius ab Aquapendente objects to this method of operating, on the ground, that it is necessary to employ both hands, so that there is a necessity for the aid of a third for holding the tongue and lower jaw. He prefers employing scissors, and thus to leave the left hand at liberty. When the uvula had been cut off, he advised a heated spoon to be applied to the cut end of the part, with a view of stopping the bleeding.

Paré speaks in favour of the method, advised by Celsus. When the size of the uvula is considerable, and there is reason to fear, that the vessels will bleed freely, he recommends it to be tied with a ligature, by means of an instrument, invented by Castellan, a physician distinguished in his time, both by his learning and judgment. The instrument in question consists of a ring, with a groove on its convexity, which ring is mounted on a slender handle. A ligature is put round the ring with a slip-knot, which is to be tightened by means of another ring, of much smaller size, mounted, like the preceding one, on a long slender handle. The ligature is to be left in the mouth, and, when it does not seem to make sufficient constriction, it is to be tightened.

Fabricius Hildanus has since described an instrument, constructed on the same principles, and applicable to the same purposes. Scultetus made use of the latter on a soldier, whose uvula was affected with the venereal disease. This author does not state, however, whether the ligature, which was applied in this way, was painful, productive of considerable inflammation, or whether the patient suffered much inconvenience from the presence of the ligature. Such effects were probably produced.

Heister, in plate 21, has given the engraving of an instrument, which was invented by a Norwegian peasant, in whose country a relaxed state of the uvula is a very common affection. The contrivance was perfected by Raw. It is only necessary for me to state, that it is a kind of knife, concealed in a sheath. At the end of this last part, when the blade is drawn back, a notch is left, in which the uvula is to be engaged, and then divided by pushing forward the knife.

Sabatier's plan of cutting off a portion of the uvula, is performed in a way very similar to the one described by Celsus. After having placed the patient on a high chair, and in a good light, with his head properly supported, he takes hold of the uvula with a pair of forceps, with holes in

the blades, like those used for the extraction of polypi from the nose. He then divides the uvula with a pair of scissors, made with concave cutting edges, like the scissors recommended by Levret for dividing the umbilical cord. As the uvula is rendered tense with the forceps, perhaps, any other kind of scissors would answer equally well; but, Sabatier states, that those, which he uses, have the advantages of taking hold of a larger piece of the uvula, and of not letting it slip away.

The perforated forceps also take better

hold of the part, than common ones do, from which it is apt to slip. Sabatier observes, that he has never seen any bleeding of consequence follow the trivial operation just described. (See *Médecine Opératoire*, Tom. 3.)

In the *First Lines of the Practice of Surgery* will be found an engraving of a pair of scissors, which seem well calculated for cutting off portions of the uvula, as they have at the end of one of their blades a transverse piece, which prevents the part, about to be cut, from slipping away.

V.

VACCINATION. The practice of inoculating with cow-pox matter, or lymph, for the purpose of rendering the inoculated subject insusceptible of the effects of the small-pox contagion.

VAGINA IMPERFORATE. It is very common to meet with female infants, born with different kinds of imperforations of the vagina. Sometimes, this passage is not completely shut up, so that the usual evacuations happen in an uninterrupted manner, and it is a considerable time before the malformation is discovered. Doubtless, there has often been occasion to obviate the defect in question, in order to qualify young women for marriage. Some females have certainly become pregnant, notwithstanding the sort of obstruction alluded to, and, in these cases, the membrane, which shuts up a part of the mouth of the vagina, has either been torn by the effects of labour, or been divided as much as was necessary for promoting this process of nature.

What is more curious, is, that there should have been found two membranes, one placed beyond the other, and obstructing the vagina. That, which is commonly met with, is nothing more than the hymen, which is thicker, and stronger, than natural. Ruysch relates, that a woman, who had been in labour three days, could not be delivered. The head presented itself; but, was prevented from coming out by the hymen, which shut up the vagina, and was very tense. Ruysch made an incision into the membrane; but, to no purpose, since there was another membrane, of a thicker texture, and situated more deeply in the passage, hindering the delivery of the child. On an incision being made into this second membrane, the

child was expelled, and the case ended well.

When the vagina is completely imperforate, as soon as the time of the menses commences, a great many complaints occur, which afflict the patient with more severity, in proportion as the blood accumulates in the passage, and they may even lead to a fatal termination, when the cause is not understood, or not detected till it is too late. The complaints alluded to, are very similar to those of pregnancy; for instance, rumbling noises in the bowels, loss of appetite, nausea, vomiting, enlargement of the mammae, spasms, convulsions, swelling of the abdomen, &c. Hence, girls, in this situation, have often been supposed to be pregnant, although they were not in a state even to become so; and some young women have been known to die, after suffering the most afflicting symptoms.

When the only malformation consists in the orifice of the vagina being shut up by a membrane, the patient may be easily relieved by a crucial incision, or a single cut, the edges of which are kept apart by a tent of suitable shape and size. Instances of the success of such an operation are to be found in numerous writers. Fabricius ab Aquapendente informs us, that a female child was born with a membrane, which completely shut up the vagina. The girl experienced no inconvenience from it, till she was about thirteen years of age, when the period of her menses began. As the blood was retained, she became afflicted with more severe pains in the loins, the lower part of the abdomen, and about the upper part of the thighs. It was supposed, that she was attacked by the sciatic gout, and she was treated

accordingly. Notwithstanding the medicines, which were prescribed, she became hectic, and reduced to a complete state of marasmus, in which she passed restless nights, had lost her appetite, and was delirious. A painful, very elastic tumour afterwards took place in that part of the abdomen corresponding to the uterus. The pains were aggravated every month, at the period, when the patient ought to have menstruated. She was in a dying condition, when Fabricius ab Aquapendente was consulted, who, after ascertaining the real nature of the case, performed the requisite operation. A prodigious quantity of black putrid blood was discharged from the vagina; the bad symptoms gradually subsided, and the patient recovered.

It is not always equally easy to cure the imperforate vagina, when the malformation is produced by an extensive accretion of the sides of this passage to each other. The success of the operation is more doubtful, because, it is impossible to reach the situation of the blood without cutting through a considerable thickness of parts, in doing which there is some danger of wounding the rectum, or bladder. A lady, twenty-four years of age, after having tried, for eight years, such remedies as seemed best calculated for exciting the menstrual discharge, became affected with a large hard swelling of the abdomen, and a kind of herpetic affection round the body near the navel. At length, it was discovered, that the imperforation of the vagina was the sole cause of all the bad symptoms, which the patient had long endured. An incision was made, which enabled the operator to introduce his finger into a large cavity, and which gave vent to a considerable quantity of blood. It was thought, that an opening had been made into the vagina; but, the patient having died three days afterwards, it was seen, that a mistake had been made, as the cavity, in which the finger had been introduced, was that of the bladder. The vagina was closed below by a substance an inch in diameter, and half an inch thick. The upper part of this passage, the uterus, and the Fallopian tubes, were exceedingly enlarged, and filled with a dark-brown, sanious fluid. A similar fluid was found extravasated in the abdomen, and, it was discovered to have got there through a rupture, which had taken place in the Fallopian tube. The ovaries were in a natural state. De Haen, who has related this case in the sixth part of his work, intitled *Ratio Medendi*, was of opinion, that, in order to avoid opening the rectum, or

bladder, only one oblique cut should be made in the membrane, which stops up the vagina, just as was advised, by Meeckren. (*Sabatier de la Médecine Opératoire*, Tom. 1.)

VAGINA, PROLAPSUS, OR INVERSION OF. This affection may take place in various degrees. The prolapsed part does not consist of all the coats of the vagina, in the manner that the inverted uterus is formed of the whole substance of that viscus, which becomes turned inside out. The inner lining of the vagina is alone displaced, in consequence of the swelling, and thickening, with which it is affected. The inversion of the vagina appears like a thick, circular substance, irregularly pleated in the middle, and at the bottom of which the cervix uteri is situated, having descended further down, than natural. The prolapsed portion of the vagina increases, or diminishes, according as the patient sits up, or keeps in bed a certain time. The complaint is accompanied by a sense of heaviness in the hypogastric region; tenesmus; and a difficulty of making water, in consequence of the alteration produced in the direction of the meatus urinarius.

Such is the prolapsus of the vagina in an early state; but, when it has been of long standing, and the patients have remained, for a long while, without any assistance, the membranous lining of the passage becomes more and more thickened; the tumour, which it forms, becomes more considerable, elongated, and hardened. In this state, there still continues at the lower part of the swelling, an opening, out of which the usual evacuations are made. The grievances, which patients suffer, are similar to those arising from a prolapsus uteri, to which, indeed, the present case bears a great resemblance. The prolapsus vaginae, however, differs, inasmuch as the tumour, formed by a descent of the uterus is very firm, and terminates in a narrow end, on which may be observed the longish transverse opening, named the os tincæ, while the tumour, arising from a prolapsus of the vagina, is soft, thicker below, than elsewhere, and ends in an irregular aperture.

When the prolapsus vaginae is recent, the part may be easily reduced, and kept up with a pessary; but, when the case has been of long standing, it is neither easy to effect the reduction, nor to prevent a recurrence of the disorder. Softening, relaxing remedies, in this circumstance, are recommended, and the patient should, in particular, confine herself to her bed, and wear a T bandage, which

should be made to press upon and support a piece of sponge in the orifice of the vagina.

The swelling of the membranous lining of this passage, being folded back on itself, increases in such a degree, that the tumour, thus occasioned, falls into a state of mortification. In this event, some writers have advised the extirpation of the swelling, justifying the practice, on the authority of some distinguished practitioners, and the little danger, attendant on the operation.

Even Sabatier only objects to this proceeding, on the ground of the danger of mistaking a prolapsus of the uterus, for one of the vagina. However, no modern surgeons in this country would hesitate about rejecting such an operation, and leaving the sloughs to separate of themselves.

VARICOCE'LE. (from *varix*, a distended vein, and *χηλα*, a tumour.) Many writers mean by the term *varicocele*, a varicose enlargement of the spermatic veins, which latter affection, we have, with Celsus and Pott, treated of under the name of *Cirsocele*.

Pott remarks, that the varicocele (which is an enlargement and distention of the blood-vessels of the scrotum) is very seldom an original disease, independent of any other, and, when it is, is hardly an object of surgery. The blood-vessels of the scrotum are of different size in different people; and like the vessels in other parts of the body, are liable to become varicose; but, they are seldom so much enlarged, as to be troublesome, unless such enlargement is the consequence of a disease, either of the testicle, or spermatic chord. When this is the case, the original disease is what engages our attention, and not this simple effect of it; and, therefore, considered abstractedly, the varicocele is a disease of no importance. (*Pott's Chirurgical Works*, Vol. 2.)

VARICULA. (dim. of *varus*, a dilated vein.) A varicose enlargement of the blood-vessels of the tunica conjunctiva of the eye.

VARIX. (from *varius*, unequal.) The term *varices* is applied to a kind of knotty, unequal, dark-coloured swellings, arising from a dilatation of different parts of the veins. Varices most frequently occur in the feet, near the ankles, and, sometimes, higher up, in the legs, thighs, and other parts, as, for instance, the scrotum, and even the abdomen, as Celsus has accurately remarked. Pregnancy is one of the most common causes of varicose veins. The disease, however, may be occasioned by the pressure of other swellings, besides that of the gravid uterus; it may

also be produced by leading too sedentary a life, and, in short, by every kind of cause, capable of retarding the return of the blood, through the veins, towards the heart. The larger the diseased vessels become, the more painful and troublesome they are, in consequence of the great distention of their coats. Sometimes, they even burst, and emit a considerable quantity of blood; while, in other instances, they give rise to very obstinate ulcers. When the affected veins are not of large size, they seldom cause any very serious inconveniences. Hence, patients commonly make no complaint, and the neglect of the case gives it an opportunity to acquire an aggravated form.

When varicose veins are in a painful state, the patient (if other circumstances do not forbid) should be bled, and be put on a cooling regimen. A roller should also be applied with due tightness, and its employment continued for a considerable time.

Celsus informs us, that the ancients used to relieve patients, afflicted with varicose veins, by the actual cautery, or an incision. The first is a very objectionable method; and the latter is seldom necessary, except as formerly described by Paré and latterly by Mr. Home, in particular cases of ulcers on the legs. (See *Ulcers*.) However, some writers are of opinion, that, when the varicose veins are exceedingly painful, and likely to burst, it is best to make a longitudinal opening into the largest of them with a lancet, in order to give vent to a certain quantity of blood, proportioned to the patient's strength, and, they advise a compress and bandage to be afterwards applied.

Dionis assures us, that he did not know any better means of compressing varicose veins, than buskins, made of dog-leather, and so contrived as to be laced on the part, with the requisite degree of tightness. Thus the leg might be compressed in an equal, regular way, without any occasion for removing the pressure at night. Since the time of Dionis, laced stockings have been very commonly and usefully employed for the cure of varices, situated in the leg.

Some have spoken in favour of applying astringent applications to varicose veins, as, for instance, compresses dipped in vinegar. But, though such remedies, perhaps, ought not to be altogether rejected as useless, little dependence can be put on them, unless they are employed in conjunction with compression, which, in the majority of cases, has of itself much greater effect, than any other plan, provided it is methodically made, and duly

maintained. For this purpose a laced-stock is certainly better, than any kind of roller.

For an account of the method of curing a particular sore on the leg, depending on varicose veins, see *Ulcer*. For a description of the varicose affection of the veins of the rectum, see *Hemorrhoids*.

VARI. Persons born with their feet deformed and turned inward are so termed.

VALGI, on the contrary, was used to express subjects born with their feet deformed and turned outward, which is a less frequent case.

VENEREAL DISEASE. (*Lues Venerea. Morbus Gallicus. Syphilis, or Siphilis.*) About the year 1494, or 1495, the venereal disease is said to have made its first appearance in Europe. Some writers are of opinion, that the distemper originally broke out at the siege of Naples; but, most of them have supposed, that, as Columbus returned from his first expedition to the West Indies, about the above period, his followers brought the disorder with them from the new to the old world. Other authors, among whom is Mr. B. Bell, maintain the opinion, that many arguments might be adduced to show, that the venereal disease was well known in the old continent, and that it prevailed among the Jews, Greeks, and Romans, and their descendants, long before the discovery of America.

Marcellus Cumanus, Johannes de Vigo, and other early writers on the *lues venerea* have left an account of some of the symptoms, and their description, as far as it extends, is found to agree with the appearances, observed even at the present day. Marcellus remarks: "I observed many of the officers and foot soldiers in Milan, while I was in the camp at Navarre, to have several scabs, or pustules, breaking out on the face, and spreading all over the rest of their bodies. The first of which appeared usually under the preputium, or on the outside, like a grain of millet, sometimes behind the glans, with a small itching. At other times, a single pustule would arise, like a little bladder, without much pain, but, itching also. If rubbed, or scratched, there arose an ulcer, corrosive, and smarting, like the sting of an ant," &c. (*Vide Astruc, Vol. 2. p. 226, translated by Dr. Barrowby.*)

Johannes de Vigo notices the way in which the disease is communicated by a chancre, in a still more particular and accurate manner: "*ejus origo in partibus genitalibus, viz. in vulvâ in mulieribus, et in virgâ in hominibus, semper ferè fuit cum pustulis parvis, interdum lividi coloris, aliquando nigri, nonnunquam subalbidis cum cal-*

lositate eas circumdante." De Morbo Gallico. These quotations shew, that the venereal disease was propagated from the beginning, as it now is, by what the old writers called a *pustule*, and we name a *chancre*.

The venereal disease arises from a morbid poison, which, when applied to the human body, has the power of propagating, or multiplying itself, and is capable of acting both locally and constitutionally. It may also be communicated to other persons, in all the various ways, in which it is received, producing, as Mr. Hunter remarks, the same disease in some one of its forms.

The same celebrated writer notices, that, in whatever manner the venereal poison arose, it certainly began in the human race, as no other animal seems capable of being affected by it. The parts of generation were, probably, also, the first affected; for, if the disease had taken place in any other part of the body, in all probability, it would never have gone further, than the person, in whom it first arose. However, since it was situated in the parts of generation, where the only natural connexion takes place, between one human being and another, except that between the mother and child, it was in the most favorable situation for being propagated; and Mr. Hunter infers, also, that the first effects of the disease must have been local, in consequence of the fact, now well established, that none of the constitutional effects are communicable to other persons.

The particular properties of the venereal poison are quite unknown, its effects on the human body being the only information, which we possess concerning it. Mr. Hunter says, that it is commonly in the form of pus, or mixed with pus, or some other secretion. The virus excites, in most cases, an inflammation in the parts contaminated, which inflammation is attended with a specific mode of action, which is different from all other actions attending inflammation, and, according to Mr. Hunter, produces the specific quality in the matter.

The formation of matter, though a very general, is not a very constant attendant on this disease: for, inflammation, produced by the venereal poison, sometimes does not terminate in suppuration. But, if Mr. Hunter's sentiments are correct, it is the matter produced, whether with, or without inflammation, which alone contains the poison. Hence, a person, having the venereal irritation in any form, not attended with a discharge, cannot communicate the disease to another. In proof of this doctrine, the above-mention-

ed distinguished writer states, that, though married men often contract the disease, and continue to cohabit with their wives, even for weeks, yet, in the whole of his practice, he never once found, that the complaint was communicated under such circumstances, except when connexion had been continued, after the discharge had appeared.

It is possible to conceive, that the venereal poison may be in so diluted a state, that it would be incapable of exciting any degree of irritation, and, consequently, that no effects would be produced. However, when the poison has the power of irritating the part, to which it is applied, the same consequences will follow, whether from a large, or small quantity; from a strong, or weak solution.

The same matter, however, may affect different persons very differently. Two men sometimes have connexion with the same woman; both catch the disease; but, one may have very severe symptoms; the other exceedingly mild ones. Mr. Hunter adds, that he has known one man give the disease to different women, and some of the women have had it with great severity, while others have suffered very slightly.

It is a great contested question, in the subject of the venereal disease, whether this malady and gonorrhœa arise from the same poison? Mr. Hunter acknowledges, that the opinion, of their originating from two distinct poisons, seems to have some foundation, when we consider the difference in the symptoms, and method of cure. But, the same author contends, that, if we take up this question upon other grounds, and, also, have recourse to experiments, the result of which we can also safely depend upon, we shall find this notion to be erroneous. I shall not repeat, in this place, the arguments, adduced by Hunter in support of the doctrine, that both diseases are produced by the same virus: the reader will find some notice taken of them in the article *Gonorrhœa*.

Mr. B. Bell, and several other writers, have supported an opinion, contrary to the one, set forth by John Hunter, relative to the poison, from which lues venerea, and gonorrhœa arise, and, indeed, after impartially considering the evidence brought forward by the two opposite parties, I feel much inclined to believe, that the two diseases do not originate from the same virus. Mr. Hunter, it is true, has brought forward some observations tending to shew, that, a chancre and other venereal symptoms, following absorption from such chancre, might be communicated by inoculating a person

with the matter of a gonorrhœa. However, in speaking of *gonorrhœa*, I have suggested some reasons for not placing implicit belief in the inferences, which Mr. Hunter has drawn.

Mr. B. Bell adduces some facts, from which an almost decisive conclusion may be made, that the poisons of the venereal disease, and the gonorrhœa, are entirely different and distinct. Mr. Bell observes, that, on a subject such as this, the names of persons, by whom the following experiments were conducted, cannot be mentioned; but, he is personally acquainted with all of them, and he believes his friend, Dr. Duncan, saw the progress of some of the cases. Mr. Bell knows, that all, which they relate, may be with certainty relied on, and he explains, what was done, in nearly their own words.

One gentleman states: "My experiments were made a good many years ago, and were meant to form the subject of a paper for a medical society, of which I am a member. I had no theory to support, nor any other view in making them, than to support the opinion, at that time generally received among practitioners, namely, that lues venerea and gonorrhœa virulenta, are one and the same disease, arising from the same matter of contagion, acting in a different manner on different surfaces. I was soon, however, convinced, by the very distressful and unexpected event of my experiments of the fallacy of this opinion.

"Matter was taken upon the point of a probe, from a chancre on the glans penis, before any application was made to it, and completely introduced into the urethra, expecting thereby to produce a gonorrhœa. For the first eight days, I felt no kind of uneasiness; but, about this period, I was attacked with pain in passing my water. On dilating the urethra, as much as possible, nearly the whole of a large chancre was discovered, and, in a few days thereafter, a bubo formed in each groin. No discharge took place from the urethra, during the whole course of the disease; but another chancre was soon perceived in the opposite side of the urethra, and red precipitate was applied to it, as well as to the other, by means of a probe previously moistened for the purpose. Mercurial ointment was at the same time rubbed on the outside of each thigh, by which a profuse salivation was excited. The buboes, which, till then, had continued to increase, became stationary, and, at last, disappeared entirely; the chancres became clean, and, by a due continuance of mercury, a complete cure was at last obtained."

Mr. B. Bell informs us that the next

experiment was made with the matter of gonorrhœa; a portion of which was introduced between the prepuce and glans, and allowed to remain there without being disturbed. In the course of the second day, a slight degree of inflammation was produced, succeeded by a discharge of matter, which, in the course of two or three days, disappeared.

The same experiment was, by the same gentleman, repeated once and again, after rendering the parts tender, to which the matter of gonorrhœa was applied; but, no chancre ever ensued from it.

Mr. B. Bell also acquaints us, that two young gentlemen, while prosecuting the study of medicine, became anxious to ascertain the point in question; with which view, they resolved on making the following experiments, at a time, when neither of them had ever laboured under either gonorrhœa, or syphilis, and both in these and in the preceding experiments, the matter of infection was taken from patients, who had never made use of mercury.

A small dossil of lint, soaked in the matter of gonorrhœa, was, by each of them inserted between the prepuce and the glans, and allowed to remain on the same spot for the space of twenty-four hours. From this, they expected, that chancres would be produced; but, in the one, a very severe degree of inflammation ensued over the whole glans and præputium, giving all the appearance of, what is usually termed, *gonorrhœa spuria*. A considerable quantity of fetid matter was discharged from the surface of the inflamed parts, and, for several days, he had reason to fear, that an operation would be necessary for the removal of a paraphymosis. By the use of saturnine poultices, laxatives, and low diet, however, the inflammation abated, the discharge ceased, no chancre took place, and he soon got entirely well.

The other gentleman, says Mr. B. Bell, was not so fortunate. The external inflammation, indeed, was slight, but, by the matter finding access to the urethra, he was attacked, on the second day with a severe degree of gonorrhœa, which continued for a considerable time to give him a great deal of distress, nor did he, for upwards of a year, get entirely free of it.

The latter gentleman, impressed with a sense of the imprudence and hazard of all such experiments, could not be prevailed upon to carry them further, although they were prosecuted by his friend. This young man, soon after the inflammation, arising from his first experiment, had been removed, inserted the matter of gonorrhœa on the point of a lancet, beneath the skin of the præputium, and,

likewise, into the substance of the glans; but, although this was repeated three different times no chancres ensued. A slight degree of inflammation was excited; but, it soon disappeared, without any thing being done for it. His last experiment was attended with more serious consequences. The matter of a chancre was inserted on the point of a probe to the depth of a quarter of an inch, or more, in the urethra. No symptoms of gonorrhœa ensued; but, in the course of five, or six days, a painful inflammatory chancre was perceived on the spot, to which the matter was applied. To this succeeded a bubo, which ended in suppuration, notwithstanding the immediate application of mercury, and the sore, that was produced, proved both painful and tedious. Ulcers were at last perceived in the throat, nor was a cure obtained, till a very large quantity of mercury was given under a state of close confinement for thirteen weeks. (*Treatise on Gonorrhœa Virulenta and Lues Venerea. Vol. 1, Edit. 2, p. 438, &c.*)

Some have supposed that the poisonous quality of venereal matter arises from a fermentation taking place in it as soon as it is formed. However, Mr. Hunter conceives, that the animal body has a power of producing matter according to the irritation given, whereby the living powers, whenever irritated in a particular manner, produce such an action in the parts, as to generate a matter, similar in quality to that which excited the action.

It does not seem necessary to adduce the arguments, by which the idea of fermentation being concerned in the production of the venereal virus might be refuted, as no modern practitioner now defends the doctrine. Mr. Hunter was of opinion, that the effects, produced by the venereal poison, arise from its peculiar, or specific irritation, joined with the aptness of the living principle to be irritated by such a cause, and the parts, so irritated, acting accordingly. Hence, he considered, that the venereal virus irritated the living parts in a manner peculiar to itself, and produced an inflammation, peculiar to that irritation, from which a matter is produced, peculiar to the inflammation.

The venereal poison is capable of affecting the human body in two different ways; locally, that is, in those parts only, to which it is first applied; and, constitutionally, that is, in consequence of the absorption of the venereal pus, which affects parts, while it is diffused in the circulation.

Though Mr. Hunter uses the term constitutional, he explains in a note,

that the word is not altogether correctly applied, as every complaint of a venereal nature is truly local, and produced by the simple application of the poison to the parts. The latter circumstance may happen, either by the immediate contact of the matter with the skin, before any absorption has taken place, or it may happen by the matter coming into contact with such parts, as are susceptible of the venereal disease, after absorption has taken place, and while the virus is circulating in the system.

Mr. Hunter believed, as the reader already understands, that gonorrhœa was only one form of the venereal disease. In gonorrhœa, he observes, there is a formation of matter without a breach in the solids; while, on the contrary, a chancre is attended with a breach of this kind; and, he imputed the two different ways, in which the disorder appears, not to any thing peculiar in the kind of poison applied, but, to the difference in the parts contaminated. When the poison was applied to a secreting surface, which had no cuticle, he believed, that, it never produced ulceration, but, only an alteration in the quality of the secretion. Thus, in the urethra, instead of mucus, pus became secreted, and a gonorrhœa arose. On the other hand, Mr. Hunter thought, that, when the virus was applied to a surface, that is covered with a common cuticle, as the common skin of the body, ulceration would be the effect. In this manner, he accounts for the same poison producing two such different consequences, as gonorrhœa, and chancre.

OF CHANCRES.

From the account, already delivered, that the venereal disease can only be imparted from one person to another by the actual contact of the matter, it must be obvious, that the first effects of the disorder must in general make their appearance on the parts of generation, in consequence of the virus being applied to them during coition.

Mr. Hunter reminds us, however, that the penis, which in men, is the common seat of a chancre, is, like every other part of the body, liable to diseases of the ulcerative kind, and that, on account of some circumstances, it is rather more so than other parts. When attention is not paid to cleanliness, excoriations, or superficial ulcers often originate in consequence of such neglect. The genitals, also, like almost every other part that has been injured, when once they have suffered from the venereal disease, are very liable to ulcerate again. Since, therefore, the

penis is not exempted from the common diseases of the body, Mr. Hunter very properly remarks, that an opinion, concerning ulcers situated on it, must be formed with great attention, particularly, as every disease in this part is suspected to be venereal.

"Venereal ulcers (says Mr. Hunter) commonly have one character, which, however, is not entirely peculiar to them; for, many sores, that have no disposition to heal, (which is the case with a chancre) have so far the same character. A chancre has commonly a thickened base, and, although, in some, the common inflammation spreads much further, yet the specific is confined to this base." (P. 215.)

Mr. Hunter notices, that there are three ways, in which chancres may be produced; first, by the poison being inserted into a wound; secondly, by being applied to a non-secreting surface; and, thirdly, by being applied to a common sore. To which ever of these three different surfaces it is applied, the pus produces its specific inflammation and ulceration, attended with a secretion of pus. The matter produced, in consequence of these different modes of application, partakes of the same nature, as the matter, which was applied, because, as Mr. Hunter observes, the irritations are alike.

Mr. Hunter takes notice, that the poison much more readily contaminates, when it is applied to a fresh wound, than to an ulcer.

Though chancres commonly occur on the parts of generation, this circumstance is entirely owing to their being the only parts, with which the virus ever comes into contact, the application being made during the connexion between the sexes. Every part of the body may be affected by the application of venereal matter to it, particularly, when the cuticle is thin. Mr. Hunter mentions, his having seen on the red part of the lip a chancre, which was as broad as a sixpence. The venereal virus had most probably been inadvertently applied to the part by the patient's own fingers. Mr. Hunter had not the least doubt of the sore being really a chancre; for, besides its diseased appearance, it was attended with a bubo in one of the glands under the lower jaw.

Chancres have occasionally occurred on the fingers, particularly, when there has been any previous cut, or scratch on these parts, and they have been employed in this state in dressing venereal sores.

Mr. Hunter computed, that claps occur more frequently, than chancres, in the proportion of four, or five to one. As

this celebrated writer conceived, that both these diseases originated from the same virus, which only produced different effects of its having to act on a secreting, or non-secreting surface, he attempts to explain the less frequent occurrence of chancres by the operation of the venereal poison, being often prevented by the intervention of the cuticle.

The same author states, that, in men, chancres generally make their appearance on the frænum, glans penis, prepuce, or on the common skin of the body of the penis; and, sometimes, on the fore part of the scrotum; but, he thought, that such sores took place most frequently on the frænum, and in the angle, between the penis and glans. He refers the cause of the venereal poison affecting these parts to the manner, in which the disease is caught, and not to any specific tendency in these parts to catch the complaint; and he imputes the circumstance of the frænum being more frequently affected, than other parts of the penis, to the external form of that part being irregular, and allowing the venereal matter to lie undisturbed in its folds. Thus the virus has time to irritate, and inflame the parts, and to produce the suppurative and ulcerative inflammation in them.

Mr. Hunter next observes, that the interval, between the application of the poison, and its effects upon the parts, is uncertain; but, that, on the whole, a chancre is longer in appearing, than a gonorrhœa. However, the nature of the parts affected makes some difference. When a chancre occurs on the frænum, or at the termination of the prepuce, in the glans, the disease in general comes on earlier; these parts being more easily affected, than either the glans penis, common skin of this organ, or the scrotum.

Mr. Hunter adds, that, in some cases, in which both the glans and prepuce were contaminated from the same application of the poison, the chancre made its appearance earlier on the latter part.

Mr. Hunter states his having been acquainted with some instances, in which chancres appeared twenty-four hours after the application of the matter; and with others, in which an interval of seven weeks, and even two months elapsed, between the time of contamination and that, when the chancre commenced.

A chancre first begins with an itching in the part. When the inflammation is on the glans penis, a small pimple full of matter, generally arises, without much hardness, or seeming inflammation, and with very little tumefaction; for, the glans penis is not so apt to swell, in consequence of inflammation, as many other

parts are, especially, the prepuce. Mr. Hunter also explains, that chancres, situated on the glans, are not attended with so much pain and inconvenience, as sores of this nature on the prepuce. When chancres occur on the frænum, or, particularly, on the prepuce, a much more considerable degree of inflammation soon follows, attended with effects, more extensive and visible. These latter parts, being composed of very loose cellular membrane, afford a ready passage for the extravasated fluids. The itching is gradually converted into pain; in some cases, the surface of the prepuce is excoriated and afterwards ulcerates; while, in other examples, a small pimple or abscess appears, as on the glans, and then turns into an ulcer. The parts become affected with a thickening, which, at first, while of the true venereal kind, is very circumscribed: not diffusing itself, as Mr. Hunter observes, gradually and imperceptibly into the surrounding parts; but, terminating rather abruptly. Its base is hard, and the edges a little prominent. When it begins on the frænum, or, near it, that part is very commonly wholly destroyed, or a hole is often made through it by ulceration. Mr. Hunter thought it better, in general, under the latter circumstance, to divide the part at once.

When the venereal matter is applied to the body of the penis, or front of the scrotum, where the cuticle is thicker, than that of the glans penis and prepuce, the chancre generally makes its appearance in the form of a pimple, which commonly forms a scab, in consequence of evaporation. The first scab is generally rubbed off; after which a second, still larger, one is produced.

When the disease is more advanced, it is often attended with such inflammation as is peculiar to the habit, becoming in many instances more diffused, and often producing phymosis, and paraphymosis. However, says Mr. Hunter, there is yet a hardness, around the sores, which is peculiar to such as are caused by the venereal virus, particularly, those on the prepuce.

The local, or immediate effects of the venereal disease are seldom wholly specific; but, are usually attended both with the specific and constitutional inflammation. Hence, Mr. Hunter, advises particular attention to be paid to the manner, in which a chancre first appears, and to its progress. If the inflammation spreads in a quick and considerable way, the constitution must be more disposed to inflammation, than is natural. When the pain is severe, Mr. Hunter remarks,

there is a strong disposition to irritation. Chancres also, sometimes, soon begin to slough, there being a strong tendency to mortification.

It is also observed by Mr. Hunter, that when there is a considerable loss of substance, either from sloughing, or ulceration, a profuse bleeding is no uncommon circumstance, more especially, when the ulcer is on the glans. The adhesive inflammation does not appear to take place sufficiently to unite the veins of this part of the penis, so as to prevent their cavity from being exposed, and the blood escapes from the corpus spongiosum urethræ. The ulcers, or sloughs, often extend as deeply as the corpus cavernosum penis, and similar bleedings are the consequence.

With respect to chancres in women, the labia and nymphæ, like the glans penis in men, are subject to ulceration, and the ulcerations are generally more numerous in females, than males, in consequence of the surface, on which the sores are liable to form, being much larger. As Mr. Hunter observes, chancres are occasionally situated on the edge of the labia; sometimes on the outside of these parts; and even on the perinæum. When the sores are formed on the inside of the labia or nymphæ, they can never dry, or scab; but, when they are externally situated, the matter may dry on them, and produce a scab, just as happens, with respect to chancres situated on the scrotum, or body of the penis.

Mr. Hunter remarks, that the venereal matter from these sores is very apt to run down the perinæum to the anus, and excoriate the parts, especially, about the anus, where the skin is thin, and where chancres are liable to be thus occasioned.

Chancres have been noticed in the vagina; but, Mr. Hunter suspected, that they were not original ones; but, that they had spread to this situation from the inside of the labia.

Before any of the virus has been taken up by the absorbents, and conveyed into the circulation, a chancre is entirely a local affection.

TREATMENT OF CHANCRES.

It was one of Mr. Hunter's opinions, that the ulceration, arising from venereal inflammation, generally, if not always, continues, till cured by art, and his theoretical reason for this circumstance was, that, as the inflammation in the chancre spreads, it is always attacking new ground, so as to produce a succession of irrita-

tions, and hinder the disease from curing itself.

We have already noticed, that chancres are not wholly venereal, but are attended with effects, dependent on constitutional peculiarities, to which the variety in the treatment must be adapted. The venereal symptoms, abstractedly considered, may be cured by mercury; but, the treatment of the symptoms, which depend on peculiarity of constitution, have no specific remedy, and demand different means in different cases.

Though the treatment of a chancre may be attempted both constitutionally and locally, it is commonly a considerable time before the sores appear to be affected by mercury. Sometimes the circulation must be loaded with mercury for three, or four weeks, or even longer, before a chancre begins to separate its discharge from its surface, so as to look red, and exhibit a living surface; but, says Mr. Hunter, when once it does change, its progress towards healing is more rapid. This author describes a chancre as being generally much longer in getting well, than the other local effects of the venereal disease, arising from the absorption of the poison into the constitution.

Mr. Hunter enjoins the practitioner to consider, also, whether weakening, strengthening, or quieting medicines, should be exhibited; sometimes, one kind; sometimes, another being proper.

Chancres (observes the same celebrated writer) admit of two modes of treatment. The object of one is to destroy or remove them by means of escharotics, or by extirpation. That of the other is to overcome the venereal irritation by means of the specific remedy for the syphilitic poison.

That chancres are local complaints, is confirmed by the circumstance of their admitting of being destroyed, or cured merely by local treatment. It has been a question, whether mercury should ever be locally applied to chancres, or not. On this subject, Mr. Hunter considers, that, in the cure of such sores, there are two objects to be aimed at; one is the cure of the chancre itself; the other is the prevention of a contamination of the habit.

The cure of the chancre is to be effected by mercury, applied either in external dressings, or, internally, through the circulation, or in both ways. The preservation of the constitution from contamination is to be accomplished, first by shortening the duration of the chancre, which shortens the opportunity for absorption; and also by internal medicine,

which must be in proportion to the time that the absorption may have been going on.

If, says Mr. Hunter, the power of a chancre to contaminate the constitution, or, what is the same thing, if the quantity of the virus absorbed is proportioned to the size of the chancre, and the time of absorption, which most probably it is, then whatever shortens the time, must diminish the above power, or the quantity of the poison absorbed. Also, if the quantity of mercury, necessary to preserve the constitution, is proportioned to the quantity of the virus absorbed, then whatever lessens the quantity absorbed, must proportionally preserve the constitution. For instance, says Mr. Hunter, if the power of a chancre to contaminate the constitution in four weeks is equal to four, and the quantity of mercury necessary to be given internally, both for the cure of the chancre and the preservation of the constitution, is also equal to four, then whatever shortens the duration of the chancre, must lessen in the same proportion the quantity of mercury necessary. Hence, if local applications, together with the internal use of mercury, will cure a chancre in three weeks, then it will only be necessary to exhibit three-fourths of the quantity of mercury internally. Mr. Hunter observes, therefore, that local applications, inasmuch as they tend to shorten the duration of a chancre, shorten the duration of absorption, and, in this manner, shorten the necessity for the continuance of an internal course of mercury, all in the same proportion. For example, if four ounces of mercurial ointment will cure a chancre and preserve the constitution in four weeks, three ounces will be sufficient to preserve the constitution, if the cure of the chancre can be, by any other means, forwarded, so as to be effected in three weeks. Mr. Hunter affirms, that this is not speculation; but, the result of experience, and confirmed by the destruction of chancres.

DESTROYING CHANCRES.

Mr. Hunter notices, that the simplest method of treating a chancre is to destroy, or extirpate it, whereby it is reduced to the state of a common sore, or wound, and heals up as such. This can only be done on the first appearance of the chancre, when the surrounding parts are not yet contaminated; for, it is absolutely necessary to remove the whole of the diseased part, and this object is exceedingly difficult of accomplishment, when the

disease has spread considerably. The plan may be effected either with the knife, or caustic. Mr. Hunter states, that, when the chancre is situated on the glans penis, touching the sore with the lunar caustic is preferable to cutting it away, because the hemorrhage from the cells of the glans would be considerable in the latter method.

The caustic will not give a great deal of pain, as the glans is not an exceedingly sensible part. The caustic employed should be pointed at the end, like a pencil, in order that it may only touch such parts as are really diseased. This treatment should be continued, till the surface of the sore looks red and healthy, after the separation of the last sloughs. When it has attained this condition, it will heal, like any other sore, made with caustic.

When the sore is on the prepuce, or the common skin of the penis, and, in an incipient state, the same practice may be adopted with success. When the chancre is large, however, it cannot be destroyed with the *argentum nitratum*, which does not extirpate the increasing sore deeply enough. In such cases, Mr. Hunter thought, that the *lapis septicus* would answer very well. When the latter caustic cannot be conveniently employed, this author recommended the chancre to be cut away. He mentions his having taken out such a sore by dissection, and that the part afterwards healed with common dressings. However, says he, as our knowledge of the extent of the disease is not always certain; and as this uncertainty increases with the size of the chancre, the cure must be in some measure promoted by proper dressings, and, it will be prudent to dress the sore with mercurial ointment. When this plan is followed, Mr. Hunter believed, that there is but little danger of the constitution being infected, particularly, when the chancre has been destroyed almost immediately on its first appearance; for, then it is reasonable to conclude, that there has not been time for absorption to have taken place. But, observes the same author, as it must be in most cases uncertain, whether there has been absorption or not, this practice should not always be trusted to, and, perhaps, never should be relied in. Hence, even when the chancre has been destroyed in its incipient state, some mercury should be given from motives of prudence, the quantity of which medicine should be proportioned to the duration and progress of the sore. When the chancre is large, before it is extirpated,

mercury is absolutely necessary, and Mr. Hunter conceived, that very little good is done by the extirpation.

LOCAL APPLICATIONS TO CHANCRES.

The cure of a chancre (says Mr. Hunter) is a different thing from its extirpation, and consists in destroying its venereal disposition, which object being effected, the parts heal of course, as far as they are venereal.

The employment of mercury, both as a topical application, and a constitutional remedy, is necessary in order to cure a chancre.

Mercurial ointments have been commonly used as dressings to chancres; but, Mr. Hunter was of opinion, that if the mercury were joined with watery substances, instead of oily ones, the application, by mixing with the matter, would be continued longer to the sore, and would prove more effectual. This, he observes, is one advantage, which poultices have over common dressings. He has often used mercury rubbed down with some conserve, instead of ointment, and it answered extremely well. Calomel used in the same way, and also the other preparations of mercury, mixed with mucilage, or honey, answer the same purpose. Such dressings, according to Mr. Hunter, will effect a cure, in cases, which are truly venereal, and free from other morbid tendencies.

Some chancres are indolent, and require a little warm balsam or red precipitate to be joined with the mercurial dressing. Mr. Hunter says, that calomel mixed with salve is more active, than common mercurial ointment, and is attended with better effects, when the case requires stimulants.

Solutions of blue vitriol, verdigrease, calomel, &c. have been recommended. But, Mr. Hunter very judiciously observes, that, as all these applications are only of service in remedying any peculiar disposition of the parts, as they have no specific power over the venereal poison, and as such dispositions are innumerable, it is almost impossible to say, what applications will be effectual in every instance. Some kinds of dressings will answer in one state of the sore; some in another. The parts affected are often found extremely irritable, in which circumstance the mercury should be mixed with opium or preparations of lead.

Mr. Hunter was an advocate for changing the dressings, very often, because the matter separates them for the sore, so as to diminish their effects. He states, that changing the applications, thrice a

day, will not be found too often, particularly, when they are in the form of an ointment.

When the venereal nature of a chancre is removed, the sore frequently becomes stationary, in which case, Mr. Hunter observes, that the new dispositions have been acquired, and the quantity of disease in the part has been increased. When chancres are only stationary, Mr. Hunter says they may often be cured, by touching them slightly with the lunar caustic. No cicatrization, in this case, seems possible, till the contaminated surface, or the new flesh, which grows on that surface, has either been destroyed or altered. It is often surprising, how quickly the sores heal up, after being touched with the application. (See *Hunter on the Venereal Disease*.)

INTERNAL EXHIBITION OF MERCURY FOR CHANCRES.

At the same time that topical applications are made to chancres, mercury must be internally exhibited, both with a view of curing these ulcers, and preventing a lues venerea. Mr. Hunter believed, that the venereal disposition of the chancre would hardly ever withstand both local and internal mercurials.

When local applications cannot easily be made to chancres, as in a case of phymosis, there is a still greater necessity for giving mercury internally, by which means, the cure may in the end be effected.

Mercury should always be given internally in every case of chancre, let it be ever so light, and even when the sore has been destroyed on its very first appearance. The remedy should always be exhibited the whole time of the cure, and continued for some time after the chancre has healed; for, says Mr. Hunter, as there are, perhaps, few chancres without absorption of the matter, it becomes absolutely necessary to give mercury to act internally, in order to hinder the venereal disposition from forming. How much mercury should be thrown into the constitution in the cure of a chancre, with a view of keeping the system from being affected, cannot easily be determined, as there is no disease actually formed, by which we can be guided. Mr. Hunter states, that the quantity must in general be proportioned to the size, number, and duration, of the chancres; or, in other words, proportioned to the opportunity, which there has been given for absorption.

The mercury, which is exhibited to act internally, may be conveyed into the

system, either by the skin, or stomach, according to circumstances, and, it should be so taken, as to produce a slight affection of the mouth.

Mr. Hunter next remarks, that when the sore has put on an healthy look, when the hard basis has become soft, and the ulcer has skinned over in a favourable manner, it may be regarded as cured.

The same distinguished writer notices, however, that, in very large chancres, it may not always be necessary to continue the application of mercury, either for external, or internal action, till the sore is healed; for, the venereal action is just as soon destroyed in a large chancre, as it is in a small one, since every part of the sore is equally affected, by the medicine, and, of course, cured with equal expedition. But, in regard to cicatrization, circumstances are different, because a large sore is longer than a small one, in becoming covered with skin. Hence, Mr. Hunter very justly explains, that a large chancre may be deprived of its venereal action, long before it has healed; while, on the other hand, a small one may heal before the syphilitic affection has been destroyed. In the latter case, this gentleman represents it as most prudent, both on account of the chancre and constitution, to continue the employment of mercury, a little while after the sore has healed.

Mr. Hunter, in the valuable work, which he has left on the present subject, takes notice of sloughs, which occur in the tonsils, from the effect of mercury on the throat, and are apt to be mistaken for venereal complaints. He also mentions, that, sometimes, when the original chancre has been doing well, and been nearly healed, he has seen new sores break out on the prepuce, near the first, and assume all the appearance of chancres.

When, in the treatment of chancres, a bubo arises, while the constitution is loaded with a sufficient quantity of mercury to cure such sores, which medicine has also been rubbed into the lower extremity, on the same side as the bubo, Mr. Hunter suspects, that the swelling in the groin is not venereal, but is produced by the mercury. In these cases he always preferred conveying mercury into the system in some other manner.

With respect to the treatment of chancres in women, since it is difficult to keep dressings on the parts, Mr. Hunter advises the sores to be frequently washed with some mercurial solution, and, speaks of one, made with corrosive sublimate, as perhaps being the best, since it will act as a specific, and stimulant also,

when this is requisite. When the chancres however, are irritable, they are to be treated in the same manner, as similar complaints in men. When the sores extend into the vagina, this passage must be kept from becoming constricted, or closed, by the introduction of lint.

Sometimes, after a chancre and all venereal diseases are cured, the prepuce continues thickened and elongated, so that the glans cannot be uncovered. Perhaps, the case is often without remedy. Mr. Hunter, however, very properly recommends trying every possible means, and he informs us, that the steam of warm water, hemlock fomentations, and cinnabar fumigations, are frequently of singular service.

When the thickening and enlargement of the prepuce cannot be removed by applications, all the portion, anterior to the glans penis, may be cut away. (See *Phymosis*.)

Mr. Hunter has very ably explained, that chancres, both in men and women, often acquire, during the treatment, new dispositions, which are of various kinds, some retarding the cure, and leaving the parts in an indolent thickened state, after the cure is accomplished. In other instances, a new disposition arises, which utterly prevents the parts from healing, and often produces a much worse disease, than that, from which it originated. Such new dispositions may lead to the growth of tumours. They are more frequent in men, than women, and generally occur only when the inflammation has been violent from some peculiarity of the parts, or constitution. They have sometimes been considered as cancerous.

Among the diseases in question, Mr. Hunter notices those continued, and often increased inflammations, suppurations, and ulcerations, which become diffused through the whole prepuce, and, also, along the common skin of the penis, which become of a purple hue, attended with such a general thickening of the cellular membrane, as makes the whole organ appear considerably enlarged. The same writer observes, that the ulceration on the insides of the prepuce will sometimes increase, and run between the skin and the body of the penis, and eat holes through in different places, till the whole is reduced to a number of ragged sores. The glans often shares the same fate, till more, or less of it is gone. Frequently, the urethra in this situation is wholly destroyed by ulceration, and the urine is discharged some way farther back. The ulceration, if unchecked, at length destroys all the parts. In this acute case, prompt relief is demanded; but, often

the proper mode of treatment cannot be at once determined, owing to our ignorance, in respect to the exact nature of the peculiar cause of the disease. Mr. Hunter states, that the decoction of sarsaparilla is often of service, when given in large quantities, and that he has known the German diet drink effect a cure, after every other remedy had failed. The following diet drinks, he says, have been much recommended.

Take of crude antimony and pumice-stone, pulverized, and tied up in a bit of rag, of each one ounce; China root, sliced, sarsaparilla root, sliced and bruised, of each half an ounce; ten walnuts with their rinds bruised; spring-water, four pints; boiled to half that quantity; filter it, and let it be drunk daily in divided doses.

Take of sarsaparilla, Saunders-wood, white and red, of each three ounces; liquorice and mezereon, of each half an ounce; of lignum rhodium, guaiacum, sassafras, of each an ounce; crude antimony, two ounces; mix them and infuse them in boiling water, ten pints, for twenty-four hours; and, afterwards boil them to five pints, of which let the dose be from a pint and a half to four pints a day.

Mr. Hunter also states, that the extract of hemlock is sometimes of service, and that he has known sea-bathing effect a perfect cure.

Sometimes, when such sores are healing, it becomes necessary to keep the orifice of the urethra from closing, by the introduction of a bougie.

Sometimes, after a chancre has healed, the cicatrix breaks out again, and puts on the appearances of the preceding sore. Occasionally, similar diseases break out in different places from that of the cicatrix. Mr. Hunter represents, that they differ from a chancre in generally not spreading so fast, nor so far; in not being so painful, nor so much inflamed; in not having such hard bases, as venereal sores have; and in not producing buboes. This writer was of opinion, that they were not venereal. They are very apt to recur.

Mr. Hunter does not specify any particular mode of cure for all these cases; but, he mentions one instance, which seemed to be cured by giving forty drops of the lixivium saponarium, every evening and morning, in a basin of broth; and he adverts to another case, which was permanently cured by sea-bathing.

In some instances, after a chancre has healed, the parts, as Mr. Hunter remarks, do not ulcerate; but, appear to become thickened, and indurated. Both the glans

and prepuce seem to swell, so as to form on the end of the penis, a tumour, or excrescence, shaped very much like a cauliflower, and, when cut into, shewing radii, running from its base, or origin, towards the external surface. It is extremely indolent. It is not always a consequence of the venereal disease; for, Mr. Hunter has seen it arise spontaneously.

No medicine seems to be at all likely to cure the disease: the only successful means is to amputate a considerable part of the penis, and then to keep a proper catheter introduced into the urethra.

WARTS.

Another disposition, induced by the previous occurrence of chancres, is a disposition to form excrescences, or cutaneous tumours, called warts. These are considered by many not simply as a consequence of the venereal poison, but, as possessed of its specific disposition, and, therefore, says Mr. Hunter, they have recourse to mercury for the cure of them; and, it is said, that such treatment often removes them. This eminent practitioner never saw mercury produce this effect, although the medicine was given in sufficient quantity to cure recent chancres, and a lues venerea, in the same person.

Mr. Hunter observes, that as these substances are excrescences from the body, they are not to be considered as truly a part of the animal, not being endowed with the common, or natural animal powers. Many trifling circumstances make them decay. An inflammation of the sound parts round the wart, or stimuli applied to its surface, will often make it die. Electricity will also induce an action in such excrescences, which they are not able to support; an inflammation is excited round them, and they drop off.

From this account, we must perceive, according to Mr. Hunter, that the knife and escharotics are not always necessary, although, these modes will act more quickly, than any other, especially, when the neck of the wart is small. When such is the form of the excrescence, perhaps, a pair of scissars is the best instrument; but, says the above distinguished writer, when cutting instruments of any kind are horrible to the patient, a silk-thread, tied round the neck of the wart, will do very well. However, which ever plan is adopted, it is in general necessary to touch with caustic the base of the little tumour, after this has separated.

Mr. Hunter remarks, that escharotics act upon warts in two different ways, namely, by deadening a part, and stimu-

lating the remainder, so that, by the application of escharotic, after escharotic, the whole excrescence decays moderately fast; and it is seldom necessary to destroy them down to the very root, which is often thrown off. This, however, is not always the case, and the wart grows again, in which circumstance, it is proper to let the caustic destroy even the root itself.

The kali purum cum calce viva, lunar caustic, and blue vitriol, are all proper applications. But, one of the best stimulants is the ærugo æris and powder of savin leaves, mixed together. (*Hunter on the Venereal Disease.*)

BUBOES.

The immediate consequence of a chancre, which is called a bubo, and also the remote effects, implied by the term, *lues venerea*, arise from the absorption of recent venereal matter from some surface, where it has either been applied or formed.

We are already aware, that Mr. Hunter believed the matter of gonorrhœa capable of communicating the venereal disease. Hence, he explains in the following terms, the three ways, in which he thought a bubo might arise in consequence of absorption. He observes, that the first and most simple manner, is when the matter, either of a gonorrhœa, or chancre, has only been applied to some sound surface, without having produced any local effect on the part; but, has been absorbed, immediately after its application. Mr. Hunter affirms, that he has seen instances of this kind, though he confesses they are very rare, and, that, in most cases apparently of this nature, a small chancre may be found to have existed.

The second mode of absorption, or that taking place in a gonorrhœa, Mr. Hunter represents as more frequent.

The third mode is the absorption of matter from an ulcer, which may either be a chancre, or a bubo. This mode is by far the most common, and it proves, with many other circumstances, that a sore, or ulcer, is the most favourable for absorption. Mr. Hunter believed, that absorption was more apt to take place from sores on the prepuce, than those on the glans, and he says, he had seen more buboes from chancres in the first situation.

A fourth mode of absorption from a wound is also an occasional occurrence.

Mr. Hunter notices, that, what is now commonly understood by a bubo, is a swelling, taking place in the absorbing

system, especially, in the glands, arising from the absorption of some poison, or other irritating matter. When such swellings take place in the groin, they are called buboes, whether they proceed from absorption, or not.

Mr. Hunter regards every abscess in the absorbing system as a bubo, whether in the vessels, or the glands, when the complaint originates from the absorption of venereal matter.

The matter is taken up by the absorbent vessels, and is conveyed by them into the circulation. In its passage through these vessels, it often affects them with the specific inflammation. The consequence is the formation of buboes, which are venereal abscesses. These are exactly similar to a chancre in their nature and effects, the only difference being in regard to size. As the lymphatic vessels and glands are irritated by the specific matter, before it has undergone any change in its passage, the inflammation produced, and the matter secreted, partake of the specific quality.

Inflammation of the absorbent vessels themselves is not nearly so frequent, as that of the glands. In men, such inflammations, in consequence of chancres upon the glans, or prepuce, generally appear, like a cord, leading along the back of the penis from the sores. Sometimes, the absorbents inflame, in consequence of the thickening and excoriation of the prepuce in gonorrhœa. The indurated lymphatics often terminate insensibly near the root of the penis, or near the pubes; while, in other instances, they extend further to a lymphatic gland in the groin. Mr. Hunter believed, that this affection to the absorbent vessels is truly venereal. The formation of a hard cord, the same author conceived, arose from a thickening of the coats of the absorbents, and from an extravasation of coagulable lymph on their inner surface.

A cord, of the above kind, often suppurates, sometimes in more places than one, so as to form one, two, or three buboes, or small abscesses in the body of the penis.

Inflammation much more frequently affects the absorbent glands, than the vessels. The structure of the former parts appear to consist of the ramifications and reunion of the absorbent vessels. From this structure, observes Mr. Hunter, we may reasonably suppose, that the fluid absorbed is in some measure detained in these glands, and thus has a greater opportunity of communicating the disease to them, than to the distinct vessels.

Swellings of the absorbent glands may originate from other diseases, and such

should be carefully discriminated from those, which arise from the venereal poison. With this view, Mr. Hunter advises us first to enquire into the cause, in order to ascertain, whether there is any venereal complaint at some greater distance from the heart, such as chancres on the penis, or any preceding disease in this situation. He recommends us to enquire, whether any mercurial ointment has been at all applied to the leg and thigh on the diseased side; for, mercury applied to those parts for the cure of a chancre, will sometimes cause glandular enlargements, which are occasionally mistaken for venereal ones. Mr. Hunter also reminds us to observe, whether there has been any preceding disease in the constitution, such as a cold, fever, &c. The quick, or slow, progress of the swelling, is likewise to be marked, and the tumour must be distinguished from femoral hernia, lumbar abscesses, and aneurisms of the crural artery.

Sometimes, the venereal matter does not produce its effects on the absorbent glands, for some time after absorption has taken place. In certain instances, Mr. Hunter notices, that, at least, six days have elapsed; a circumstance, which could only be known by the chancres having been healed six days before the bubo began to appear. However, Mr. Hunter infers, that the matter had been much longer absorbed, as the last matter of a chancre is probably not venereal.

Mr. Hunter next remarks, that the glands, nearest to the seat of absorption, are in general the only ones, which are attacked. Thus, when the matter has been taken up from the penis in men, the inguinal glands are affected; and, when from the vulva in women, those glands swell, which are situated between the labia and thigh, and the round ligaments.

It was one of Mr. Hunter's opinions, that only one gland at a time is commonly affected by the absorption of venereal matter. If this sentiment be correct, the circumstance may be considered as a kind of criterion between venereal and other buboes. The second order of lymphatic vessels and glands are never affected; as, for instance, those along the iliac vessels, or back. Mr. Hunter informs us, that he has also observed, that, when the disease was contracted by a sore, or cut upon the finger, the bubo occurred a little above the bend of the arm, by the side of the biceps muscle, and no swelling of this sort formed in the arm-pit. However, he mentions his having heard of a few rare cases, in which a swelling in the axilla was also produced.

When buboes arise from a venereal disease on the penis, they are situated in the glands of the groin. When a bubo arises from a gonorrhœa, either groin may be attacked. But when the disease originates from a chancre, the bubo most frequently takes place in the nearest groin.

The situation of the absorbent glands, however, is not always exactly the same, and the course of the lymphatics therefore is subject to some variety. Hence, Mr. Hunter has seen a venereal bubo, produced by a chancre on the penis, situated a considerable way down the thigh; he has also often seen buboes as high as the lower part of the belly, before Poupart's ligament; and sometimes near the pubes.

BUBOES IN WOMEN.

The seat of absorption is more extensive in the female sex, and the course of some of the absorbents is also different. Hence, buboes in women may occur in three situations, two of which are totally different from those in men.

When chancres are situated forwards, near the meatus urinarius, nymphæ, clitoris, labia, or mons veneris, the absorbed matter is generally conveyed along one, or both of the round ligaments, and the buboes are formed in those ligaments, just before they enter the abdomen. Mr. Hunter suspected such buboes not to be glandular ones; but, only inflamed absorbents.

When chancres are situated far back, near, or on the perinæum, the absorbed matter is carried forward along the angle, between the labium and the thigh, to the glands in the groin, and often, in this course, there are formed small buboes in the absorbents, similar to those abscesses, which occur on the penis in men.

When the effects of the poison do not rest here, a bubo in the groin may be occasioned, in the same manner as in men.

It is more difficult to learn, whether a bubo is venereal in women, than men, owing to the frequent difficulty of ascertaining, that there is no infection present. In men, who have had no local complaint, the bubo can only be venereal, when direct absorption from the surface of the skin has taken place.

MANNER IN WHICH BUBOES MAKE THEIR APPEARANCE, &c.

A bubo, says Mr. Hunter, commonly begins with a sense of pain, which leads the patient to examine the part, where a

small hard tumour is to be felt. This increases, like every other inflammation, that has a tendency to suppuration, and, unless checked, pus forms, and ulceration follows, the matter making its way to the skin very fast.

The above celebrated writer remarks, however, that there are some cases, which are slow in their progress. This circumstance he imputes either to the inflammatory process being kept back by mercury, or other means, or by its being retarded by a scrophulous tendency.

The inflammation, he says, is at first confined to the gland, which may be moved about in the cellular membrane; but, when the part has become enlarged, or when the inflammation, and suppuration, are more advanced, the surrounding parts become more inflamed, and the tumour is more diffused. Some buboes, become complicated with an erysipelatous and œdematous affection, by which means, they are rendered more diffused, and less disposed to suppurate.

Mr. Hunter allows, that to distinguish with certainty, the true venereal bubo from swellings of the glands in the groin, may be very difficult. He represents the true venereal bubo, in consequence of a chancre, as being most commonly confined to one gland. It preserves its specific distance till suppuration has taken place, and then becomes more diffused. It is rapid in its progress from inflammation to suppuration and ulceration. The suppuration is commonly large, considering the size of the gland, and there is only one abscess. The pain is very acute; and the inflamed part of the skin is of a florid red colour.

Mr. Hunter describes such buboes, as arise without any visible cause, as being of two kinds. One sort inflame and suppurate briskly. These he always suspected to be venereal, although he allows, there was no proof of it, and only a presumption deduced from the quick progress of the disease.

The second kind are generally preceded, and attended with slight fever, or the common symptoms of a cold, and they are generally indolent and slow in their progress. If they are quicker, than ordinary, they become more diffused, than venereal ones, and they may not be confined to one gland. When very slow, they give but little sensation; but, when quicker, the sensation is more acute, though not so much so as in venereal cases. They usually do not suppurate, and often become stationary. When they do suppurate, it is in a slow manner, and, frequently, in more glands, than one, while the inflammation is more diffused,

and not considerable, in relation to the swelling. The matter makes its way to the skin slowly, and the part affected is of a more purple colour. Sometimes, the abscesses are very large, yet not painful.

In considering whether the swellings of the inguinal glands are, or are not venereal, the first thing to be attended to is, whether, or not, there are any venereal complaints. If there are none, Mr. Hunter observes, that there is a strong presumptive proof, that the swellings are not venereal. When the swelling is only in one gland, very slow in its progress, and gives but little, or no pain, it is probably merely scrophulous. However, when the swelling is considerable, diffused, and attended with some inflammation and pain, the constitution is most probably affected with slight fever, the symptoms of which are lassitude, loss of appetite, want of sleep, small quick pulse, and an appearance of approaching hectic. Such swellings are long in getting well, and do not seem to be affected by mercury, even when very early applied.

Mr. Hunter mentions his having seen the above affection of the groin, together with the constitutional indisposition, take place, when there were chancres; and he was puzzled to determine, whether the disease in the groin was sympathetic, from derangement of the constitution, or from the absorption of matter. He had long suspected, that there was a mixed case, and was at last certain, that such a case may prevail. He says, he had seen instances, in which the venereal matter, like a cold, or fever, only irritated the glands to disease, producing in them scrophula, to which they were disposed.

In such cases, says Mr. Hunter, the swellings commonly arise slowly, give but little pain, and seem to be rather hastened in their progress, if mercury is given to destroy the venereal disposition. Some suppurate while under this resolving course; and others, which probably had a venereal taint at first, become so indolent, that mercury has no effect upon them, and, in the end, they either get well of themselves, or by other means.

Mr. Hunter states, that buboes are undoubtedly local complaints.

TREATMENT OF BUBOES.

When a bubo is certainly a venereal one, and only in an inflamed state, an attempt is to be made to resolve the swelling. The propriety of the attempt, however, depends on the progress, which the disease has made. If the bubo be very large, and suppuration appears to be near at hand, resolution is not likely to

be effected. When suppuration has already taken place, Mr. Hunter much doubted the probability of any success attending the endeavour, which now might possibly only retard suppuration, and protract the cure.

The resolution of these inflammations, says Mr. Hunter, depends principally on mercury, and almost absolutely on the quantity, which can be made to pass through them. When suppuration has taken place, the cure also depends on the same circumstances.

The quantity of mercury, which can be made to pass through a bubo, is represented by Mr. Hunter, as depending principally on the quantity of external surface for absorption beyond the bubo.

The mercury is to be applied to such surfaces, as allow the remedy, when absorbed, to pass through the diseased gland. In this manner, the disease in the groin is subdued, and the constitution is less liable to be contaminated.

However, Mr. Hunter accurately notices, that the situation of many buboes is such, as not to have much surface for absorption beyond them; for instance, the buboes on the body of the penis, arising from chancres on the glans, or prepuce.

When the bubo is in the groin, Mr. Hunter recommends surgeons to pay attention to whether the swelling is in the upper part of the thigh and groin, on the lower part of the belly before Poupart's ligament, or near the pubes. When the buboes are situated on the body of the penis, the absorbents, leading directly from the seat of absorption are themselves diseased. When the bubo is in the groin, and, at the upper part of the thigh, we may conclude, that the lymphatics, both from the penis and thigh, run to the affected gland. When the bubo is high up, or on the lower part of the belly, before Poupart's ligament, probably, the absorbents, which arise from about the groin, lower part of the belly and pubes, pass through the bubo. When the bubo is far forward, the absorbents of the penis and skin about the pubes, pass through the swelling. Mr. Hunter contends, that the knowledge of these circumstances is very necessary, in order to apply mercury in the most advantageous situations.

The utility of rubbing the mercury into surfaces, the absorbents of which lead through the bubo, must be obvious, when it is considered, that the medicine cannot pass to the common circulation, without going through the diseased parts; that it must promote the cure, as it passes through them; and that it also prevents the matter, which has already passed,

and is still continuing to pass into the constitution, from acting there. Thus the bubo is cured, and the constitution, at the same time, preserved.

Mercury alone, however, is not always capable of effecting the cure of buboes.

When the inflammation rises very high, bleeding, purging, and fomenting, are generally recommended. When the inflammation was erysipelatous, Mr. Hunter had a high opinion of bark; and, when it was scrophulous, he used to recommend hemlock, and poultices made with sea-water.

The same eminent writer also takes notice of the fact of emetics sometimes occasioning the absorption of buboes, even after they contain matter.

1. *Resolution of the Inflammation of the Absorbents on the Penis.*

Though there is not surface enough beyond the bubo, for rubbing in a sufficient quantity of mercury, to prevent the effects of absorption, Mr. Hunter still advises this surface to be kept constantly covered with mercurial ointment. In consequence of the surface in question being so small, more mercury must also be conveyed into the system by the mouth, or frictions on some other part. Mr. Hunter observes, that this is necessary, both in order to prevent a lues venerea, and to cure the parts themselves. The quantity of mercury must be regulated by the appearances of the original complaint, and the readiness, with which the disease gives way. The same method, he adds, is to be followed in women, and the ointment should be kept continually applied to the inside and outside of the labia.

2. *Resolution of Buboes in the Groin.*

The inflammation of the absorbent glands, is to be treated on the same principle as that of the vessels. In the first case, however, we are able to make a larger quantity of mercury pass through the diseased parts. When the bubo is in the groin, the mercurial ointment is to be rubbed on the thigh. This surface, as Mr. Hunter remarks, will in general absorb as much mercury as will be sufficient to resolve the bubo, and preserve the constitution from being contaminated; but, when resolution does not readily take place, the same author advises us to increase the surface of friction, by rubbing the ointment upon the leg.

When the bubo is on the lower part of the belly, the ointment should be rubbed also on the penis, scrotum, and belly,

The same plan should be followed when the bubo is still more forward.

Mr. Hunter states, that when the bubo gives way, the mercurial frictions must be continued, till it has entirely subsided, and, perhaps, longer, on account of the chancre, which may not yield so soon as the bubo. After the bubo has suppurated, Mr. Hunter is doubtful, whether rubbing in mercury is useful, or not.

3. *Resolution of Buboes in Women.*

When the swellings are situated between the labia and thigh, Mr. Hunter recommends the mercurial ointment to be rubbed in all about the anus and buttock, from which parts the absorbents probably run through the seat of the diseases. When the buboes are in the round ligaments, the surface for absorption will not be large enough, and more mercury must be internally given, or rubbed into other surfaces.

When the bubo is in one of the inguinal glands, the same plan is to be adopted, as in the same case in men.

4. *Buboes in unusual Situations.*

When buboes form in the arm, or armpit, in consequence of the absorption of venereal matter from wounds on the hands, or fingers, mercurial ointment should be rubbed on the arm and fore-arm. Mr. Hunter adds, however, that this surface may not be sufficient, so that it may be proper to convey more mercury into the system in other ways. He states, that he has seen a true venereal chancre on the middle of the lower lip, attended with a bubo, on each side of the neck, under the lower jaw, close to the maxillary gland.—The swellings were resolved by applying mercurial ointment to them, and the chin, and lower lip.

5. *Quantity of Mercury necessary for the Resolution of a Bubo.*

Mr. Hunter observes, that the quantity of mercury, necessary for the resolution of a bubo, must be proportioned to the obstinacy of the complaint; but, that care must be taken not to extend the employment of the medicine so far as to produce certain effects on the constitution. When the bubo is in a situation, which admits of a large quantity of mercury being rubbed in, so as to pass through the swelling, and when the complaint readily yields to the use of half a drachm of mercurial ointment, every night, the mouth not becoming sore, or at most, only tender, the above author thinks it sufficient

to pursue this course, till the gland is reduced to its natural size. In this manner, the constitution will probably be safe, provided the chancre, which may have caused the bubo, heals at the same time. When the mouth is not affected in six, or eight days, and the gland does not readily resolve, then two scruples, or a drachm, may be applied every night; and, (continues Mr. Hunter,) if there should still be no amendment, even more must be rubbed in. In short (says he) if the reduction is obstinate, the mercury must be pushed as far as can be done without a salivation.

When there is a bubo on each side, so much mercury cannot be made to pass through each, as the constitution in general will not bear this method. However, Mr. Hunter sanctions the plan of minding the soreness of the mouth less in this kind of case; though, he adds, that it is better to let the buboes proceed to suppuration, than to load the system with too much mercury.

When the situation of buboes will not allow an adequate quantity of absorbed mercury to pass through them, the frictions must be continued in order to affect the constitution; but, according to Mr. Hunter, more mercury in this case will be requisite, than when the remedy can be made to pass directly through the diseased gland.

Many buboes remain swollen, without either coming to resolution, or suppuration; and, notwithstanding every attempt to promote these changes, the glands become hard and scirrhus. Mr. Hunter conceived, that cases of this sort are either scrophulous at first, or become so as soon as the venereal disposition is removed. He advises the use of hemlock, sea-water poultices, and sea-bathing.

6. *Treatment of Buboes which suppurate.*

The suppuration of buboes frequently cannot be prevented by any known means. They are then to be treated, in some respects, like any other abscess. Before opening buboes, Mr. Hunter conceived it was advantageous to let the skin become as thin as possible, as a large opening would then become unnecessary, and no measures would be requisite for keeping the skin from closing, before the bottom of the sore had healed.

Mr. Hunter thinks it doubtful whether the application of mercury should be continued through the whole suppuration. He was inclined to continue it; but, in a smaller quantity.

There has been much dispute, whether a bubo should be opened, or allowed to

burst of itself, and whether the opening should be made with a cutting instrument, or caustic. On this subject, Mr. Hunter remarks, that there is no peculiarity in a venereal abscess to make one practice more eligible, than another. The surgeon, he says, should in some degree be guided by the patient. Some patients are afraid of caustics; others, of cutting instruments. But, when the surgeon has the choice, Mr. Hunter expresses a preference to opening the bubo with a lancet, in which method, no skin is lost. But he observes, that when a bubo is very large, and there will be a great deal of loose skin, after the discharge of the matter, he thinks, that caustic may, perhaps, be better, as it will destroy some of the redundant skin, and occasion less inflammation, than what is caused by an incision. The *kali purum* with the *calx viva*, is the caustic commonly employed.

After the bubo has been opened, surgeons usually poultice it, as long as the discharge and inflammation are considerable, and then they employ dressings, which must be of such a quality, as numerous undescribable circumstances may indicate. The use of mercury, in the mean while, is to be continued, both to make the bubo heal, and prevent the bad effects, which might otherwise arise from the matter being continually absorbed. The mercury should also be rubbed in, so as to pass, if possible, through the diseased groin.

The mercurial course is to be pursued, till the sore is no longer venereal. But, in general, since this point is difficult to ascertain, the mercury must be given till the part has healed, and even somewhat longer, when the bubo has healed very quickly; for, the constitution is afterwards very apt to become contaminated.

However, mercury is not to be continued thus long in all cases; for, as Mr. Hunter explains, buboes often assume, besides the venereal, other dispositions, which mercury cannot cure; but, will even exasperate.

CONSEQUENCES OF BUBOES.

Sometimes, the sores, when they are losing, or entirely deprived of the venereal disposition, become changed into ulcers of another kind, and, most probably, of various kinds. How far it is a disease arising from a venereal taint, and the effects of a mercurial course jointly, says Mr. Hunter, is not certain. This writer suspected, however, that the nature of the part, or constitution, had a principal share in the malady.

Mr. Hunter observes, that such dis-

eases make the cure of the venereal affection much more uncertain, because, when the sore becomes stationary, or the mercury begins to disagree, we are ready to suspect, that the virus is gone; but, this is not always the case. Perhaps, the action of the venereal poison is only suspended, and will commence again, as soon as the other disease ceases.

In these cases, Mr. Hunter recommends attacking the predominant disease; but, he allows there is difficulty in ascertaining its nature, and finding out, whether it is venereal, or not.

The same author also acquaints us, that he has seen some buboes exceedingly painful and tender to almost every thing that touched them, and the more mild the dressings were, the more painful the parts became.

In some instances, the skin only seems to become diseased. The ulceration spreads to the surrounding integuments, while a new skin forms in the centre, and keeps pace with the ulceration, so that an irregular sore, which Mr. Hunter compares with a worm-eaten groove, is formed all round. It appears only to have the power of contaminating the parts, which have not yet been affected; and those, which have, readily heal.

When buboes become stationary, and seem little inclined to spread, attended with a sinus, or two, hemlock, joined with bark, is, according to Mr. Hunter, the medicine most frequently serviceable. It is best to use it both externally and internally. The same author also speaks favourably of sarsaparilla, sea-bathing, and sea-water poultices. He states, that at the Lock Hospital, gold-refiners' water has been found a useful application; that, in some cases, drinking large quantities of orange-juice, and in others taking mezereon, have been found serviceable.

LUES VENEREA.

Surgeons imply, that a *lues venerea* has taken place, when the venereal virus has been absorbed into the circulation. Mr. Hunter does not think the epithet *constitutional* strictly proper in its application to this form of the venereal disease. By *constitutional* disease, he observes, he should understand, that, in which every part of the body is acting in one way, as in fevers of all kinds; but, the venereal poison seems to be only diffused through the circulating fluids, and, as it were, to force certain parts of the body to assume the venereal action, which action is perfectly local. To use Mr. Hunter's phrase, it takes place in different parts in a regu-

lar succession of susceptibilities. Only a few parts are acting at the same time; and a person may be constitutionally affected in this way, and yet almost every function may be perfect.

The venereal poison is generally conveyed into the system from a chancre. It may, also, according to Mr. Hunter's doctrine, be absorbed from a gonorrhœa. There is likewise a possibility of its getting into the circulation from the surface of the body, without any previous ulceration. It may be absorbed from common ulcers, without necessarily rendering these venereal; and it may be taken up from wounds, in which cases, it in general induces a previous ulceration in the wound.

VENEREAL ULCERS.

In consequence of the blood being contaminated with real venereal pus, it might be expected, that the local effects, thus produced, would be similar in their nature to those, producing them. Mr. Hunter believed, that this is not the case. He notices, that the local effects, from a constitutional contamination, are all of one kind, viz. ulcers, let the effects make their appearance on any surface whatever, either the throat, or common skin. But, Mr. Hunter conceived, that if the matter, when in the constitution, were to act upon the same specific principles, as that, which is externally applied, a gonorrhœa would arise, when it affected a canal, and, only sores, or chancres, when it attacked other surfaces.

Mr. Hunter found, that even the sores, which are caused in the throat, are very different from chancres. He says, that the true chancre produces considerable inflammation, often attended with a great deal of pain, and quickly followed by suppuration. But, the local effects, arising from the virus in the constitution, are slow in their progress, attended with little inflammation, and are seldom or ever painful, except in particular parts. However, Mr. Hunter allows, that this sluggishness in the effects of the poison depends on the nature of the parts diseased; and, he owns, that when the tonsils, uvula, or nose, are affected, the progress of the morbid mischief is rapid, and bears a greater resemblance to a chancre, than when it occurs on the skin. Even, in those parts Mr. Hunter thought, the ulcers were attended with less inflammation, than chancres, which were spreading with equal celerity.

The matter, secreted by such sores, as arise from a constitutional contamination, was always considered, before the time of

Mr. Hunter, as being of a poisonous quality, like the matter of a chancre. At first, one would certainly expect, that this was actually the case, because venereal matter is the cause, and mercury cures chancres, and also ulcers proceeding from a lues venerea. Mr. Hunter remarks, however, that the latter circumstance is not a decisive proof, since mercury is capable of curing many diseases, besides the venereal. He also takes notice, that, when pus is absorbed from a chancre, it generally produces a bubo; but, that a bubo is never occasioned by the absorption of matter from a venereal sore, arising from the virus diffused in the circulation. For instance, when there is a venereal ulcer in the throat, no buboes occur in the glands of the neck; when there are syphilitic sores on the arms, or even suppurating nodes on the ulna, no swellings form in the glands of the armpit, although these complaints occur, when fresh venereal matter is applied to a common sore on the arm, hand, or fingers. No swelling is produced in the groin, in consequence of nodes, or blotches on the legs and thighs.

Some very important experiments are related in Mr. Hunter's Treatise on the Venereal Disease, in order to shew, that the matter from a gonorrhœa, or chancre, is capable of affecting a man locally, who has already got a lues venerea, and that the matter from secondary syphilitic sores has not the same power. The particulars, however, are too long to be inserted in this book.

PARTS MOST SUSCEPTIBLE OF THE LUES VENEREA, &c.

Some parts of the body seem to be much less susceptible of the lues venerea, than others; indeed, Mr. Hunter observes, that, as far as our knowledge extends, certain parts cannot be affected at all. The brain, heart, stomach, liver, kidneys, and several other viscera, have never been known to be attacked by the lues venerea.

The *first order of parts*, or those, which become affected in the early stage of the lues venerea, are the skin, tonsils, nose, throat, inside of the mouth, and sometimes the tongue.

The *second order of parts*, or those, which are affected at a later period, are the periosteum, fasciæ, and bones.

Mr. Hunter conceived, that one great reason of the superficial parts of the body suffering the effects of the lues venerea, sooner than the deep-seated ones, depended on the former being more exposed to external cold. Even the second order of parts do not all become diseased at the

same time, not every where at once. But, on the contrary, it is observed, that, those, which are nearest the external surface of the body, are first diseased, as, for instance, the periosteum, or bones of the head, the tibia, ulna, bones of the nose, &c. Neither does the disease affect these bones on all sides equally; but, first on that side, which is next to the external surface. Mr. Hunter notices, however, that the susceptibility of particular bones does not altogether depend on their nearness to the skin; but, on this circumstance, and their hardness together.

After many ingenious observations, Mr. Hunter presents the reader of his treatise with the following summary of his doctrines of the lues venerea.

First; that most parts, if not all, that are affected in the lues venerea, are affected with the venereal irritation at the same time.

Secondly; that the parts, exposed to cold, are the first which admit the venereal action; then the deeper-seated parts, according to their susceptibility for such action.

Thirdly; the venereal disposition, when once formed in a part, must necessarily go on to form the venereal action.

Fourthly; that all parts of the body, under such disposition, do not run into action equally fast, some requiring six or eight weeks; others, as many months.

Fifthly; in the parts, which first come into action, the disease continues to increase, without wearing itself out; while those, which are second in time, follow the same course.

Sixthly; mercury hinders a disposition from forming, or, in other words, prevents contamination.

Seventhly; mercury does not destroy a disposition already formed.

Eighthly; mercury hinders the action from taking place, although the disposition be formed.

Ninthly; mercury cures the action.

On these principles, Mr. Hunter asserts, that the cure of the disease may be easily explained.

SYMPTOMS OF LUES VENEREA.

Mr. Hunter remarks, that the time, necessary for the appearance, or production of the local effects, in parts most susceptible of the disease, after the virus has got into the constitution, is uncertain; but, he says, in general, it is about six weeks; in many cases, the period is much longer; in other instances, it is shorter. Sometimes, the local effects make their

appearance within a fortnight after the possibility of absorption.

The effects, on other parts of the body, which are less susceptible of the venereal irritation, or slower in their action, are of course much later in making their appearance. Mr. Hunter also notices, that when the first and second order of parts are both contaminated, the effects, generally, do not begin to appear in the latter, till after a considerable time, and, sometimes, not till those affecting the former parts have been cured.

Mr. Hunter, however, mentions his having seen instances, in which the periosteum, or bone, has been affected before any of the first order of parts: but, he was uncertain, whether the skin, or throat, would afterwards have become diseased, as the disorder was not allowed to go on.

In the first order of parts, most susceptible of the effects of lues venerea, the disease is much quicker in its progress, than in the second order of parts. Mr. Hunter represents, that the symptoms in each succeeding part, which becomes affected, are slower and slower in their progress, and of a more fixed kind. It was also an observation, made by the same ingenious writer, that similar parts come sooner into action, and appear to go on more rapidly with it, in proportion as they are nearer the source of the circulation. The disease appears earlier on the face, head, shoulders, and breast, and the eruptions suppurate sooner, than on the legs.

SYMPTOMS OF THE FIRST STAGE OF THE LUES VENEREA.

According to Mr. Hunter, the first symptoms of the disease, after absorption, appear either on the skin, or in the throat, or mouth.

VENEREAL ERUPTIONS.

The appearances on the skin generally occur all over the body. The discolourations make the skin appear mottled, and many of the eruptions disappear, while others continue, and increase with the disease.

In other cases, the eruption comes on in distinct blotches, which are often not observed, till the scurfs have begun to form. At other times, the eruption assumes the appearance of small distinct inflammations, containing matter, and resembling pimples, not being, however so pyramidal, nor so red at the base. Mr. Hunter also observes, that venereal

blotches, on their first coming out, are often attended with inflammation, which gives them a degree of transparency, which is generally greater in the summer, than the winter, especially, if the patient be kept warm. In a little time, this inflammation disappears, and the cuticle peels off in the form of a scurf. The latter occurrence often misleads the patient and the surgeon, who look upon this dying away of the inflammation, as a decay of the disease, till a succession of scurfs undeceives them. Mr. Hunter adds, that the discolourations of the cuticle arise from the venereal irritation, and are to be seldom regarded as a true inflammation, since they rarely have any of its characteristics, such as tumefaction and pain. However, he explains, that in parts, which are well covered, or which are constantly in contact with other parts, there is more of the true inflammatory appearance, especially, about the anus.

The parts affected next begin to alter their appearance, and form a copper-coloured, dry, inelastic cuticle, called a scurf. This is thrown off, and new ones are formed. Mr. Hunter relates, that these appearances spread to the breadth of a sixpence, or shilling; but, seldom more extensively, at least, for a considerable time. In the mean while, every succeeding scurf becomes thicker and thicker, till at last it becomes a common scab. Then the disposition for the formation of matter takes place in the cutis underneath, and a true ulcer is formed, which commonly spreads, although in a slow way.

Mr. Hunter states, that these appearances arise first from the gradual loss of the true sound cuticle, which the diseased cutis cannot reproduce. As a kind of substitute for this want of cuticle, an exudation takes place, and forms a scale. The matter afterwards acquiring more consistence, at last forms a scab. However, before the disease has attained this condition, the cutis has ulcerated, after which the discharge is more like true pus. When this form of the lues venerea attacks the palms of the hands and soles of the feet, where the cuticle is thick, this latter part first becomes separated, and peels off. A new one is immediately formed, which also separates. In this manner, a series of new cuticles take place, in consequence of scurfs not being so readily formed as on the common skin. When the disease is confined to the palms of the hands, or soles of the feet, Mr. Hunter mentions, that there is difficulty in determining whether it is venereal, or not; because, most diseases of the cutis, in these situations, produce a separation

of the cuticle, attended with the same appearances in all, and having nothing characteristic of the venereal disease.

When the affected part of the skin is opposed by another portion of skin, which keeps it in some degree more moist, as between the nates, about the arms, between the scrotum and the thigh, in the angle between the two thighs, on the red part of the lip, or in the arm-pits, the eruptions, instead of being attended with scurfs and scabs, become accompanied by an elevation of the skin, which is swollen with extravasated lymph into a white, soft, moist, flat surface, which discharges a white matter.

A venereal eruption often attacks that part of the fingers, on which the nail is formed. Here, the disease renders that surface red, which is seen shining through the nail; and, if allowed to continue, a separation of the nail takes place, similar to that of the cuticle in the above cases. However, Mr. Hunter states, that there cannot be the same regular succession of nails, as of cuticles in other instances.

Such surfaces of the body, as are covered with hair, may also be attacked, and the hair separates, and cannot be produced as long as the disease lasts.

VENEREAL DISEASE OF THE THROAT, MOUTH, AND TONGUE.

In the throat, tonsils, and inside of the mouth, the disease generally makes its appearance at once in the form of an ulcer, without much previous tumefaction. Consequently, the tonsils are not much enlarged. It is observed by Mr. Hunter, that, the venereal inflammation attacks the surface of these parts, and very soon forms an ulcer.

A venereal ulcer in the throat should be carefully distinguished from other kinds of sores in the same situation. The syphilitic one is in general tolerably well marked. However, Mr. Hunter confesses, that, it may not in every instance be distinguishable from an ulcer of a different nature. Sores in the throat, which are really venereal, may resemble others which are not so. The same celebrated author mentions, that there are several diseases of this part, which do not produce ulceration on the surface. One of these is common inflammation of the tonsils. The inflamed place often suppurates in the centre, so as to form an abscess, which bursts by a small opening; but, never looks like an ulcer, that has begun upon the surface, like a true venereal one. The case, just alluded to, is always attended with too much inflammation, pain, and tumefaction, of the parts, to be venereal. Also when it suppurates

and bursts, it subsides directly, and it is generally attended with other inflammatory symptoms in the constitution.

Mr. Hunter next takes notice of another disease, consisting of an indolent tumefaction of the tonsils, and peculiar to many persons, whose constitutions are disposed to scrophula. The complaint produces a thickness in the speech. Sometimes coagulable lymph is thrown out on the surface of the parts affected, and occasions appearances, which are by some called ulcers; by some, sloughs; and occasionally, by others, putrid sore-throats. The case is attended with too much swelling to be venereal, and, with a little care, it may easily be distinguished from an ulcer, or loss of substance. However, when this difference is not obvious at first sight, it is proper to endeavour to remove some of the lymph, and, if the surface of the tonsil underneath should appear to be free from ulceration, we may conclude with certainty, that the disease is not venereal. Mr. Hunter states, that he has seen a chunk filled with coagulable lymph, so as to appear very much like an ulcer; but, on removing that substance, the tonsil underneath was found perfectly sound. He adds, that he has seen cases of a swelled tonsil, having a slough in its centre, which slough, before its detachment, looked very like a foul ulcer. The stage of the complaint, he says, is even more puzzling, when the slough has come out; for, then the disease has most of the characters of the venereal ulcer. Whenever he met with the disease in its first stage, he always treated it, as if it had been of the nature of erysipelas, or a carbuncle. When the complaint is in its second stage, without any preceding local symptoms, he recommends the practitioner to suspend his judgment, and to wait a little, in order to see how far nature is able to relieve herself. If there should have been any preceding fever, the case is still less likely to be venereal. Mr. Hunter informs us, that he has seen a sore-throat of this kind mistaken for venereal, and mercury given, till it affected the mouth, when the medicine brought on a mortification of all the parts concerned in the first disease.

Another complaint of these parts, which Mr. Hunter represents as being often taken for a venereal one, is an ulcerous excoriation, which runs along their surface, becoming very broad and sometimes foul, having a regular termination, but, never going deeply into the substance of the parts, as the venereal ulcer does. No part of the inside of the mouth is exempted from this ulcerous excoriation; but, Mr. Hunter thought, that the dis-

ease most frequently occurred about the root of the uvula, and spread forwards along the palatum molle. He remarks, that the complaint is evidently not venereal, since it does not yield to mercury. He has seen these ulcerous excoriations continue for weeks, without undergoing any change, and a true venereal ulcer make its appearance on the surface of the excoriated part. He says, that the excoriations in question have been cured by bark, after the end of the mercurial course, which cured the syphilitic sore.

This author describes the true venereal ulcer in the throat, as a fair loss of substance, part being dug out, as it were, from the body of the tonsil; it has a determined edge, and is commonly very foul, having thick white matter, like a slough, adhering to it, and not admitting of being washed away. Ulcers in such situations are always kept in a moist state, and the matter cannot dry and form scabs, as it does on sores upon the skin. The ulcer is also much more rapid in its progress, and generally has thickened edges.

When lues venerea attacks the tongue, it sometimes produces a thickening and hardening of the part. However, it also frequently gives rise to ulceration, as in other parts of the mouth.

Venereal sores on the tongue, are generally more painful, than those on the skin; but less so, than common sore-throats from inflamed tonsils. They oblige the patient to speak thick, as if his tongue was too large for his mouth, with a small degree of snuffing.

Mr. Hunter doubted the reality of a venereal ophthalmia, though he owns there are inflammations of the eyes, which yield to mercury. The case, commonly supposed to be venereal, is described in the article *Ophthalmia*.

SYMPTOMS OF THE SECOND STAGE OF THE LUES VENEREA.

The second order of parts, or those, which are commonly affected at a later period, may occasionally assume the venereal action, before the disease has produced its local effects on the first order of parts; and they may even go on with the action, in many cases, after these latter have taken on the action, and been cured.

The periosteum, fasciæ, tendons, ligaments, and bones, are the parts, which are usually affected in the second stage of the lues venerea. Mr. Hunter remarks, however, that we cannot always know with certainty what parts may become affected in this stage of the disease.

He says, he has known the distemper produce a total deafness, sometimes followed by suppuration, and great pain in the ear, and side of the head. We have already explained, that it was one of this gentleman's doctrines, that the second order of parts were generally deep-seated. When these become irritated by the poison, he observes, that the progress of the disease is more gradual, than in the first order of parts. It assumes very much the character of scrophulous swellings, or chronic rheumatism; only it affects the joints, less frequently, than the latter affection does. A swelling sometimes makes its appearance on a bone, when there has been no possible means of catching the infection for many months; and, in consequence of the little pain experienced, the tumour may be of some considerable size, before it is noticed. Sometimes, a great deal of pain is felt; but, no swelling comes on, till after a long while. Mr. Hunter states, that these remarks are also applicable to swellings of the tendons, and fasciæ. As tumours of this kind only increase by slow degrees, they are not attended with symptoms of much inflammation. When they attack the periosteum, they seem like an enlargement of the bone itself, in consequence of being very firm, and closely connected with the latter part. Mr. Hunter also further observes, that, in these advanced stages of the disease, the inflammation can hardly get beyond the adhesive kind, in which state, it continues to become worse and worse, and when matter is formed, it is not true pus, but of a slimy description. Some nodes, he says, both of the tendons and bones, last for years, before they form any matter at all. These cases, he mentions as not being certainly venereal, though commonly considered as such.

It is not easy to explain the reason, why, when lues venerea attacks the bones, or the periosteum, the pain should sometimes be very considerable, and, sometimes, very trivial. The pains are usually of a periodical kind, being, in general, most severe in the night-time.

TREATMENT OF LUES VENEREA.

The first order of parts, or those which are most susceptible of being affected in lues venerea, are also the easiest of cure, while the second order of parts take more time to be remedied.

In the class of complaints, arising in the second stage of the lues venerea, Mr. Hunter believed, that it was unnecessary to continue the employment of mercury, till all the swelling had disappeared. For,

it is observed by this distinguished writer, that, since these local complaints cannot contaminate the constitution by re-absorption, and since the venereal disposition and action from the constitution can be cured, while the local effects still remain, and this even when the tumefaction, forming nodes on the bones, fasciæ, &c. has proceeded to suppuration, there can be no occasion for continuing the course, after the venereal action has been destroyed. Mr. Hunter thought, that in this latter stage of the lues venerea, the syphilitic irritation was more easy of cure, than the swelling and other effects of that irritation.

Mercury, in the lues venerea, as well as in cases of chancres, is the great specific. In the present state of our knowledge, nothing else is to be depended upon.

For an account of the various ways of exhibiting this valuable medicine, I must refer the reader to the article *Mercury*, in this Dictionary.

In curing the lues venerea, mercury can only have two modes of action; one on the poison; the other on the constitution. If, says Mr. Hunter, mercury acted on the poison only, one might conceive it did so, either by destroying its qualities, by decomposing it, or else by attracting it and carrying it out of the circulation. If mercury acted in the first of these ways, one would expect, that the cure would depend on the quantity of the medicine taken into the system. If it acted in the second manner, one would infer, that, the progress of the cure would be proportionate to the quantity of evacuation. But, observes Mr. Hunter, if it act upon the principle of destroying the diseased action of the living parts, and of counter-acting the venereal irritation, by producing one of a different kind, then, neither quantity alone, nor evacuations, will avail much. He states, that the quickness of the cure depends on quantity, joined with visible effects. However, it is added, that although the effects, which mercury has upon the venereal disease, are in some degree proportioned to the local effects of the medicine on some of the glands, or particular parts of the body, as the mouth, skin, kidneys, and intestines, yet such effects are not altogether proportioned to these other circumstances. When mercury disagrees with the constitution, so as to produce great irritability and hectic symptoms, this action, or irritation, as Mr. Hunter explains, is not a counter-irritation to the venereal disease.

It was also noticed by the same author, that the effects of mercury on lues venerea, are always in proportion to the quantity

of the remedy, exhibited in a given time, and the susceptibility of the constitution to the mercurial irritation. He says, that these circumstances require the minutest attention, and that, in order to obtain the greatest action of mercury with safety, and in the most effectual manner, the medicine must be given, till it produces effects somewhere. However, it must not be exhibited too quickly, in order that a sufficient quantity may be given, before we are obliged to stop, in consequence of the effects. Mr. Hunter justly informs us, that when the local effects are produced too quickly, they prevent a sufficient quantity of the remedy from being taken into the system to counteract the venereal irritation at large.

Mr. Hunter mentions his having seen some cases, in which mercury acted very readily locally, and, yet the constitution was hardly affected by it, for the disease would not give way. He states, that he has met with other cases, in which the mere quantity of mercury did not answer, till it was given so quickly as to affect the constitution in such a manner, as to produce local irritation, and, consequently, sensible evacuations. This, he observes, is a proof, that the local effects of mercury are often the sign of its specific effects on the constitution at large, and shews, that the susceptibility of the diseased parts to be affected by the medicine, is in proportion to its effects on the mouth. Its effects, he contends, are not to be imputed to evacuation; but, to its irritation. Hence, he inculcates, that mercury should be given, if possible, in such a manner, as to produce sensible effects upon some parts of the body, and in the largest quantity that can be given, to produce these effects within certain bounds. Mr. Hunter also remarks, that these sensible effects should be the means of determining, how far the medicine may be pushed, so as to have the greatest effect on the disease, without endangering the constitution. The practice must vary according to circumstances; and, if the disease is in a violent degree, less regard must be had to the constitution, and mercury must be thrown into the system in larger quantities.

Mr. Hunter likewise acquaints us, that, when the disease is in the first order of parts, a smaller quantity of mercury is necessary, than when the second order of parts are affected, and the disease has been of long standing, its first appearances alone being cured, and the venereal disposition still remaining in the secondary parts. For the purpose of curing the venereal disease, whether in the form of chancre, bubo, or lues venerea, Mr. Hun-

ter was of opinion, that probably the same quantity of mercury is necessary. He represents, that one sore requires as much mercury as fifty sores in the same person, and a small sore as much as a large one. He thought, that the only difference, if there is any, must depend upon the nature of the parts affected, that is, on their being naturally active or indolent. He conceived, however, that, on the whole, recent venereal complaints are generally more difficult of cure, than the symptoms of lues venerea, and that this may make a difference, in regard to the quantity of mercury necessary.

The principles above laid down, and other observations, contained in the article *Mercury*, must suffice for the direction of the cure of lues venerea by this great specific remedy. Other information, connected with the subject, will be found by referring to *Acidum Nitricum*, *Guaiacum*, *Mezereon*, *Sarsaparilla*, &c.

With respect to the local treatment of the symptoms of lues venerea, Mr. Hunter thought, that none would in general be necessary, since the constitutional treatment would commonly effect a cure.

The same writer notices, however, that sometimes the local effects will not give way, and the parts remain swollen in an indolent inactive state, even after there is every reason to believe, that the constitution is perfectly cured. In such cases, he recommends assisting the constitutional treatment by local applications of mercury to the part, either in the form of a plaster, or ointment. The latter application, he says, is the best. When these are not sufficient, he advises an attempt to be made to excite inflammation of another kind. He says, he has seen a venereal node, which gave excruciating pain, cured by merely making an incision down to the bone, the whole length of the node. The pain ceased, the swelling decreased, and the sore healed up kindly, without the assistance of a grain of mercury. He mentions, that blisters have been applied to nodes with success, removing the pain, and taking away the swelling.

DISEASES RESEMBLING THE VENEREAL.— PSEUDO-SYPHILIS.

Sores on the glans penis, prepuce, &c. in the form of chancres, as Mr. Hunter notices, may and do arise without any venereal infection, although in general they are a consequence of former venereal sores, which have been cured.

The symptoms, produced by the venereal poison in the constitution, are such as are common to many other diseases.

For instance, Mr. Hunter remarks, that blotches on the skin are common to what is called scorbutic habit; pains are common to rheumatism; swellings of the bones, periosteum, fasciæ, &c. to many bad habits, perhaps, of the scrophulous and rheumatic kind. Thus, says this valuable writer, most of the symptoms of the venereal disease, in all its forms, are to be found in many other diseases. Hence, the original cause, and many leading circumstances, such as dates, effects of the disorder upon others, from connexion, when only local, the previous and present symptoms, &c. must be considered, before we can determine absolutely what the disease truly is. All the circumstances and symptoms, taken together, may be such, as will attend no other disease. However, Mr. Hunter confesses, that with all our knowledge, and with all the application of that knowledge to suspicious symptoms of this disease, we are often mistaken, calling distempers venereal, which are not so, and sometimes supposing really syphilitic affections to be of another nature.

Mr. Hunter takes notice, that, in some constitutions, rheumatism, in many of its symptoms, resembles the lues venerea. The nocturnal pains, swelling of the tendons, ligaments, and periosteum, and pain in those swellings, are symptoms both of the rheumatism, and also of the venereal disease, when it attacks those parts. Mr. Hunter, however, did not know, that he ever saw the lues venerea attack the joints, though many rheumatic complaints of such parts are cured by mercury, and therefore supposed to be venereal.

Mercury, given without caution, often produces the same symptoms as rheumatism. Mr. Hunter has seen such complaints supposed to be venereal, and the medicine continued.

This interesting author also explains, that some diseases not only resemble the venereal in appearance, but, in the mode of contamination, proving themselves to be poisons by affecting the part of contact; then producing immediate consequences similar to buboes; and also remote consequences similar to the lues venerea.

Mr. Hunter observes, that it is nearly as dangerous, in some constitutions to give mercury, when the disease is not venereal, as to omit it in other cases, which are really syphilitic. Many of the constitutions, which put on some of the venereal symptoms, when the disease is not really present, are those, with which mercury seldom agrees, and commonly does harm. Mr. Hunter has seen mercury, which was exhibited for a supposed ve-

neral ulcer of the tonsils, produce a mortification of those glands, and the patient was nearly destroyed.

Mr. Abernethy, in his *Surgical Observations*, 1804, has treated at some length of diseases resembling syphilis, and has adduced several very interesting cases, which I advise every surgical practitioner to read with the greatest attention. The following case, recorded by this gentleman, I shall take the liberty of quoting.

"A gentleman (says Mr. Abernethy) thought, that he had infected a slight cut on his hand (which was situated in front of and just below the little finger) with the discharge from a bubo in the groin, that he had occasion to open. The wound fretted out into a sore about the size of a sixpence, which he shewed me, and which I affirmed had not the thickened edge and base, and other characters of a venereal chancre. I therefore recommended him to try the effect of local means, and not to use mercury.

"In about a month the sore, which had spread a little, became again contracted in its dimensions, and assumed an healing appearance. At this time pain was felt extending up the arm, and suddenly a considerable tumour arose over the absorbing vessels, which proceed along the inner edge of the biceps muscle. This tumour became nearly as big as a small orange. As the original sore seemed now disposed to heal, and as there was no surrounding induration, I could not believe it venereal, and therefore recommended him still to abstain from mercury, and apply leeches and linen moistened in the aq. litharg. acet. comp. to the tumour formed over the inflamed absorbents. For it seemed to me, that if the venereal poison had been imbibed from the sore, it would have passed on to one of the axillary glands, and would have caused induration and inflammation to take place there, more slowly, than had occurred on the present occasion.

"Under this treatment the tumour was discussed, and the sore at the same time healed. About three weeks afterwards the patient called on me, and said that there were venereal ulcers in his throat; and in each tonsil there was an ulcer deeply excavated, with irregular edges, and with a surface covered by adhering matter; ulcers, in short, which every surgeon, who depends on his sight as his guide, would have pronounced to be venereal. Shortly after also, some copper-coloured eruptions appeared on his face and breast. He shewed his diseases to several surgeons, on whose opinion he relied, who, without hesitation, affirmed

that they were venereal, and that the mercurial course had been improperly delayed.

"Whilst the patient was looking out for lodgings, in order that he might go through the mercurial process, a circumscribed thickening and elevation of the pericranium covering the frontal bone, appeared; it was of the circumference of an half-crown piece; and was, in short, what every surgeon, who is guided only by his sight and touch, would, without hesitation, have called a fair corona veneris. I now told the patient that I was more inclined to believe his disease was not syphilitic, from the sudden and simultaneous occurrence of this node with the sore throat, &c. Other surgeons thought differently; and I believe this very sensible and amiable young man imagined, that his health would become a sacrifice, if he any longer attended to my opinion. He was preparing to submit to a mercurial course, when very important concerns called him instantly into the country. He went with great reluctance, taking with him mercurial ointment, &c.; and after a fortnight I received a letter from him, saying that he found his complaints benefited by his journey, that business had prevented him from beginning the use of mercury for a few days, that he now found it was unnecessary, for his symptoms had almost disappeared, and shortly afterwards he became perfectly well."

Mr. Abernethy considers this case as the most unequivocal instance extant of a disease occurring, which could not from appearance be distinguished by surgeons of the greatest experience from syphilis, and which, however, was undoubtedly of a different nature. He believes, that there is no one, who would not have decided on this case, as those did who declared it to be venereal, unless they had had an opportunity of watching its progress very attentively.

Mr. Abernethy, in the course of his remarks, makes it appear, that cases, which are venereal, and others, which are not, cannot, in general be discriminated by the mere aspect of the affections. He believes, however, that there are some circumstances, in the progress of such different distempers, from which a line of distinction might be drawn.

A very simple fact has enabled this gentleman in most cases to distinguish the two diseases: "yet, simple as it is, (says Mr. Abernethy,) if it be generally true, it is very important; and if it were universally true, it would be of the highest consequence. The fact alluded to is, that the constitutional symptoms of the

venereal disease are generally progressive, and never disappear unless medicine be employed. It may be added too, they are as generally relieved under an adequate effect of mercury on the constitution, &c.

"I have asked the opinion of several surgeons of great practice and abilities respecting this question; Whether constitutional symptoms of syphilis do ever spontaneously amend? and no one has decidedly replied in the affirmative, whilst all, without hesitation, agreed that they were generally progressive till checked by the effect of mercury. It seemed useless to seek further information; for what surgeon is there, at present, if he sees diseases, that cannot be distinguished by the sight from syphilis, and hears that they arose in consequence of a chancre, that would suspend his judgment, and forbear to administer mercury? If I have lived in the habit of so frequently detecting the imposing appearances of the secondary effects of these diseases, it is because I have been upon the watch, and because they have occurred in patients, in whom I have seen the primary sores, the appearance and progress of which have excited my suspicion as to their nature. I have stated the rule as general, but not universal; for I could myself relate cases of diseases, in which, from the great abatement, and even disappearance of symptoms, I have concluded the disease was not syphilitic; yet, from the duration of the disorder, or from the subsequent aggravation of its symptoms, the patient has desired, and I have recommended the use of, mercury, and the disease has been treated as venereal, without its real nature being ascertained.

"The rule, which has been mentioned, relates to the constitutional symptoms of the venereal disease, for the primary ones, chancres, do sometimes heal spontaneously, generally, however, though not constantly, leaving a thickening or induration of the affected part. They may also be induced to heal by topical means, without mercury, with similar events. Some enlargements of glands in the groin will also in like manner subside.

"It may be fairly supposed, that if some chancres heal spontaneously, that constitutional diseases arising from the same cause, may, in like manner, sometimes get better without medicine. The administration of nitrous acid, opium, and other remedies have been said to have amended, if not entirely cured, these constitutional diseases. But the question is, will they get better spontaneously? and the question can only be solved by experience. Delay will frequently enable

a surgeon to decide; but, there are cases, in which no amendment takes place, and the surgeon is as it were forced, from the progress of the disease, to employ mercury.

"In recommending prudent delay and attentive observation, I hope and believe, (continues Mr. Abernethy,) that I am not recommending any thing likely to be of dangerous consequence. The venereal disease is generally soon checked by the use of mercury; and in constitutions, where much medicine is required to counteract its effects, that medicine may be given with freedom. By delay and observation, we perhaps may perceive, that eruptions and sore throats, which could not from appearance be distinguished from venereal, spontaneously amend: that some eruptions scale and become well, and the probability will of course be that the rest will do so likewise: or that an ulcer mends in one part, though it may spread in another, when the natural inference is that the diseased actions in the sore will gradually cease, and health return spontaneously; and that what has occurred in one part of an ulcer, will successively take place in another.

"In recommending delay it cannot, I suppose, be thought that I would advise any one to wait till an ulcer destroyed the velum pendulum palati, or did material injury to any important part. There are cases where the progress of the disease obliges a surgeon to use mercury, even though he may be suspicious that it is not syphilitic. The effect of exciting a mercurial affection of the constitution in diseases resembling syphilis is, as far as my observation enables me to determine, very various. It sometimes cures them very suddenly and very differently from the gradual amendment, which it produces in truly venereal diseases. Sometimes, however, these diseases yield more slowly to its operation, and are cured permanently. Sometimes the diseases recur in the same parts after a severe course of mercury; sometimes mercury merely checks the disease, and can scarcely be said to cure it; in which case it seems important to support the strength of the constitution, and to keep up that mercurial effect which controuls the disease, and can be borne without material derangement of the constitution for a great length of time. Sometimes also the use of mercury aggravates these diseases.

"Again, in some constitutions, the venereal disease may assume unusual characters, and be very difficult of cure. It must then be scarcely possible to descri-

minate between these anomalous cases of syphilis and those of diseases resembling it, unless some new distinctions are discovered." (See *Surgical Observations*, by John Abernethy, F. R. S.)

For information concerning the venereal disease, the reader should particularly consult *Astruc de Morbis Venereis*. John Vigo's *Whole Works in Chirurgie*, by Gale, 1586; or the Latin edition published at Leyden, in 1518. *Fallopian de Morbo Gallico*. Antonius Musa *Brasavolus in the Aphrodisiacus*. Ulricus de Hutten *de Morbo Gallico*. Boerhaavius *de Lue Venerea*, 12mo. 1751. *Rondeletti Opera Omnia*, 4to; Geneva, 1610. *Morgagni de Sedibus et Causis Morborum*. Franciscianus *de Morbo Gallico*, 8vo. Patav. 1563. *Gataker on Venereal Complaints*, 1754. *Chapman on the Venereal Disease*, 1770. *Fordyce on the Venereal Disease, with an Appendix*, 1777. *Plenck Doctrina de Morbis Venereis*. B. Bell's *Treatise on Gonorrhœa Virulenta, and Lues Venerea*, edit. 2, 1797. *Lalouette's New Method of Curing Diseases by Fumigation*, 8vo. 1777. *Hunter's Treatise on the Venereal Disease*, edit. 2.; which is by far the most valuable work ever published on the subject. *An Enquiry into some of the Effects of the Venereal Poison, &c.* by S. Sawrey, 1802. *Observations on the Effects of various Articles of the Materia Medica in the Cure of Lues Venerea*, edit. 2, 1807. *Practical Observations on the Natural History and Cure of the Venereal Disease*, 2 vol. 8vo. edit. 2. 1806. *Practical Observations on Venereal Complaints*, by F. Swediaur, edit. 3. *Abernethy on Diseases resembling Syphilis, in his Surgical Observations*, 1804. *Adams on Morbid Poisons*, edit. 2.

VENESECTIO, (from *vena*, a vein, and *sectio*, a division.) The operation of opening a vein. *Phlebotomy*. This subject has already been spoken of in the article *Bleeding*.

VERRUCA. A wart. (See *Wart*.)

VERTEBRÆ, DISEASE OF. In the present part of the Dictionary, I have little more to do, than insert some of the very excellent account, which Mr. Pott has left us of the affection about to be considered.

The disorder, which we are going to consider, is a disease of the spine, attended with a more, or less, complete loss of the power of using the legs.

Mr. Pott mentions, that it has in general been called a palsy, and treated as a paralytic affection; to which it is in almost every respect perfectly unlike.

This author observes, that the occasion of the mistake is palpable; the patient is deprived of the use of his legs,

and has a deformed incurvation of the spine; the incurvation is supposed to be caused by a dislocation of the vertebræ; the displaced bones are thought to make an unnatural pressure on the spinal marrow, and a pressure on that being very likely to produce a paralysis of some kind, the loss of the use of the legs is in this case determined to be such: the truth is, that there is no dislocation, no unnatural pressure made on the spinal marrow, nor are the limbs by any means paralytic, as will appear to whoever will examine the two complaints with any degree of attention.

In the true paralysis, (says Mr. Pott,) from whatever cause, the muscles of the affected limb are soft, flabby, unresisting, and incapable of being put into even a tonic state; the limb itself may be placed in almost any position, or posture; if it be lifted up, and then let go, it falls down, and it is not in the power of the patient to prevent, or even to retard its fall: the joints are perfectly and easily moveable in any direction; if the affection be of the lower limbs, neither hips, knees, nor ankles, have any degree of rigidity, or stiffness; but, permit the limb to be turned, or twisted, in almost any manner.

Mr. Pott next notices, that, in the present case, the muscles are indeed extenuated, and lessened in size; but, they are rigid, and always at least in a tonic state, by which the knees and ankles acquire a stiffness not very easy to overcome; by means of this stiffness, mixed with a kind of spasm, the legs of the patient are either constantly kept stretched out straight, in which case considerable force is required to bend the knees, or they are, by the action of the stronger muscles, drawn across each other, in such manner as to require as much to separate them: when the leg is in a straight position, the extensor muscles act so powerfully, as to require a considerable degree of force, to bend the joints of the knees; and, when they have been bent, the legs are immediately, and strongly, drawn up, with the heels toward the buttocks: by the rigidity of the ankle-joints, joined to the spasmodic action of the gastrocnemii muscles, the patient's toes are pointed downward, in such manner as to render it impossible for him to put his foot flat to the ground: which makes one of the decisive characteristics of the distemper.

These (says Pott) are strong marks of the distinction, which ought to be made between the two diseases; and, fully sufficient to shew the impropriety of confounding them with each other.

The majority of those, who labour under this disease, are infants, or young children: adults are by no means exempt from it; but Mr. Pott never saw it at an age beyond forty.

Mr. Pott remarks, that, when it attacks a child, who is old enough to have walked properly, its awkward and imperfect manner of using its legs, is the circumstance, which first excites attention, and the incapacity of using them at all, which very soon follows, fixes that attention, and alarms the friends.

Mr. Pott tells us, that the account, most frequently given, is, that for some time previous to the incapacity, the child had been observed to be languid, listless, and very soon tired; that he was unwilling to move much, or briskly; that he had been observed frequently to trip and stumble, although no impediment lay in his way; that when he moved hastily, or unguardedly, his legs would cross each other involuntarily, by which he was often and suddenly thrown down; that if he endeavoured to stand still, and upright, unsupported by another person, his knees would totter and bend under him; that he could not, with any degree of precision, or certainty, steadily direct either of his feet, to any particular point, but, that in attempting so to do, they would be suddenly, and involuntarily brought across each other; that soon after this, he complained of frequent pains and twitchings in his thighs, particularly when in bed, and of an uneasy sensation at the pit of his stomach; that when he sat on a chair, or a stool, his legs were almost always found across each other, and drawn up under the seat; and that in a little time after these particulars had been observed, he totally lost the power of walking.

These, continues Pott, are the general circumstances, which are found, at least, in some degree, and that pretty uniformly, in most infants and children; but, there are others, which are different in different subjects.

The same author observes, that if the incurvation be of the neck, and to a considerable degree, by affecting several vertebræ, the child finds it inconvenient and painful to support its own head, and is always desirous of laying it on a table or pillow, or any thing to take off the weight. If the affection be of the dorsal vertebræ, the general marks of a distempered habit, such as loss of appetite, hard dry cough, laborious respiration, quick pulse, and disposition to hectic, appear pretty early, and in such a manner as to demand attention: and as, in this state of the case, there is always, from the connexion be-

tween the ribs, sternum, and spine, a great degree of crookedness of the trunk, these complaints, are by every body set to the account of the deformity merely. In an adult, the attack, and the progress of the disease, are much the same; but, there are some few circumstances, which may be learned from a patient of such age, which either do not make an impression on a child, or do not happen to it.

Mr. Pott states, that an adult, in a case, where no violence hath been committed, or received, will tell you, that his first intimation was a sense of weakness in his back-bone, accompanied with what he will call a heavy dull kind of pain, attended with such a lassitude as rendered a small degree of exercise fatiguing; that this was soon followed by an unusual sense of coldness in his thighs, not accountable for from the weather, and a palpable diminution of their sensibility. That in a little time more, his limbs were frequently convulsed by involuntary twitchings, particularly troublesome in the night; that soon after this, he not only became incapable of walking, but that his power either of retaining or discharging his urine and feces, was considerably impaired, and his penis became incapable of erection.

The adult also finds all the offices of his digestive, and respiratory organs much affected, and complains constantly of pain and tightness at his stomach.

Mr. Pott next continues: In infants, the curve is seldom noticed till it has got to such size and state, as to demand attention from the deformity: previous to this, all the marks of distemper, which appear in the child, pass for the effects of general weakness, and are treated as such; differently by different people, and under different circumstances, but never with any permanent good effect; some of the adventitious symptoms, if I may so call them, are, in some degree, relieved, but the principal remain in full force, or, what is much more frequent, go on increasing.

In an adult it passes for rheumatism, or gravel, or a strain, and the defect in the limbs is the first thing, that occasions an enquiry into the state of the back-bone.

When a curvature, says Mr. Pott, is perceived in an infant, it is always supposed to have received a hurt by a blow, or fall, and an adult has always recourse to some exertion in pulling, drawing, lifting, or carrying, by which the spine is thought to have been deranged, or injured; but which supposition is seldom, if ever true, in either case.

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The true cause of the disease, is a morbid state of the spine, and of some of the parts connected with it; which distempered state of parts will, upon careful enquiry, be always found to have preceded the deformity some length of time; in infants, this is the sole cause, and external violence has nothing to do with it. In the adult, (continues Mr. Pott,) I will not assert, that external mischief is always and totally out of the question; but, I will venture to affirm, what is equal, as far as regards the true nature of the case, which is, that although accident and violence may in some few instances be allowed to have contributed to its more immediate appearance, yet the part, in which it shews itself, must have been previously in a morbid state, and thereby predisposed for the production of it. I do not (says Pott,) by this mean to say, that a violent exertion cannot injure the spine, nor produce a paralytic complaint, that would be to say more than I know; but, I will venture to assert, that no degree of violence whatever is capable of producing such an appearance as I am now speaking of, unless the bodies of the vertebræ were by previous distemper disposed to give way; and that no supposable dislocation, caused by mere violence done to the bones of the back, which bones were, before the receipt of the injury, in a sound state, can possibly be attended with the peculiar symptoms of a curved spine. In which distinction, according to my judgment, (observes Mr. Pott,) consists the very essence of the disease. Violence may easily be supposed to bring the two vertebræ nearer to each other than they ought to be, and by crushing an intermediate one to produce a curvature; but, then the body of the vertebræ so crushed must have been in a distempered state previous to such violence: great violence may also suddenly and immediately displace a perfectly sound vertebra, from its proper and natural situation, with regard to those annexed to it: but, the necessary consequences of these two kinds of injury, must be so very different, that they never can be confounded together, or mistaken for each other even by the most inattentive observer.

Mr. Pott next acquaints us, that the true curvature is invariably uniform, in being from within outwards; but, it varies in situation, in extent, and in degree; it affects the neck, the back, or the loins; it comprehends one vertebra only, or two, or more; and as few or more are affected, or, as these are more or less morbid, and, consequently give way more or less, the curve must be different; but, whatever

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variety these circumstances may admit, the lower limbs alone,* in general, feel the effect. Some are, very soon after the curvature, rendered totally and absolutely incapable, not only of walking, but of using their legs in any manner; others can make shift to move about with the help of crutches, or by grasping their thighs just above the knees with both hands; some can sit in an armed chair, without much trouble or fatigue; others cannot sit up with any help; some retain such a degree of power of using their legs, as to be able to shift their posture when in bed; others have no such power, and are obliged to be moved upon all occasions.

Mr. Pott adds, that weak and delicate children are the most frequent subjects of this distemper; and when in these, it seizes on the dorsal vertebræ, great deformity of the trunk, both before, and behind, is the almost inevitable and necessary consequence; this will be different in different persons; but, let the difference in this be what it may, it is an adjunct circumstance, and upon due enquiry it will always be found, that the curvature from within outward, preceded the other deformity, and was, at one time, the only one to be seen.

Before the alteration of figure in the back-bone has been discovered, says Mr. Pott, all the attention is paid to the limbs, in which the whole disorder is supposed to reside; and all the applications for relief are made to them: frictions, liniments, embrocations, blisters, &c. to which is generally added cold bathing and electricity; when the curvature has been noticed, recourse is immediately had to back-boards, collars, steel boddices, swings, screw-chairs, and other pieces of machinery, but all to no purpose; the patient becomes daily more and more helpless and unhealthy, languishes for more or less time, and at last dies, either in an emaciated state, from an hectic, or by a

drain from an abscess, formed within the body.

That this is the case, frequent and melancholy experience evinces; but, why it is so, is perhaps not generally so well understood, or attended to as it ought to be.

Mr. Pott contends, that the primary and sole cause of all the mischief, is a distempered state of the parts composing, or in immediate connexion with the spine, tending to, and most frequently ending in, a caries of the body, or bodies, of one or more of the vertebræ: from this proceed all the ills, whether general, or local, apparent or concealed; this causes the ill health of the patient, and, in time, the curvature. The helpless state of the limbs, is only one consequence of several, proceeding from the same cause; but, though this effect is a very frequent one, and always affects the limbs in nearly the same manner; yet, the disease not having its origin in them, no application made to them only, can ever be of any possible use.

The same failure of success (observes Mr. Pott) attends the use of the different pieces of machinery, and, for reasons, which are equally obvious.

They are all, (says this author,) from the most simple, to the most complex, but particularly the swing and the screw, calculated to obviate and remove what does not exist. They are founded upon the supposition of an actual *dislocation*, which never is the case, and therefore they always have been, and ever must be, unsuccessful.

To understand this in the clearest and most convincing manner, we need only reflect on the nature of the disease, its seat, and the state, in which the parts concerned must necessarily be.

Mr. Pott states, that the bones are either already carious, or tending to become so; the parts connected with them are diseased, and not unfrequently ulcerated; there is no displacement of the vertebræ, with regard to each other, and the spine bends forward only because the rotten bone, or bones, intervening between the sound ones, give way, being unable, in such state, to bear the weight of the parts above. The most superficial reflection on this, must point out to every one, why attempts of this kind can do no good, and a little more attention to the subject will shew, why they may be productive of real, and great mischief. The bones are supposed to be sound, but displaced; these machines are designed to bring them back to their former situation, and thereby to restore to the spine its pro-

* Since I began to put these papers together, (says Pott,) I have seen two cases, in one of which the arms only were affected, in the other both legs and arms.

Mr. E. Ford, of Golden-square, has favoured me with the examination and case of a lad, who lost the use of both legs, and both arms, from a curvature, which Mr. Ford cured by means of the caustics. —Mr. Parke, of Liverpool, has also obliged me with an account of two persons, both under his care, both with useless arms and legs, and both cured by the same means. (Pott.)

per rectitude; if, therefore, they have any power, that power must be exercised on the parts in connexion with the curve; which parts, when the disease is at all advanced, are incapable of bearing such a degree of violence, without being much hurt thereby: this, if it were merely theoretical, being a conclusion drawn from the obvious and demonstrable state of the distempered parts, says Pott, could not be deemed unreasonable; but, unfortunately for the afflicted, it is confirmed by practice. They who have had patience and fortitude to bear the use of them, to such a degree as to affect the parts concerned, have always found increase of pain and fever, and an exasperation of all their bad symptoms, and (observes Mr. Pott) I have known more than one instance, in which the attempt has proved *fatal*.

The use of some or other of these pieces of machinery was so general, and the vulgar prejudice in their favour so great, that notwithstanding Mr. Pott was long convinced of their perfect inutility, yet if he had had no other objection to them, he says he would not have attempted to rob the afflicted of what they seemed to derive such comfortable expectation from. However, as he was satisfied of their mischievous effects, not only in the case of the present subject, but in many others; he could not help bearing his testimony against the indiscriminate and very improper use, which was daily made of them.

Mr. Pott says, they are used with design to prevent growing children from becoming crooked or misshapen, and this they are supposed to do, by supporting the back-bone, and by forcing the shoulders unnaturally backward; the former they cannot do, and in all cases where the spine is weak, and thereby inclined to deviate from a right figure, the latter action of these instruments must contribute to, rather than prevent such deviation; as will appear to whoever will, with any attention, examine the matter: if, instead of adding to the embarrassments of children's dress, by such iron restraints, parents would throw off all of every kind, and thereby give nature an opportunity of exerting her own powers; and if, in all cases of manifest debility, recourse was had to friction, bark, and cold bathing, with a due attention to air, diet, exercise, and rest, the children of the opulent would perhaps, stand a chance of being as stout, as straight, and as well shaped, as those of the laborious poor.

Mr. Pott observes: When a child appears to be what the common people call naturally weakly, whatever complaints it

may have, are supposed to be caused by its weak state, and it is generally believed, that time and common care will remove them; but, when a curvature has made its appearance, all these marks of ill health, such as laborious respiration, hard cough, quick pulse, hectic heat and flushing, pain and tightness of the stomach, &c. are more attentively regarded, and set to the account of the deformity consequent to the curve, more especially if the curvature be of the dorsal vertebræ, in which case the deformity is always greatest: but, whoever will carefully attend to all the circumstances of this disorder, will be convinced, that most, if not all the complaints of children, labouring under this infirmity, precede the curvature, and that a morbid state of the spine, and of the parts connected with it, is the original and primary cause of both.

I have (says Pott) in the former edition, informed the reader, that my particular attention to this disease, was first excited by an instance of its being cured by a seemingly accidental abscess; that this first gave me reason to suspect, that we had mistaken an effect for a cause, and, that upon a mature deliberation upon the matter, I was still more inclined to think so, for the following reasons.

1. "That I did not remember ever to have seen this useless state of the limbs from a mere mal-formation of the spine, however crooked such mal-formation might have made it.

2. "That none of those deviations from right shape, which growing girls are so liable to, however great the deformity might be, was ever attended with this effect.

3. "That the kind of deformity, which was attended with this affection of the limbs, although it was different as to its degree, and its extent, in different people; yet, it was uniform in one circumstance, which was, that the curvature always was from within outwards.

4. "That since I had been particularly attentive to the disorder, I thought that I had observed, that neither the extent, nor degree of the curve, had in general produced any material difference in the symptoms; but that the smallest was, when perfectly formed, attended with the same consequences as the largest.

5. "That although it had sometimes happened, that a blow, or a strain, had preceded the appearance of the curve, yet it much more frequently happened, that no such cause was assignable.

6. "That I had observed exactly the same symptoms in infants, and in young children, who had neither exerted them-

selves, nor were supposed to have received any injury from others; and that the case was still the same in those adults, who had no such cause to look to.

7. "That although it might be expected, that a dislocation of any of the vertebræ, would be attended with symptoms of the paralytic kind, yet they would be very unlike to those which affected the limbs in the present case."

Mr. Pott next continues: The suspicions, which these circumstances had excited in my mind, were confirmed* by what I had a few opportunities of observing, in the dead bodies of some who had died afflicted with this disorder, and altogether satisfied me, that there must be something predisposing in the parts concerned; and that when we attribute the useless state of the limbs merely to the curvature, we mistake, as I have just said, an effect for a cause.

At the same time, says Mr. Pott, I gave an account of a conversation which passed between me and the late Dr. Cameron, of Worcester, who told me, that having remarked in Hippocrates, an account of a paralysis of the lower limbs, cured by an abscess in the back, he had, in a case of useless limbs, attended with a curvature of the spine, endeavoured to imitate this act of nature, by exciting a purulent discharge, and that it had proved very beneficial; which was confirmed to me by Mr. Jeffrys, of Worcester, who had made the same experiment with the same success.

If the cure of this most dreadful distemper, observes Mr. Pott, had depended upon an application to the constitution in general, it might have required a variety of medicines, the administration of which must have demanded judgment, in adapt-

* In the first edition, (says Pott,) I had described the bones, on which the disease had seized, as being enlarged and spread; upon repeated enquiry and examination, I am convinced that they are not.

The bodies of the vertebræ concerned are often affected, while the ligaments bear but little mark of distemper; but whether the ligaments be affected, or not, the bodies of the vertebræ are always diseased, which disease does not so properly *enlarge* as *erode*: the state also of the intervertebral cartilages, I find to be subject to great variety, they being sometimes totally destroyed, while the caries is small in degree, sometimes apparently but little injured, where the caries has done considerable mischief, and sometimes totally destroyed and annihilated. (Pott.)

ing them to particular persons and constitutions; and it must also, in the nature of things, have happened, that many individuals could not have been benefited at all. But, fortunately for the afflicted, the means of relief are simple, uniform, and safely applicable to every individual, under almost every possible circumstance, not attended by the smallest degree of hazard, and capable of being executed by any body, who has the least portion of chirurgic knowledge: it consists merely in procuring a large discharge of matter, from underneath the membrana adiposa, on each side of the distempered bones forming the curvature, and in maintaining such discharge until the patient shall have recovered his health and limbs. They who are little conversant with matters of this sort, (continues Mr. Pott,) will suppose the means very inadequate to the proposed end; but they who have been experimentally acquainted with the very wonderful effects of purulent drains, made from the immediate neighbourhood of diseases, will not be so much surprised at this particular one; and will immediately see how such kind of discharge, made, and continued from the distempered part, checks the further progress of the caries, gives nature an opportunity of exerting her own powers, of throwing off the diseased parts, and of producing, by incarnation, an union of the bones (now rendered sound,) and thereby establishing a cure.

Mr. Pott states, that it is a matter of very little importance towards the cure, by what means the discharge be procured, provided it be large, that it come from a sufficient depth, and, that it be continued for a sufficient length of time.

I have tried, says he, the different means of setons, issues by incision, and issues by caustic, and have found the last in general preferable, being least painful, most cleanly, most easily manageable, and capable of being longest continued.

The caustics, he observes, should be applied on each side of the curvature, in such a manner as to leave the portion of skin covering the spinal processes of the protruding bones, entire and unhurt, and so large that the sores, upon the separation of the eschars, may easily hold each three or four peas, in the case of the smallest curvature; but, in large curves, at least as many more.

The issues, which modern surgeons usually make, for the relief of the symptoms arising from diseased vertebræ are larger, than such as Mr. Pott himself was in the habit of forming. Practitioners now commonly prefer making an issue on each side of the spinous processes, about

three, or four inches long, and half an inch broad. This leads me to speak of the method of making caustic issues in general, and of the best way of keeping them open.

The size of the issue, intended to be made, being determined, the place, where it is to be made, should be accurately marked out with ink. All the skin immediately around should then be covered with adhesive plaster, in order that it may be protected from the action of the caustic. Let the surgeon next take a piece of the *kali purum*, or *kali purum cum calce viva*, and wrap a little tow round one end of it, so that he may take hold of it with safety and convenience. The other end of the caustic should then be moistened a little, and rubbed very quickly on the portion of the integuments which is to be converted into an eschar. The part is to be rubbed in this manner, till it turns of a dull brown colour, when the caustic should be carefully washed off with a little wet tow, and a poultice applied.

As soon as the eschars admit of being removed, a row of peas, or beans, connected together with thread, should be laid on the sore, and confined there with sticking plaster. A compress, containing a piece of pasteboard, or sheet-lead, is then to be bound over the peas, or beans, with a roller. In consequence of the continued pressure, the peas, or beans, soon form little hollows for themselves, in which they should be regularly placed every day. When the pressure is not duly maintained, the granulations are apt to rise so high, that the peas cannot be well kept on the part. In this circumstance, the surgeon must try to repress the high surface of the sore, by sprinkling on it a little of the *pulvis sabinæ et æruginis* mixed together in equal proportions. When this plan is unavailing, the re-application of the caustic becomes indispensable.

With respect to the treatment of diseased vertebræ, Mr. Pott observes, whatever length of time it may take to obtain a complete cure, by restoring the health as well as the limbs, the issues must be continued at least as long; and in his opinion, a considerable time longer, especially in the persons of infants and growing children; the necessity of which will appear more strongly, when it shall be considered, that infants and young children of strumous habits, are the subjects, who are most liable to this distemper, and that, in all the time previous to menstruation in one sex, and puberty in the other, they are in general more served by artificial drains, than any other persons whatever.

Mr. Pott maintains, that this, and this only, does, or can, alleviate the misery attending this distemper, and in proper time effect a cure.

By means of these discharges, says he, the eroding caries is first checked, and then stopped; in consequence of which an incarnation takes place, and the cartilages between the bodies of the vertebræ having been previously destroyed, the bones become united with each other, and form a kind of ankylosis.

Mr. Pott observes, that the time necessary for the accomplishment of this, must, in the nature of things, be considerable in all cases; but, very different, according to different circumstances.

No degree of benefit or relief, nor any the smallest tendency towards a cure, is to be expected, until the caries be stopped, and the rotten bones have begun to incarnate; the larger the quantity of bones concerned, and the greater degree of waste and havock committed by the caries, the greater must be the length of time required for the correction of it, and for restoring to a sound state so large a quantity of distempered parts—and vice versa.*

In the progress toward a cure, (according to Pott) the same gradation, or succession of circumstances, may be observed, as was found to attend the formation of the disease, with this difference, that those which attend the latter, are much more rapid, than those which accompany the former.

This author represents, that after the discharge has been made some time, very uncertain what, the patient is found to be better, in all general respects, and if of age to distinguish, will acknowledge, that he feels himself to be in better health; he begins to recover his appetite, gets refreshing sleep, and has a more quiet, and less hectic kind of pulse; but, the relief, which he feels above all others, is from having got rid of that distressing sensation of tightness about the stomach; in a little time more a degree of warmth, and a sensibility is felt in the thighs, which they had been strangers to for some time; and generally much about the same time, the power of retaining and discharging the urine and feces begins to be in some degree exerted.

* Nothing (says Pott) can be more uncertain than the time required for the cure of this distemper. I have seen it perfected in two or three months, and I have known it require two years; two-thirds of which time passed before there was any visible amendment.

The first return of the power of motion in the limbs, says Mr. Pott, is rather disagreeable; the motions being involuntary, and of the spasmodic kind, principally in the night; and generally attended with a sense of pain in all the muscles concerned.

At this point of amendment, if it may be so called, it is no uncommon thing, especially in bad cases, for the patient to stand some time, without making any farther progress; this, in adults, occasions impatience, and in parents, despair; but, in the milder kind of case, the power of voluntary motion generally soon follows the involuntary.

Mr. Pott next notices, that the knees and ankles, by degrees, lose their stiffness, and the relaxation of the latter enables the patient to set his feet flat upon the ground, the certain mark that the power of walking will soon follow; but those joints, having lost their rigidity, become exceedingly weak, and are not for some time capable of serving the purpose of progression.

The first voluntary motions are weak, not constantly performable, nor even every day, and liable to great variation, from a number of accidental circumstances, both external and internal.

The first attempts to walk (continues Mr. Pott) are feeble, irregular, and unsteady, and bear every mark of nervous and muscular debility; the patient stands in need of much help, and his steps, with the best support, will be irregular and unsteady; but, when they have arrived at this, this eminent surgeon had never seen an instance, in which they did not soon attain the full power of walking.

Mr. Pott adds, that when the patient can just walk, either with crutches, or between two supporters, he generally finds much trouble and inconvenience, in not being able to resist, or to regulate the more powerful action of the stronger muscles of the thigh over the weaker, by which his legs are frequently brought involuntarily across each other, and he is suddenly thrown down.

The same writer informs us, that adults find assistance in crutches, by laying hold of chairs, tables, &c. but the best and safest assistance for a child, is what is called a go-cart, of such height as to reach under the arms, and so made as to inclose the whole body: this takes all inconvenient weight off from the legs, and at the same time enables the child to move them as much as it may please.

Time and patience, says Mr. Pott, are very requisite; but, they do, in this case, as in many others, accomplish our wishes at last.

The deformity remaining after recovery, he observes, is subject to great uncertainty, and considerable variety, as it depends on the degree of caries, and the number of bones affected; in general, it may be said, that where one vertebræ only is affected, and the patient young, the curve will in length of time almost totally disappear; but, where two or three are affected, this cannot be expected; the thing aimed at is the consolidation and union of the bones, which had been carious, and are now become sound; this is the *sine quâ non* of the cure, and this must, in such cases, render the curvature, and, consequently, the deformity permanent: the issues will restore the use of the limbs, but not the lost figure of the spine.

Mr. Pott, after having paid much attention to the subject, was convinced, that the complaint arises from what is commonly called a strumous, or scrophulous indisposition, affecting the parts composing the spine, or those in its immediate vicinity.

This morbid affection, says he, shews itself in a variety of forms: but, although its appearances be various, yet they are always such as determine the true nature of the distemper.

Sometimes it appears in a thickened state of the ligaments, connecting the vertebræ together, without any apparent affection of the bones.

Sometimes in the form of a distempered state of the intervertebral substances, called cartilages.

Sometimes in that of diseased glands, either in a merely indurated and enlarged state, or, what is more frequent, in that of a partial suppuration.

Sometimes it is found in the form of bags, or cysts, containing a quantity of stuff, of a very unequal consistence, partly purulent, partly sanious, and partly a curd-like kind of substance; and not unfrequently entirely of the last.

Sometimes under these bags, or cysts, even while they remain whole, the subjacent bones are found to be distempered, that is, deprived of periosteum, and tending to become carious.

Sometimes (continues Mr. Pott) these collections erode the containing membranes, and make their way downward by the side of the psoas muscle, toward the groin, or by the side of the pelvis, behind the great trochanter, or, in some cases, to the outside of the upper part of the thigh.

Sometimes (says the same author) each of the distempered states of these parts is accompanied by a greater or less degree of deformity, and crookedness of the

spine, without any apparent disease of the bones composing it. Sometimes the deformity is attended with an erosion, or caries of the body, or bodies, of some of the vertebræ; and sometimes the same bones are found to be carious, without any crookedness, or alteration of figure.

Mr. Pott next acquaints us, that these different affections of the spine, and of the parts in its immediate neighbourhood, are productive of many disorders, general and local, affecting the whole frame and habit of the patient, as well as particular parts; and, among the rest, of that curvature which is the subject of this inquiry; and it may not be amiss to remark, that strumous tubercles in the lungs, and a distempered state of some of the abdominal viscera, often make a part of them.

From an attentive examination of these morbid appearances, and of their effects in different subjects, and under different circumstances, Mr. Pott deduces the following observations:

1. That the disease, which produces these effects on the spine, and the parts in its vicinity, is what is in general called the scrophula; that is, that same kind of indisposition as occasions the thick upper lip, the tedious obstinate ophthalmia, the indurated glands under the chin, and in the neck, the obstructed mesentery, the hard dry cough, the glairy swellings of the wrist and ankles, the thickened ligaments of the joints, the enlargement and caries of the bones, &c. &c. &c.

2. That this disease, by falling on the spine and the parts connected with it, is the cause of a great variety of complaints, both general and local.

3. That when these complaints are not attended with an alteration of the figure of the back-bone, neither the real seat, nor true nature of such distemper are pointed out by the general symptoms, and, consequently, that they frequently are unknown, at least while the patient lives.

4. That when, by means of this distemper, an alteration is produced in the figure of the back-bone, that alteration is different in different subjects, and according to different circumstances.

5. That when the ligaments and cartilages of the spine become the seat of the disorder, without any affection of the vertebræ, it sometimes happens, that the whole spine, from the lowest vertebra of the neck downwards, gives way laterally, forming sometimes one great curve to one side, and sometimes a more irregular figure, producing general crookedness and deformity of the whole trunk of the body, attended with many marks of ill health.

6. That these complaints, which are by almost every body supposed to be the effect of the deformity merely, are really occasioned by that distempered state of the parts within the thorax, which is, at the same time, the cause both of the deformity and of the want of health.

7. That the attack is sometimes on the bodies of some of the vertebræ; and that, when this is the case, ulceration or erosion of the bone, is the consequence, and not enlargement.

8. That when this erosion, or caries, seizes the body, or bodies, of one or more of the vertebræ, it sometimes happens, that the particular kind of curvature, which makes the subject of these sheets, is the consequence.

9. That this curvature, which is always from within outward, is caused by the erosion, or destruction, of part of the body or bodies of one or more of the vertebræ; by which means that immediately above the distemper, and that immediately below it, are brought nearer to each other than they should be, the body of the patient bends forward, the spine is curved from within outward, and the tuberosity appears behind, occasioned by the protrusion of the spinal processes of the distempered vertebræ.

10. That according to the degree of carious erosion, and according to the number of vertebræ affected, the curve must be less or greater.

11. That when the attack is made upon the dorsal vertebræ, the sternum and ribs, for want of proper support, necessarily give way, and other deformity, additional to the curve, is thereby produced.

12. That this kind of caries is always confined to the bodies of the vertebræ, seldom or never affecting the articular processes.*

13. That without this erosive destruction of the bodies of the vertebræ, there can be no curvature of the kind here treated of; or, in other words, that erosion is the *sine quâ non* of this disease; that although there can be no true curve without caries, yet there is, and that not infrequently, caries without curve.

14. That the caries with curvature and useless limbs, is most frequently of the cervical or dorsal vertebræ; the caries without curve, of the lumbal, though this is by no means constant or necessary.

* Mr. Pott mentions his having seen two cases in which the bodies of the vertebræ were totally separated from all connexion with the other parts leaving the membrane, which included the spinal marrow, perfectly bare.

15. That in the case of carious spine, without curvature, it most frequently happens, that internal abscesses, and collections of matter are formed, which matter makes its way outward, and appears in the hip, groin, or thigh; or, being detained within the body, destroys the patient: the real and immediate cause of whose death is seldom known, or even rightly guessed at, unless the dead body be examined.

16. That what are commonly called lumbar and psoas abscesses, are not unfrequently produced in this manner, and, therefore, when we use these terms, we should be understood to mean only a description of the course which such matter has pursued in its way outward, or the place where it makes its appearance externally, the terms really meaning nothing more, nor conveying any precise idea of the nature, seat, or origin of a distemper subject to great variety, and from which variety its very different symptoms and events, in different subjects, can alone be accounted for.

17. That contrary to the general opinion, a caries of the spine is more frequently a cause, than an effect of these abscesses.

18. That the true curvature of the spine, from within outward, of which the paralytic, or useless state of the lower limbs, is a too frequent consequence, is itself but *one* effect of a distempered spine; such case being always attended with a number of complaints, which arise from the same cause: the generally received opinion, therefore, that all the attending symptoms are derived from the curvature, considered abstractedly, is by no means founded in truth, and may be productive of very erroneous conduct.

19. That in the case of true curvature, attended with useless limbs, there never is a *dislocation*, properly to be so called; but that the alteration in the figure of the back-bone, is caused solely by the erosion and destruction of a part of one or more of the corpora vertebrarum; and, that as there can be no true curvature without caries, it must be demonstrably clear, that there must have been a distempered state of parts previous to such erosion; from all which it follows, that this distemper, call it by what name you please, ought to be regarded as the original cause of the whole, that is, of the caries, of the curvature, and all the attendant mischiefs, be they what they may, general or particular; a consideration, as it appears to me, of infinite importance to all such infants and young children, as shew, either from their general complaints, or from their shape, a tendency to this kind of evil:

and whose parents and friends generally content themselves with a swing, or piece of iron machinery, and look no further.

20. That whoever will consider the real state of the parts, when a caries has taken place, and the parts surrounding it are in a state of ulceration, must see why none of the attempts, by means of swings, screws, &c. can possibly do any good, but, on the contrary, if they act so as to produce any effect at all, it must be a bad one.

21. That the discharge, by means of the issues, produces in due time (more or less under different circumstances) a cessation of the erosion of the bones; that this is followed by an incarnation, by means of which the bodies of the vertebræ, which had been the seat of the disease, coalesce, and unite with each other, forming a kind of anchylosis.

22. That the different degrees and extent of the caries, in different subjects, must render all attempts to cure, uncertain, both as to the time required, and as to the ultimate event: the least and smallest degree will (every thing else being equal) be soonest relieved and cured: the larger and more extensive will require more time, and where the rottenness is to a great degree, and all the surrounding parts in a state of distempered ulceration, it must foil all attempts, and destroy the patient.

23. That when two or more vertebræ are affected, forming a large curve, however perfect the success may be with regard to the restoration of health and limbs, yet the curvature will and must remain, in consequence of the union of the bones with each other.

24. That the useless state of the limbs is by no means a consequence of the altered figure of the spine, or of the disposition of the bones with regard to each other, but merely of the caries; of this truth there needs no other proof, than what may be drawn from the cure of a large and extensive curvature, in which three or more vertebræ were concerned: in this the deformity always remains unaltered and unalterable, notwithstanding the patient recovers both health and limbs.

Upon the whole, after due consideration of what has been said concerning the nature of the complaint, its producing cause, and the method by which it is capable of being cured, Mr. Pott says, he would ask, whether the diseased state of the spine, and of the parts connected with it, (which if not prevented, must produce some of its very dreadful effects,) may not, by a timely use of proper means, be prevented?

He contends, that a morbid state of the

parts, previous to deformity, caries, or curve, must be allowed : every complaint of the living, and every appearance in the dead, he says, prove it beyond contradiction or doubt. All the general complaints of persons, afflicted with this disorder, will always, upon careful inquiry, be found to have preceded any degree of deformity, to have increased as the curve became apparent, and to have decreased as the means used for relief took place : the pain and tightness about the stomach, the indigestion, the want of appetite, the disturbed sleep, &c. &c. gradually disappear, and the marks of returning health become observable, before the limbs recover the smallest degree of their power of moving.

Mr. Pott remarks, that on the other hand, it is as true, that when from extent, or degree, or inveteracy of the caries, the issues are found to be unequal to the wished-for effect, the general complaints receive no amendment ; but increase until the patient sinks under them.

If all this be true, says Mr. Pott, which that it is, the manifold and repeated experience of many, as well as myself, can amply testify ; and if it be found, that the issues are capable of effecting a perfect cure, even after a caries has taken place, and that to a considerable degree, which is also true to demonstration, is it not reasonable to conclude, that the same means, made use of in due time, might prove a preventive ?

If this was a matter of mere speculation, or opinion, observes this celebrated surgeon, I would be very cautious how I spake on the subject ; but it is really a matter of experiment ; and as far as I have had it in my power to put it to that test, it has succeeded, by the restoration of lost health, and the prevention of a deformity, which was advancing rapidly.

It may, perhaps, be said, continues Mr. Pott, that if no such means had been used, the same space of time might have

produced the same effect : to this it is impossible to make an answer. I shall, therefore, content myself with having given my opinion, with the circumstances and reasons on which it is founded.

Mr. Pott concludes : I should be sorry to be misunderstood on this point, or to have it thought, that I meant to say, that every weak or ricketty child was necessarily liable to a curved spine ; or that issues were to be deemed an infallible remedy for the ills arising from a strumous habit : far be it from me to say either : what I would wish to be understood to mean is, that such kind of habit appears to me to be most apt to produce some of the mischiefs mentioned in this tract ; that, as a purulent discharge, derived from the neighbourhood of the spine, is found, from repeated experience, to be a successful remedy, even after the disease is confirmed by a caries, it seems to me to bid fairer than any thing else, if used in time, to become a preventive ; and, that as some other kinds of deformity are found to follow attacks of the same kind of constitutional disorder, seizing on these parts, and which, though not causing precisely the same effect, are nevertheless attended with the same general symptoms ; I cannot help thinking, that it may be well worth while to try whether benefit be not obtainable by the same means, in the one case as in the other ; and if the old maxim, "*anceps remedium quam nullum*," be admissible, surely an experiment, which is in its nature perfectly incapable of harm, is worth making. (*Pott on the Palsy of the Lower Limbs.*)

VERTIGO. (from *verto*, to turn, because all things seem to turn round.) A giddiness of the head ; a symptom of several diseases.

VINEGAR. For an account of its uses in surgery, see *Acetum*.

VIPER, BITE OF. See *Wounds*.

VOLVULUS. (from *volvo*, to roll up.) See *Intussusception*.

W.

WART. Mr. Hunter observes, that a wart appears to be an excrescence from the cutis, or a tumour forming upon it, by which means, it becomes covered with a cuticle, which is either strong and hard, or thin and soft, just as the cuticle is, which covers the parts, from

which the excrescence arises. Warts are radiated from their basis to their circumference. The surface of the radii appears to be pointed, or granulated, like the surface of healthy granulations, with the exception of being harder, and rising higher. The surface, on which a wart is

formed, seems only to be capable of producing one; for, the surrounding and connecting surface does not throw out a similar substance. Thus, when a wart has once begun to grow, it rises higher and higher, without becoming larger at its basis. Such excrescences seem to have within themselves the power of growing larger; for, as Hunter remarks, after they have risen above the surface of the skin, on which their basis cannot grow larger, they swell out into a round thick substance, which becomes rougher and rougher.

In consequence of having this structure, warts are very liable to be hurt by bodies rubbing against them, and, from such a cause, they often bleed very profusely, and are rendered very painful. (*Treatise on the Venereal Disease*, p. 250, Edit. 2.)

As warts are adventitious substances, and not any part of the original structure of the body, their powers of life are weak. Hence, when stimulated by particular applications, these excrescences generally become smaller and smaller, and, at length, altogether disappear, or drop off.

On this principle, warts may frequently be cured by stimulating them with a powder, composed of *æugo æris* and *savine* leaves, in equal proportions.

However, the employment of escharotics; the removal of such excrescences with a knife or pair of scissors; or tying their necks with a ligature; is a mode frequently preferred, because the cure is sooner accomplished.

The two last methods are certainly particularly eligible, when the wart has a narrow neck; but, after the removal of the excrescence, it is still proper to touch the root with caustic; for, unless the whole be completely destroyed, the wart will inevitably grow again.

With respect to caustics, the practitioner may use the *kali purum cum calce vivâ*, the *argentum nitratum*, or the *cuprum vitriolatum*. I think a strong solution of the *argentum nitratum* is as efficacious an application of the caustic kind, as any, which can be used in these cases.

Warts on the pudenda, and about the anus, which are often supposed to be venereal, scarcely ever withstand the effect of the powder of *savine*, and *æugo æris*.

WHITLOW. (*Panaris, Panaritium, Paronychia.*) A whitlow is an inflammation, which occurs about the end of the finger, and is exceedingly painful, and very much disposed to suppurate. The affection is commonly seen attacking the

fingers, but the toes are undoubtedly, in a few instances, the seat of the disease.

Writers usually divide whitlows into four kinds, or degrees.

The first one is the mildest. In this case, a vesicle, filled with matter, commonly arises near the root, or side of the nail, after a preceding superficial inflammation of trivial extent. The matter is situated immediately under the cuticle. Sometimes the abscess takes place under the nail, in which case, the pain is very severe, and not unfrequently shoots upward as far as the external condyle.

The second kind of whitlow is chiefly situated in the cellular substance under the cutis, and, for the most part, occurs at the very end of the finger. In this sort of case, the inflammatory symptoms, especially the pain, are far more violent, than they usually are in inflammations of such little extent. However, although the pain is thus severe, it does not in general extend far from the part affected, unless the tendon partake of the inflammation. Writers usually impute the violence of the pain, and the inconsiderable degree of inflammation attending the complaint, to the hard and unyielding nature of the skin on the finger. To the same cause they also ascribe the difficulty of perceiving any fluctuation, after matter has formed; and the slowness, with which the pus makes its way outward.

The third kind of whitlow is distinguishable from the others by the following circumstances. With the most excruciating pain, there is very little swelling in the affected finger, but, a vast deal in the hand, particularly, about the wrist, and over the whole fore-arm. The pain extends to the hand, wrist, elbow, and even the shoulder. When suppuration has taken place, a fluctuation can never be felt in the affected finger, though the undulation of matter may very often be distinctly perceived in the hand, at the wrist, or even somewhere in the fore-arm. The case is frequently accompanied with a considerable degree of fever. In this species of whitlow, the disease is seated in the tendons and their sheaths, and the power of moving the fingers, and even the whole hand, is lost.

Authors describe the fourth kind of whitlow, as arising principally from an inflammation of the periosteum. The case is attended with one peculiarity, which is, that, however violent the pain may be, it never extends to the hand, and fore-arm, nor is there any external swelling of the affected finger. Suppuration generally very soon follows, the usual consequence of which is a caries of the subjacent finger-bones.

Whitlows commonly begin on the inside of the fingers; but, they do occasionally commence on the back of these parts, and even on that of the hand. Though pain about the wrist is usually the effect of the inflammation in the finger, yet Acrel makes mention of a case, in which the disorder was altogether confined to the hand itself. (*Vorfülle*, 2 B. p. 191.)

Besides the above species of whitlows, Richter takes notice of a very painful affection of the finger, that has been termed the *dry* whitlow. Acrel relates, that a man, without any particular preceding cause, was seized with a very violent darting pain, near the nail of the little finger. The pain sometimes ceased for a few minutes, or hours, and then recurred and lasted for weeks, and months.

At length, it became still more intolerable and unremitting, and extended all up the arm. Hence, the removal of the first painful portion of the finger was determined on. Nothing unnatural was found in the appearance of the integuments and tendons; but, the texture of the bone was quite destroyed, and changed into a fatty substance. (*Acrel*, *Vorfülle*, 2 B. p. 210.)

The causes of whitlows are generally of a local nature. Writers enumerate the following as the most common ones: a contusion; suddenly warming the finger when it is exceedingly cold; pricks with needles, or other sharp instruments; and the insinuation of irritating matter into scratches on the finger. A surgeon, in operating for a fistula in ano, has been known to cut his finger, and have in consequence of the accident a very severe and dangerous kind of whitlow. Richter also mentions a person having had a most obstinate whitlow, in consequence of getting a slight wound on the finger, in examining the head of a horse, that had the glanders. Sometimes, the cause of a whitlow depends on a splinter, which still continues lodged in the part. Very often, no particular cause whatever can be assigned for the complaint.

The different kinds of whitlows are not all to be treated in the same manner.

The first case, which occurs about the root of the nail, ought to be opened as soon as possible. When this plan is not adopted, the matter not only makes its way round the nail, but penetrates more deeply, so as to reach the root of the nail, and occasion a loss of the part. When an effectual opening is not made, the matter is apt to collect again. In general, a detachment of the cuticle takes place, as far as the abscess extends. When the inflammation has been very violent, and the matter has made its way

as far as the root of the nail, the nail itself is in general gradually detached, while the denuded portion of the root of the nail acts on the sore as a foreign body, and hinders it from healing. Hence, the surgeon should repeatedly cut away as much of the lower edge of the nail as he can, and insinuate a little soft lint between the margin of the nail and the sore, in order to keep the latter from being irritated by the former. In proportion as the old nail gradually separates, a new one makes its appearance.

When matter lies under the nail, an opening should be made through the part, as speedily as possible, for the discharge of the abscess. In order to perform this operation, Richter advises the surgeon to scrape, with a piece of glass, the part of the nail to be opened, till it is as thin as it can well be, and then to cut through it with the point of a bistoury.

In the second species of whitlow, supuration may sometimes be prevented, and the inflammation be resolved, by the timely employment of proper means. When the pain is exceedingly violent, and there is acute fever, it may be advisable to bleed the patient in the arm. In a few severe cases, the application of three, or four leeches to the affected finger, has been known to procure prompt relief. (*Schmucker*.) Theden thinks, that applying a roller round the finger, hand, and arm, and frequently wetting the two first parts with a lotion, the most certain means of resolving the inflammation. Platner advises the finger to be for some time immersed in water, as warm as the patient can bear. Some recommend the external use of camphorated spirit, or the volatile alkali; while others advise the affected finger to be plunged in a very warm solution of soap, or kali. When the whitlow has been occasioned by a prick, particular care must be taken, that there is no extraneous substance remaining in the puncture.

When the symptoms do not lessen by the fourth day, Richter recommends making an opening in the finger. Even when no fluctuation is discovered, the same surgeon approves of making a crucial incision in the seat of the pain, and, he states, that although no matter may be discharged, the patient always derives infinite relief from the operation. The benefit, he says, may either be imputed to the bleeding, or to the division of the hard tense skin, which compresses the subjacent inflamed parts. Sometimes, the collection of matter can be plainly felt, and, in this case, there can be no hesitation about the place, where the opening should be made. However, it

may be proper to remark, that the opening should always be made sufficiently large. When the surgeon makes a small puncture, it very soon closes again, and a repetition of the operation becomes necessary. When opening the abscess is delayed, the theca of the flexor tendons easily becomes affected, or the matter may make its way to a considerable extent around under the skin. Sometimes, the matter gets through the cutis by ulceration, and elevates the cuticle, in the form of a pustule. In this case, as soon as the cuticle has been opened, a director should be introduced into the aperture in the skin, and the latter opening be enlarged with a bistoury.

The third species of whitlow seldom affects the last phalanx of the fingers; but, generally, the second, or third one. In this case, Richter enjoins us never to defer making an opening longer, than the third day. If we wait till suppuration happens, we shall wait till the tendons are destroyed, and the use of the finger lost. In the case under consideration, the matter is always of a bad quality, and very small in quantity. A fluctuation in the finger can very seldom be felt. However, in a very few instances, the matter becomes perceptible at the extremity of the finger, or about the finger-joints, but, more often, in the palm of the hand, or near the wrist. In these circumstances, the tendons are in general already destroyed, and a stiffness of the finger and hand is to be apprehended. When the complaint is the consequence of a puncture, the best plan, according to Richter, is at once to enlarge the wound; for, in this sort of case, all other methods are quite unavailing. It is not enough, however, to cut through the skin; the tendinous theca itself must be laid open.

When the pain does not undergo any diminution, after the tendinous sheath has been opened, or, should the pain, after subsiding, recur again, the first opening should be dilated by means of a knife and director. Also, if the patient should experience in any other part of the hand an acute pain, which does not diminish in consequence of this first opening; or if signs of the formation of matter should be observed elsewhere in the hand; an opening should be made there, of sufficient depth to reach through the theca of the flexor tendons. When a collection of matter forms towards the wrist, or the patient feels violent pain in that situation, an opening must also be made there. If an opening should have been already made in the hand, a probe may be introduced into the wound, and an-

other aperture made in an eligible situation by cutting on the end of the instrument. In the same way, Richter advises making an opening in any part of the forearm, where great pain, or the symptoms of suppuration, indicate.

In the fourth kind of whitlow, early incisions, made down to the bone, are the most certain means of obviating the danger. When such incisions are not made early enough, suppuration takes place, and the bone becomes carious. The cut is to be made in the place, where the pain is most severe. When the first phalanx is affected, the incision may be made in front of the finger; but, when the second, or third, is the seat of the complaint, the opening had better be made on one side. However, in order that the opening may be at all useful, it is absolutely necessary to make it down to the bone. When the incision has been delayed too long, a small quantity of unhealthy matter is usually detected, and the bone is found to be carious. As an exfoliation can hardly be expected in this situation, it is best to remove the diseased piece of bone at once, which can generally be effected without difficulty. When the last phalanx alone is affected, the finger retains its form, with the exception of its end being a little shorter and flatter. When the disease, however, is situated in the third phalanx, Richter thinks it better to amputate the finger than remove the diseased bone, as the finger, if left, would always remain stiff and unserviceable. (See *Anfangsgr. der Wundarzneykunst*, vol. 7.)

WOUNDS. A great deal of the subject of wounds is already treated of in several parts of this work; for instance, the articles *Abdomen*; *Hydrophobia*; *Gun-shot Wounds*; *Head, Injuries of*; *Parotid Duct*; *Sutures*; *Thorax*; *Throat*, &c.

A wound may be defined to be a recent solution of continuity in the soft parts, suddenly occasioned by external causes.

Wounds in general are subject to a great deal of variety, both in their nature and external appearance. The differences depend, in a very great measure, on the nature of the injured parts, the manner in which the wound has happened, and its extent.

Wounds of fleshy parts are exceedingly different from those of tendinous ones, both in regard to their appearance, and nature, and the degree of danger. There is also an essential difference, between such as are made with a sharp cutting instrument, and others, in which the fibres, besides being divided, have suffered considerable contusion and laceration. A wound, made with a narrow-

pointed instrument, is also of a very different nature from one that has an ample orifice.

Wounds are distinguished by surgical writers into several kinds, viz. *incised, punctured, contused, lacerated, and poisoned ones, and gun-shot injuries.*

The latter cases have been treated of in the article *Gun-shot Wounds*; but, of the other kinds of wounds, we shall presently treat.

The degree of danger, attending every wound, depends very much on some of the following circumstances. The extent of the injury; the additional violence, which the fibres of the part have suffered, besides their division; the nature of the blood-vessels, or nerves, which happen to be cut; the nature of the wounded part, in respect to its general power of healing favourably, or not; whether the operations of the system at large, and life itself, can be well supported, or not, while the functions of the wounded part are disturbed, interrupted, or suspended, by the accident; the age of the patient; the goodness, or badness of his constitution; and the opportunities, which there may be, of receiving proper surgical aid, and assistance of every kind.

INCISED WOUNDS.

As a general observation, we may state, that, *ceteris paribus*, a wound, which is made with a sharp cutting instrument, which is, in short, a mere incision, is attended with less hazard of dangerous consequences, than any other kind of wound whatever. The fibres have only been simply divided; they have suffered no contusion, nor laceration; they are consequently less likely to inflame much so as to suppurate, and slough; and they commonly admit of being united again in a very expeditious manner.

Simple incised wounds commonly bleed more freely, than contused and lacerated ones, which at first frequently emit no blood at all, although considerable blood-vessels may be injured. But, this circumstance, apparently diminishing the danger of contused and lacerated wounds, is deceitful, and serves rather to render the case in reality more perilous, by inducing the inexperienced practitioner to be off his guard against hemorrhage. Certainly, it often happens, that, on the immediate occurrence of such wounds, there is no bleeding of consequence. However, the side of some large artery having suffered great violence at the time of the accident, it may ulcerate, or slough, a week or ten days afterwards, and an

alarming, and even fatal effusion of blood be the result.

This unpleasant occurrence of sudden hemorrhage is particularly apt to occur in cases of gun-shot wounds, which are injuries always attended with a considerable degree of contusion and laceration.

In cases of simple incised wounds, the bleeding, which at once takes place from all the divided vessels, is a source of very useful information to the surgeon, inasmuch as it enables him to judge, what danger is to be apprehended from the hemorrhage, whether the cut vessels are large enough to demand the ligature, or, on the contrary, whether they are such as will cease to bleed, either by slight pressure, or of their own accord.

A surgeon, called to a recent simple incised wound, has three objects which he should endeavour to accomplish, without the least delay. The first, and that, which requires his immediate interference, is the bleeding, which must be checked. The second is the removal of all extraneous matter from the surface of the wound. The third object is to unite the opposite sides of the injury.

When the divided vessels are not above a certain size, the bleeding soon spontaneously ceases, and no surgical measures need be taken on this particular account. When the wounded vessels are even somewhat larger, and their situation is favourable for compression with a bandage, it is often advisable to close the wound and apply compresses and a roller, rather than have recourse to ligatures, which always create a certain degree of suppuration. However, though I have made this observation, I should be exceedingly sorry to appear at all against the general preference to ligatures, whenever the wounded arteries are above a certain magnitude. In this circumstance, tying the bleeding vessels is the only safe mode of proceeding. When the artery is of considerable size, and its mouth can be readily seen, the most proper instrument for taking hold of it, is a pair of forceps. In applying the ligature, the surgeon must take care to pull its end in such a manner, that the noose will not rise above the mouth of the vessel, and for the purpose of altering the direction of the force employed in tightening the ligature, the ends of the thumbs are generally made use of. The tenaculum is commonly employed for taking up arteries, which are not exceedingly large and distinct. However, I need not expatiate on the mode of tying arteries, as the subject is fully considered in an-

other part of the Dictionary. See *Hæmorrhage*.

The bleeding having been suppressed, the next object is to remove any extraneous matter, such as dirt, bits of glass, clots of blood, &c. from the surface of the wound. Were this circumstance neglected, the plan of uniting the opposite sides of the cut by the adhesive inflammation, or by, what is more frequently termed, union by the first intention, would in general be frustrated.

As soon as the foregoing indications have been attended to, the surgeon must approximate the lips of the wound, put them in contact, and take proper precautions for keeping them in this state, until they have firmly grown together. The sides of wounds are kept in a state of apposition by the aid of adhesive plaster, a proper position, the pressure of a roller, and, in a few particular instances, by the employment of sutures. Of this last means, nothing need be said in this article, as all the requisite information may be found in another place. See *Sutures*.

The best and most common method of keeping the surfaces of divided parts in contact is by means of strips of adhesive plaster. At the time, when they are to be applied, the surgeon should put the wounded parts in such a position, as shall render them capable of being brought into a state of apposition with most facility. With this view, a position should generally be chosen, which relaxes the skin and subjacent muscles. An assistant should then place the edges of the wound as evenly together as possible, and hold them in this state, until the surgeon has secured them in this condition by strips of adhesive plaster, applied across the line of the wound. In general, it is deemed advisable to leave a small interspace of about a quarter of an inch between each two strips of plaster, by which means the matter cannot be confined in case of suppuration. Over these first strips, lint is to be applied, and kept in its place with some more pieces of adhesive plaster. Then, if necessary, a pledget, and compresses are to be put on the part, and, lastly, the bandage, or roller, is to be applied.

In this manner, the fresh-cut surfaces are brought into contact, and to preserve them quietly in this state, is the next great aim, which the surgeon should have in view. The wounded part should be laid in the posture, which was found the most favourable for approximating the sides of the cut, at the time of applying the dressings, and the patient should be directed to keep the part in a perfectly quiet state.

When attention is paid to these circumstances, it often happens, that the two opposite surfaces of the wound grow together again in the course of forty-eight hours, without the occurrence of the least degree of suppuration. The process, by which this desirable event is accomplished, is well known among surgeons, by the name of *union by the first intention*. Besides the advantage of the cure being effected in this way with the greatest expedition possible, there is still another thing much in favour of always promoting this method of healing wounds, which is, that the scar is much less, than after any other plan, and the part is covered with original skin, which is always much stronger, than any which can be formed as a substitute for it.

It is wonderful with what celerity union by the first intention takes place under favourable circumstances. In the course of three days, the large wound, made in the operation of amputation, is frequently all healed, except just where the ligatures are situated.

When the two sides of the wound have been brought together, before the oozing of blood has entirely ceased, it is probable, that blood itself becomes the first bond of union, and this connection must happen indeed almost immediately. In other instances, what Mr. Hunter called the adhesive inflammation occurs. In this process, coagulating lymph either issues from the half-closed mouths of the vessels, or from the surface of the opened cells of the cellular substance. This becomes the first uniting medium, and, very soon afterwards, in some inexplicable manner, a vascular intercourse is established between the opposite sides of the wound.

The power, which parts of the animal body have, of growing together in the above manner, is strikingly evinced by the possibility of removing a part of one body, and then uniting it to some part of another. In this latter case, there can be no assistance given to the union on one side, since the detached part, as Mr. Hunter observes, can hardly do more, than just preserve its own living principle, and accept of union. In this way, says the same writer, the spurs of the young cock can be made to grow on his comb, or on that of another cock; and its testicles, after having been removed, may be made to unite to the inside of any cavity of an animal.

Mr. John Bell describes the process of adhesion to be this: either the arteries of the opposite surfaces inosculate mouth to mouth, or rather each cut surface throws out a gluten; the gluten fills up

the intermediate space; into that gluten, the lesser arteries of each cut-surface extend themselves, and it is thus, perhaps, by the generation of a new intermediate substance, that the continuity and entireness of the part are so quickly restored. If any one point fail to adhere, there the wound must run into suppuration; because, says Mr. J. Bell, at that point there is a separation of parts, which is equivalent to a loss of substance.

The same writer observes, that there are, no doubt, accidents, both of the constitution and the wound, which will prevent adhesion. If the patient be of a bad habit of body; if he be lying in a foul hospital, in the midst of putrid sores, and breathing a contagious air; if he be ill of a fever, or flux, or any general disease; then the properties of the body being less perfect, the wound will not adhere. Mr. J. Bell also notices, that, if the wound be foul, made with a poisoned weapon, or left with foreign bodies lodged in it; or if a considerable quantity of blood be poured out into the cavity of the wound; or if there be a wounded lymphatic, or a wounded salivary duct, a wounded intestine, or a bleeding artery or vein, the immediate adhesion of the whole of the wound may be prevented. However, I cannot help remarking, that, though Mr. John Bell, in imitation of most surgical writers, sets down the wound of a lymphatic, as preventive of the union of wounds, I cannot say, that I ever saw such an effect imputable to the cause just mentioned. Also, when an artery, or vein is cut, and requires being tied, the adhesion of the wound would only be prevented just where the ligature lies.

There is no wound, observes Mr. John Bell, in which we may not try with perfect safety to procure this adhesion; for, nothing can agree better with one surface of the wound, than the opposite one, which has been just separated from it. They may immediately adhere together, and even if they should not do so, no harm is done, and the wound will yet suppurate as favourably, as if it had been roughly dressed with dry caddis, or some vulnerary balsam, or acrid ointment. If one part should suppurate, while one half adheres, then, says Mr. John Bell, one half of our business is done. In short, this simple duty of immediately closing a wound is both natural and safe. (*Discourses on the Nature and Cure of Wounds*, vol. 1.)

Sometimes, the attempt to procure an union by the first intention fails, even in cases of incised wounds. The moment, where we observe pain, inflamma-

tion, and swelling of the wound, a separation or gaping of its lips, the stitches tense (when these have been used,) and the points, where the stitches pass, particularly inflamed, Mr. John Bell advises us to undo the bandages, draw out the sutures, and take away every thing, which acts like a stricture on the wound. These prudent measures, he observes, may abate the rising inflammation, and prevent the total separation of the skin. While an endeavour may still be made to keep the edges of the wound tolerably near each other by the more gentle operation of sticking plasters.

However, when the inflammation rises still higher, and it is evident that a total separation of the sides of the wound cannot be avoided, the above author recommends leaving the parts quite loose, and applying a large soft poultice; for, says Mr. John Bell, should you, in this critical juncture, persist in keeping the parts together with sutures, the inflammation, in the form of erysipelas, would extend over the whole limb, attended with a fetid and bloody suppuration. After the wound has got into a favourable state, another attempt may now be made to bring the edges near each other, not with sutures, but, strips of adhesive plaster, or the gentle application of a bandage.

Mr. John Bell concludes with remarking, that the suppuration, production of granulations and all that follows, are the work of nature. The only thing, that the surgeon can usefully do, is to take care of the health. When the wound does not suppurate favourably, the discharge generally becomes profuse, thin, and gleety. This state is to be amended by bark, wine, rich diet, and good air.

I shall conclude this subject of union by the first intention with an extract from the writings of Mr. Hunter, who observes that

"It is with a view to this principle of union, that it has been recommended to bring the sides (or lips) of wounds together; but as the natural elasticity of the parts makes them recede, it has been found necessary to employ art for that purpose. This necessity first suggested the practice of sewing wounds, and afterwards gave rise to various inventions in order to answer this end, such as bandages, sticking-plasters, and ligatures. Among these, the bandage commonly called the uniting bandage is preferable to all the rest, where it can be employed; but its application is very confined, from being only adapted to parts where a roller can be used. A piece of sticking-plaster, which has been called the dry suture, is more general in its application

than the uniting bandage, and is therefore preferable to it on many occasions.

"I can hardly suppose (says Mr. Hunter) a wound, in any situation, where it may not be applied, excepting penetrating wounds, where we wish the inner portion of the wound to be closed equally with the outer, as in the case of hair-lip. But even in such wounds, if the parts are thick, and the wound not large, the sides will seldom recede so far as to make any other means necessary. The dry suture has an advantage over stitches, by bringing a large surface of the wound together, by not inflaming the parts to which it is applied, and by neither producing in them suppuration nor ulceration, which stitches always do. When parts, therefore, can be brought together, and especially where some force is required for that purpose, from the skin not being in large quantity, the stitching plaster is certainly the best application. This happens frequently to be the case after the removal of tumours, in amputation, or where the sides of the wound are only to be brought together at one end, as in the hare-lip; and I think the difference between Mr. Sharp's cross-stitch, after amputation, as recommended in his *Critical Enquiry*, and Mr. Allanson's practice, shews strongly the superiority of the sticking-plaster (or dry suture.) In those parts of the body where the skin recedes more than in others, this treatment becomes most necessary; and as the scalp probably recedes as little as any, it is therefore seldom necessary to apply any thing in wounds of that part; the practice will certainly answer best in superficial wounds, because the bottom is in these more within its influence.

"The sticking plasters should be laid on in strips, and these should be at small distances from each other, viz. about a quarter of an inch at most, if the part requires close confinement; but when it does not, they may be at greater distances. This precaution becomes more necessary if the bleeding is not quite stopped; there should be passages left for the exit of blood, as its accumulation might prevent the union, although this does not always happen. If any extraneous body, such as a ligature, should have been left in the wound, suppuration will take place, and the matter should be allowed to vent at some of those openings, or spaces, between the slips of plaster. I have known a very considerable abscess formed in consequence of this precaution being neglected, by which the whole of the recently united parts has been separated.

"The interrupted suture, which has generally been recommended in large

wounds, is still in use, but seldom proves equal to the intention. This we may reckon to be the only one that deserves the name of suture; it was formerly used, but is now in a great measure laid aside in practice, not from the impropriety of uniting parts by this process, but from the ineffectual mode of attempting it. In what matter better methods could be contrived, I have not been able to suggest. It is to be understood, that the above method of bringing wounded parts together, in order to unite them, are only to be put in practice in such cases as will admit of it; for if there was a method known, which in all cases would bring the wounded surfaces into contact, it would, in many instances, be improper, as some wounds are attended with contusion, by which the parts have been more or less deadened; in such cases, as was formerly observed, union cannot take place according to our first principle, and therefore it is improper to attempt it.

"In many wounds, which are not attended with contusion, when we either know, or suspect, that extraneous bodies have been introduced into the wound, union by the first intention should not be attempted, but they should be allowed to suppurate, in order that the extraneous matter may be expelled. Wounds, which are attended with laceration, although free from contusion, cannot always be united by the first intention, because it must frequently be impossible to bring the external parts, or skin, so much in contact, as to prevent that inflammation which is naturally produced by exposure. But even in cases of simple laceration, where the external influence is but slight, or can be prevented (as we observed in treating of the compound simple fracture) we find that union by the first intention often takes place; the blood, which fills up the interstices of the lacerated parts, having prevented the stimulus of imperfection in them, and preventing suppuration, may afterwards be absorbed.

"Many operations may be so performed as to admit of parts uniting by the first intention; but the practice should be adopted with great circumspection; the mode of operating with that view, should in all cases be a secondary, and not a first consideration, which it has unluckily been too often among surgeons. In cases of cancer, it is a most dangerous attempt at refinement in surgery.

"In the union of wounded parts by the first intention, it is hardly or never possible, to bring them so close together at the exposed edges, as to unite them perfectly by these means; such edges are

therefore obliged to take another method of healing. If kept moist, they will inflame as deep between the cut surfaces as the blood fails in the union, and there suppurate and granulate; but if the blood be allowed to dry and form a scab between, and along the cut edges, then inflammation and suppuration of those edges will be prevented, and this will complete the union, as will be described by-and-by.

"As those effects of accidental injury, which can be cured by the first intention, called up none of the powers of the constitution to assist in the reparation, it is not the least affected or disturbed by them; the parts are united by the extravasated blood alone, which was thrown out by the injury, either from the divided vessels, or in consequence of inflammation, without a single action taking place, even in the part itself, except the closing, or inosculation of the vessels; for the flowing of the blood is to be considered as entirely mechanical. Even in cases where a small degree of inflammation comes on, it is merely a local action, and so inconsiderable, that the constitution is not affected by it; because it is an operation to which the powers belonging to the parts themselves are fully equal. The inflammation may produce a small degree of pain, but the operation of union gives no sensation of any kind whatever." (*Hunter on the Blood, Inflammation, and Gunshot Wounds.*)

CONTUSED AND LACERATED WOUNDS.

Lacerated wounds are those, in which the fibres, instead of being divided by a cutting instrument, have been torn asunder by some violence, capable of overcoming their force of adhesion. The edges of such wounds, instead of being straight and regular, are jagged and unequal.

The term *contused* is applied to those wounds, which are occasioned by some blunt instrument, or surface, which has violently struck a part of the body.

These two species of wounds greatly resemble each other, and as they require nearly the same kind of treatment, writers usually treat of them together.

Lacerated, and contused, wounds differ from simple incised ones in appearing, at first view, much less alarming, than the latter, while, in reality, they are infinitely more dangerous. In simple cut wounds, the retraction of the parts, and the hemorrhage, are generally much more considerable, than in a lacerated wound of the same size. However, notwithstanding these circumstances, they

commonly admit of being healed with by far the greatest ease. It is even proper to remark, that lacerated and contused wounds are scarcely ever attended with any serious effusion of blood, even though some large blood-vessels may be injured. This circumstance often leads inexperienced practitioners to commit great mistakes, by inducing them to promise too much in the prognosis, which they make. Surgeons, versed in practice, however, do not allow themselves to be deceived by the absence of hemorrhage and, in proportion as there is little bleeding, they apprehend that the violence, done to the fibres and vessels has been considerable. Whole limbs have frequently been torn from the body, without any hemorrhage of consequence taking place.

Cheselden has described, in the *Philosophical Transactions*, a very remarkable case, in which a man's arm was suddenly torn from his body. Samuel Wood, a miller, had round his arm a rope, which got entangled with the wheel of a mill. He was lifted off the ground, and then stopped by a beam, which prevented his trunk from passing further, at this instant, the wheel, which was moving with immense force, completely tore, and carried away, his arm and scapula from his body. The appearance of a wound, occasioned in this manner, must of course be horrible, and the first idea, thence arising, must naturally be that the patient cannot possibly survive. Samuel Wood, however, escaped with his life. The limb had been torn off with such velocity, that he was unaware of the accident, till he saw his arm moving round on the wheel. He immediately descended by a narrow ladder from the mill, and even walked some paces, with a view of seeking assistance. He now fell down with weakness. The persons who first came to his assistance, covered the wound with powdered sugar. A surgeon, who afterwards arrived, observing that there was no hemorrhage, was content with bringing down the skin, which was very loose, so as to make it cover the surface of the wound. For this purpose, he used two cross-stitches. The patient was conveyed, the next day, to St. Thomas' Hospital, and put under the care of Mr. Fern, who was then the head surgeon of that charity. This practitioner employed the means usually resorted to, with a view of preventing the bad symptoms to be apprehended in this sort of case. The first dressings came away without any bleeding; no alarming consequences ensued; and the patient got completely well in the course of a couple of months.

When the arm was examined, it was found, that the muscles, inserted into the scapula, were torn through near their insertions; while other muscles, arising from this bone, were carried away with it. The skin, covering the scapula, had remained in its natural situation, and seemed as if it had been divided precisely at the insertion of the deltoid muscle.

In La Motte's *Traité des Accouchemens*, may be found an account of a little boy, who, while playing near the wheel of a mill, got his hand, fore-arm, and arm, successively entangled in the machinery, and the limb was violently torn away at the shoulder joint, in consequence of the lad's body not being able to pass in the direction, in which the arm was drawn. The bleeding was so trivial, that it was stopped with a little lint, and the boy very soon recovered.

In the fifth volume of the *Edinburgh Medical Commentaries*, may also be perused the history of a child, three years and a half old, which had its arm torn off by the wheel of a mill. Mr. Carmichael, who saw the child about an hour after the accident, found it almost in a dying state, with cold extremities, small fluttering pulse, and all the right side of the body convulsed. However, there had been hardly any bleeding. The arm had been broken about an inch and a half above the elbow; the stump had a very dreadful appearance; all the soft parts were in a contused and lacerated state, and the humerus was laid bare as high as the articulation, which was itself exposed. The skin and muscles were lacerated to a much greater extent, and in different directions. The remainder of the humerus was removed from the shoulder-joint by amputation, only as much skin and muscle being left, as was sufficient to cover the wound. The child got completely well in two months.

In the second volume of the *Mémoires de l'Académie de Chirurgie*, is an account of a leg being torn away at the joint by a cart-wheel. The patient was a boy, about nine or ten years of age. This accident, like the foregoing ones, was accompanied with no hemorrhage. The lower portion of the os femoris, which was exposed, was amputated, together with such portion of the soft parts, as was in a contused and lacerated state. The patient experienced a perfect recovery.

The preceding cases strikingly confirm the observation, which I have already made, in regard to the little bleeding, which usually arises from contused and lacerated wounds.

In these instances, the pain is also in an inverse ratio to the cause of the accident: It is generally very severe, when the wound is only moderately contused; and, on the other hand, the patient scarcely suffers any pain at all, where there has been so violent a degree of contusion, as almost to destroy the organization of the nerves of the part.

When the bruised fibres have not been exceedingly injured, the part suppurates; but, such portions of the wound, as have suffered greater violence, inevitably die, and are cast off in the form of sloughs. Granulations are afterwards formed, and the breach of continuity is repaired by the process of cicatrization. (See *this word*.)

When a still greater degree of violence has been done to the parts, and, especially, when arteries of a certain magnitude have been injured, a mortification is too frequently the consequence. However, if the constitution is good, and the mischief is not too extensive, the case may still end well. But, in other instances, the event is always alarmingly dubious; for, the mischief is then not limited to the wounded parts, which have suffered the greatest degree of contusion; but, too frequently, extends over such parts, as were not at all interested by the wound itself.

The mortification, arising directly from the impaired organization of parts, is not what is the most alarming circumstance. The most dangerous kind of mortification is that, which is apt to originate from the violent inflammation, occasioned by the accident. This consequence demands the utmost attention on the part of the surgeon, who must let no useful means be neglected, with a view of diminishing the inflammation, before it has attained so high a pitch, as to induce fatal effects. He should not be afraid of letting the wound bleed a little, if it should be disposed to do so in the first instance. The edges of the wound should then be approximated with a few strips of sticking plaster, so as to lessen the extent of the exposed surface: but, no sutures are proper. Not much of the wound can be expected to unite by the first intention; the whole, or the greater part of it, will necessarily suppurate, after the detachment of the sloughs. The surface will then granulate, new skin will form, and the part heal just like a common wound. Perhaps, until the sloughs have separated, the best application over the adhesive plaster is a soft poultice, which should be put on cold, lest it should bring on too great an oozing of blood. When, however, there is much

bleeding, lint, and a simple pledget must be employed for the first few hours. The healing of a contused, or lacerated wound, is to be accomplished on the same principles, as the cure of sores in general. (See *Ulcers*.)

PUNCTURED WOUNDS.

A *punctured* wound signifies one, that is made with a narrow-pointed instrument, the external orifice of the injury being small and contracted, instead of being of a size proportionate to its depth. A wound, produced by the thrust of a sword, or bayonet, affords us an example of a punctured wound.

Wounds of this description are in general infinitely more dangerous, than incised ones, notwithstanding the latter have the appearance of being by far the most extensive. The greatest degree of danger, in cases of punctured wounds, always depends on the additional injury, and rough violence, which the fibres have suffered, besides being divided. Some of the disagreeable consequences, apt to follow, are also to be imputed to the frequent great depth, to which punctured wounds are liable to extend, in consequence of which circumstance, important parts and organs are often injured. These cases are likewise less easy of cure, owing to the difficulty of extracting any extraneous substances, which may happen to be lodged in the wound. All punctured wounds, and stabs are at the same time dangerous, inasmuch as they are particularly liable to be followed by a great deal of inflammation, fever, deep-seated abscesses, sinuses, &c.

A strange notion seems to pervade the writings of every systematic author, that all the danger and disagreeable consequences of punctured wounds are entirely owing to the narrowness of the orifice, which prevents suitable applications to the bottom of such wounds. Hence, it is absurdly recommended to dilate the opening of every stab, with a view, as is generally added, of converting the accident into a simple incised wound. Some of these writers are advocates for making the dilatation with a cutting instrument, while others, with equal absurdity, advise enlarging the opening with tents.

Certain authors regard a punctured wound, as a recent sinus, and, in order to make the inner surfaces unite, they recommend exciting a degree of inflammation in them, either by means of setons, or injections.

In the *First Lines of the Practice of Surgery*, I have taken particular pains to ex-

pose the folly and error, which prevail in most writings on this part of practice. In the above work, I have remarked, that, certainly, if the notion were true, that an important punctured wound, such as the stab of a bayonet, is actually changed into a wound partaking of the mild nature of an incision, by the mere enlargement of its orifice, the corresponding practice would be highly commendable, however painful it might be. But the fact is otherwise: the rough violence done to the fibres of the body by the generality of stabs, is little likely to be suddenly removed by an enlargement of the wound. Nor can the distance, to which a punctured wound frequently penetrates, and the number and nature of the parts injured by it, be at all altered by such a proceeding. These, which are the grand causes of the collections of matter that often take place in the cases under consideration, must exist, whether the mouth and canal of the wound be enlarged or not. The time when incisions are proper, is, when there are foreign bodies to be removed, abscesses to be opened, or sinuses to be divided. To make painful incisions sooner than they can answer any end, is both injudicious and hurtful. They are sometimes rendered quite unnecessary, by the union of the wound throughout its whole extent, without any suppuration at all.

Making a free incision in the early stage of these cases, undoubtedly seems a reasonable method of preventing the formation of sinuses, by preventing the confinement of matter, and, were sinuses an inevitable consequence of all punctured wounds, for which no incisions had been practised at the moment of their occurrence, it would undoubtedly be unpardonable to omit them. Fair, however, as this reason may appear, it is only superficially plausible, and a small degree of reflection soon discovers its want of real solidity. Under what circumstances do sinuses form? Do they not form only where there is some cause existing to prevent the healing of an abscess? This cause may either be the indirect way, in which the abscess communicates externally, so that the pus does not readily escape; or it may be the presence of some foreign body, or carious bone; or, lastly, it may be an indisposition of the inner surface of the abscess to form granulations, arising from its long duration, but removeable by laying the cyst completely open to the influence of the air. Thus it becomes manifest, that the occurrence of suppuration in punctured wounds, is only followed by sinuses in cases, in which the surgeon neglects to procure a

free issue for the matter, after its accumulation; or in which he neglects to remove any extraneous bodies. But, as dilating the wound at first can only tend to augment the inflammation, and render the suppuration more extensive, it ought never to be practised in these cases, except for the direct objects, of giving free exit to matter already collected, and of being able to remove extraneous bodies palpably lodged. I shall once more repeat, that it is an erroneous idea, to suppose the narrowness of punctured wounds so principal a cause of the bad symptoms, with which they are often attended, that the treatment ought invariably to aim at its removal.

Recent punctured wounds have absurdly had the same plan of treatment applied to them, as old and callous fistulæ. Setons and stimulating injections, which, in the latter cases, sometimes act beneficially by exciting such inflammation as is productive of the effusion of coagulating lymph, and of the granulating process, never prove serviceable when the indication is to moderate an inflammation, which is too apt to rise to an improper height. The counter-opening, that must be formed, in adopting the use of a seton, is also an objection. However, what good can possibly arise from a seton in these cases? Will it promote the discharge of foreign bodies, if any are present? By occupying the external openings of the wound, will it not be more likely to prevent it? In fact, will it not itself act with all the inconveniences and irritation of an extraneous substance in the wound? Is it a likely means of diminishing the immoderate pain, swelling, and extensive suppuration, so often attending punctured wounds? It will undoubtedly prevent the external openings from healing too soon; but cannot this object be effected in a better way? If the surgeon observes to insinuate a piece of lint into the sinus, and pass a probe through its track once a day, the danger of its closing too soon will be removed.

The practice of enlarging punctured wounds by incisions, and of introducing setons, is often forbidden by the particular situation of these injuries.

In the first stage of a punctured wound, the indication is to guard against the attack of violent inflammation. When no considerable quantity of blood has been lost, general and topical bleeding should be practised. In short, the antiphlogistic plan is to be followed. As no man can pronounce, whether such wounds will unite, or not, and as no harm can result from the attempt, the orifice ought to be closed with strips of adhesive plaster

and gentle compression applied along the whole course of the puncture. Perfect quietude is to be observed. When the pain is very severe, opium is to be administered.

Sometimes, under this treatment, the surgeon is agreeably surprised to find the consequent inflammation mild, and the wound speedily united, by the first intention. More frequently, however, in cases of deep stabs, the pain is intolerable; and the inflammatory symptoms run so high as to leave no hope of avoiding suppuration. In this condition, an emollient poultice is the best local application; and, when the matter is formed, the treatment is like that of abscesses in general. (See *Suppuration*.)

POISONED WOUNDS.

Wounds of this description are not very common in this country. The stings and bites of certain insects; and the bites of vipers, mad dogs, cats, &c. are the only instances, which we meet with.

In this article, I shall dismiss from consideration the symptoms and treatment of the alarming indisposition arising from the bite of particular rabid animals, and content myself with referring the reader to *Hydrophobia*.

With respect to the stings of bees, wasps, hornets, &c. and the bites of gnats, and other insects, these cases are seldom of sufficient consequence to require the assistance of a surgeon. However, were his advice requested, he should be prepared to give it.

The hornet is, to appearance, the most formidable creature of the winged kind in Britain. Mr. Latta says, it is not to be met with in Scotland; though there are nests of them in some of the woods in England. The fact, however, is, that its sting, though more painful, than that of either the wasp or bee, is not attended with any material consequence. Wasps seldom sting, unless irritated by the destruction of their nest, and then they attack in great numbers every one who passes by. It is an error to suppose that bees sting more frequently; and that the human breath is particularly offensive to them. It has even been represented, as part of the secret of those, who make them swarm at pleasure, without danger to themselves, upon any part of their bodies, to keep their breath from them, as much as possible, lest they should thereby be provoked to sting them. Bees are, however, the most harmless of all creatures, if not touched or interfered with, and use their weapons only in their defence. The stings of all these insects

are attended with a sharp pain in the part, very quickly succeeded by an inflammatory swelling, which in no long time goes off of itself. It may, however, be relieved, by rubbing the part, immediately after the injury, with honey, oil, vinegar, or spirits of wine, or even by immersing it in cold water. There are several other insects known to us, which do not fly, that seem to have something poisonous in their bite.

Were any material degree of inflammation to be induced by the irritation, occasioned by the bites and stings of insects, the best plan would be to keep the part continually covered with linen, wet with the saturnine lotion, and to exhibit one or two doses of some saline purgative.

With regard to the bites of serpents, those inflicted by the rattle-snake of America, and the cobra de capello of the East-Indies, are said to be the most speedily mortal. Indeed, writers state, that this is so much the case, that there is scarcely time to apply any remedy, although it be at hand the very moment, when the bite is received. Mr. Latta takes notice, that Mr. Catesby, in the Preface to his Natural History of Carolina, informs us, that the Indians, who, by their constant wanderings in the woods, are liable to be bit by those venomous animals, know, as soon as they receive the injury, whether it will prove mortal or not. If it be on any part at a distance from large blood-vessels, or where the circulation is not vigorous, they apply their remedies; but, if any vein, of considerable magnitude, happens to be hurt, they quietly resign themselves to their fate, as knowing that they could then be of no benefit. It is not well known what the remedies are, on which they chiefly depend. Seneka root and volatile alkali, are among the number; and, more particularly, strong doses of arsenic, as we shall have occasion to notice again.

Mr. Latta observes, that the only person, who has particularly considered this subject, of the bites of serpents, is the Abbé Fontana. This latter gentleman agrees with Dr. Mead, that the poison of the viper is neither acid nor alkaline; but, denies that he could perceive in it any thing like salts, by means of a microscope, which Dr. Mead says he saw. He even denies, that it has any determinate taste when put upon the tongue; though Dr. Mead assures us, that both he and others, who have tasted it, felt it exceedingly sharp and burning to the taste; and he particularly takes notice, that one gentleman, who could not be satisfied without tasting a large drop undiluted

with water, had an inflammation of his tongue, and the inside of his lips, of some continuance.

Mr. Latta remarks, that it is of no small consequence, towards the cure of such bites, to consider attentively the symptoms, which take place in the patient, whether they indicate any violent stimulus suddenly applied, in consequence of which, the person dies of an universal inflammation; or whether it operates, by suddenly checking the vital power, to such a degree, that it cannot be restored. From a vast number of experiments made by M. Fontana, he concludes, that the bite of an ordinary viper will not prove fatal to a full grown person, nor even to a large dog, though it certainly will do so to smaller animals. Five bites from three strong and healthy vipers were not able to kill a dog weighing sixty pounds; and, as this dog was little more than a third part of the weight of any ordinary man, he concludes, that a single bite can never be fatal to an adult. In confirmation of this, he says, that he has seen a dozen of cases himself, and that he has heard of fifty more, only two of whom died. Concerning one of these cases he could get no information; the other perished of a gangrene, twenty days after the bite, and which began in three days after it, the bitten place having been deeply scarified almost immediately after the injury was received. Fontana believes, that much of the faintness, &c. which ensue upon the bite of a viper, are the mere effects of terror. "Upon a person's being bit, (says he,) the fear of its proving fatal, terrifies himself and the whole family. From the persuasion of the disease being mortal, and that not a moment is to be lost, they apply violent, or hurtful remedies. The fear increases the complaint. I have known a person, that was imperceptibly bit, in the hands or feet, and who, after seeing the blood, and observing a viper near him, has suddenly fainted away; one, in particular, continued in a swoon for upwards of an hour, until he was accidentally observed, and recovered out of it, by being suddenly drenched in cold water. We know, that death itself may be brought on by very violent affections of the mind, with any internal disease. Why may not people, that are bit, die from a disease, produced entirely from fear, and who would not otherwise have died from any complaint produced by the venom?"

Mr. Latta acknowledges, that M. Fontana has bestowed a great deal of attention upon this subject; but, he rightly contends, that the above reasoning is hy-

pothetical and inconclusive. Mr. Latta owns, that some very timid, delicate, or nervous people might die from fear alone; but, he remarks, that it is by no means fair to conclude from thence that the generality of people will do so. It is easy to see, that the bite of a viper must be more or less dangerous, according to circumstances. It depends on the creature itself, to throw out more or less of this poison; and the greater the rage is, into which it is thrown, the greater quantity it will throw out. If it has bitten any creature soon before it bites a man, the latter will be in less danger, because the quantity is but small. In like manner, when the person is bit through his clothes, they will absorb a quantity of it, and therefore the wound will also be the less dangerous: and the same thing must happen when only the small vessels are wounded; for then only a small quantity is likely to be conveyed immediately into the system. It must be otherwise, however, when the bite is inflicted upon a bare place of the body, and the poison is conveyed directly into a large vein; in this case, says Mr. Latta, it is quickly conveyed to the heart, and there can be little doubt, that it will very soon manifest its deleterious effects. Nay, M. Fontana himself informs us of a woman in Tuscany, who, though bit only in the little finger by a viper, fell into an hemiplegia, which could not be removed; and, Mr. Latta argues, that if such a violent disease could be induced by a wound inflicted at such a distance from the heart, we can have no reason to suppose, that, had the viper been large, and the poison quickly conveyed to the heart, that death would not have ensued.

Writers usually notice the following symptoms, as those which result from the bite of a viper:—1. A violent burning pain, with tension in the injured part. 2. The whole of the affected limb, and sometimes the whole body, become tense and inflamed in like manner. 3. The patient becomes extremely faint, the pulse low and feeble; he has a giddiness in his head, nausea, and vomiting. 4. There is a fixed pain in the region of the heart. 5. The urine becomes tinged, of a deep yellow, the skin becomes yellow, like one who has the jaundice, and there is an evident diffusion of bile throughout the whole vascular system. 6. Cold sweats, with slight convulsive motions, ensue; and, if relief be not soon obtained, death is the consequence. These symptoms come on within twelve, or fourteen, hours after the bite, sooner or later, according to the violence of the injury and

the sooner they make their appearance, the more dangerous they are.

The medicines recommended for the bites of vipers are, according to M. Fontana, not only of very different, but even opposite, qualities. "In no country, (says he) through which I passed, could I ever find any two people or persons, bit by the viper, either in the mountains or valleys, that used the same remedies. Some used theriaca alone, either externally or internally applied; others common oil: a third set used stimulants, such as the strongest spirituous liquors; whilst others, on the contrary, tried every different kind of sedative. In short, there is hardly any active kind of medicines that has not been tried as a cure in this disease: while, at the same time, it is certain, that, under all the varieties of application, none of them died." Hence, our author concludes, that none of the remedies made use of had any effect in curing the disease; which, indeed, is by no means improbable, considering that many of them must have acted in a manner directly contrary. But this only proves that the bites of the vipers of Italy are not mortal. In a hotter climate, they certainly will be attended with more dangerous consequences. Hence, in the island of Malta, even in the winter-time, when the viper came out of the fire, no doubt enraged to the utmost degree, and fastened on the hand of the Apostle Paul, the people expected, that "he should have swollen, or fallen down dead suddenly;" whence we may see, that, in Malta, which is indeed very hot, the symptoms attending the bite of these creatures, were then extremely violent; and it was thought miraculous to escape death in consequence of it. And we have the most undoubted authority for believing, that, in America, as well as the East Indies, the bite of some serpents is attended with very speedy death. With regard to the cure of the bite of vipers, in such animals as were liable to be killed by it, our author says, from his own experience, that neither scarifications, nor even the excision of the part, are beneficial, but, on the contrary, hurtful. We may, indeed, readily conclude, that scarifications can do no good, because they do not tend to take away the poison, but rather to allow it more free access to the blood; but, we cannot so well say this of excision, if properly performed. Indeed, there can be no doubt, that it is a most prudent plan, when care is taken to make a complete removal of the parts as deeply as the bite extends. Fontana also found oil, volatile alkali, theriaca, &c. either

useless, or absolutely hurtful, particularly the volatile alkali. The only thing, which he found of any avail, was the tying of a ligature round the bitten limb, to stop the progress of the blood towards the heart. This method, however, cannot prevent the poison from entering the mouths of the absorbents, nor from getting into the system, when the ligature is removed. The constriction of the limb might also bring on swelling, inflammation, and mortification, and it must evidently be inferior, in point of efficacy, to the careful excision of the bitten parts.

The practice of sucking the wound has been recommended to be employed very early; and, indeed, if it could be done with safety to the person who sucks, it affords some chance of success. Dr. Mead endeavours to shew, that it may be done with safety; but, Mr. Latta is altogether at a loss to account for the difference between this author and M. Fontana, concerning the taste of the poison; the former affirming, from his own experience, and that of several others, that it had a violent, hot, and fiery taste, as if the tongue was struck through with something burning, or scalding; while M. Fontana as confidently affirms, that it has no taste, nor raises any inflammation on the tongue. Dr. Mead relates, that, in a gentleman already mentioned, an inflammation was raised on the tongue, which did not go off in two days.

In treating this disease, Dr. Mead seems to lay considerable stress upon emetics; and, indeed, in all cases where the poison seems to be diffused through the body, this remedy has a chance of being useful, by relieving the extreme sickness and nausea, with which the patient is affected.

In cases of this kind, external applications can avail but little. Oil has been recommended; but, the trials made by Dr. Mead proved it to be insufficient. He seems to have some confidence in the fat of the viper itself; but, it is evident, that the success of this, or any other remedy of the kind, must depend entirely upon an accidental circumstance. It is not impossible, that, if any oily matter could get at the poison, it might so blunt or soften it, that its deadly effects would be prevented; but, it is easy to see, that, by reason of the narrowness and depth of the wound, we have but a small chance of mixing it with the poison, after it has once been injected. Nevertheless, this has perhaps been sometimes done; and, thus, both oil olive, and viper's fat, have

gained their reputation, though, in by far the greatest number of instances, they could be of no efficacy.

To complete the cure, Dr. Mead recommends the use of warm cordials, among which he mentions volatile sal-ammoniac, to produce a sweat, and seems, indeed, to insist upon these medicines as necessary for the recovery of the patient. Indeed, Mr. Latta thinks it probable, that the cure can only be accomplished by the exhibition of the very strongest cordials. He approves of applying a ligature; but, I would advise excision of the parts. He also speaks in favour of t. ying wine, bark, and vegetable acids.

Dr. Temple directs the use of *caustic volatile alkali* and *eau de luce*, as specifics against the bite of the viper, in the following way:

℞. Alkal. volatil. caust. gutt. xl. in quovis vehiculo sumend.

℞. Sp. ammoniæ succinat. (*vulgo* eau de luce) gutt. xl. quovis vehiculo sumend.

This, he observes, should be given as soon as possible, after the accident, repeating the dose in five minutes, and also embrocating the parts well with it.—(See *Catesby's History of Carolina*. Mead on Poisons. Fontana on the Venom of the Viper. Latta's System of Surgery, Vol. 3.)

Mr. Chevalier was induced to recommend the trial of arsenic in these cases from the facts recorded in Dr. Russell's History of Indian Serpents, on the authorities of Mr. Duffin and Mr. Ramsay, and from which it appears, that the Tanjore pill, of which arsenic is in all probability the chief ingredient, is exhibited with considerable success in India after the bites of venomous serpents.

Mr. Ireland surgeon to the fourth battalion of the sixtieth regiment of foot, had formerly heard Mr. Chevalier recommend the trial of arsenic for the bites of serpents, and he was resolved to make the experiment whenever an opportunity offered. On his arrival in the island of St. Lucia, he was informed, that an officer and several men, belonging to the sixty-eighth regiment, had died from the bites of serpents, supposed to be the *coluber carinatus* of Linnæus. Mr. Ireland also learnt, that every thing had been tried by the attending medical men to no purpose, as all the patients had died, some in six, and others, in about twelve hours, from the time of their receiving the wound.

A case, however, soon came under Mr. Ireland's own observation, and, as nothing, that had been done before, seem-

ed to have been of any service, he was determined on giving arsenic a full trial.

"Jacob Course, soldier in the York light infantry volunteers, was bitten in the left hand, and the middle finger was so much lacerated, that I found it necessary to amputate it immediately at the joint with the metacarpal bone.

"I first saw him about ten minutes after he had received the wound, and found him in a torpid senseless state: the hand, arm, and breast of the same side were much swelled, mottled, and of a dark purple, and livid colour. He was vomiting, and appeared as if much intoxicated. Pulse quick and hard: he felt little or no pain during the operation.

"The wound being dressed, and the patient put to bed, I ordered a cathartic clyster, and the following medicine to be taken immediately. ℞. Liqueur. Arsenic. ℥ij. Tinct. Opii gr. x. Aq. Menth. Pip. ℥iiss; which was added to half an ounce of lime juice, and as it produced a slight effervescence, it was given in that state: this remained on his stomach, and was repeated every half hour for four successive hours. In the mean time, the parts were frequently fomented with common fomentation, and rubbed with a liniment composed of Ol. Terebinth. ℥ss. Liqueur. Ammon. ℥ss. and Ol. Oliv. ℥iiss. The cathartic clyster was repeated twice, when the patient began to be purged; and the arsenical medicine was now discontinued. He had become more sensible when touched, and, from that time, he gradually recovered his faculties; he took some nourishment, and had several hours sleep.

"The next day, he appeared very weak, and fatigued; the fomentation and liniment were repeated. The swelling diminished gradually; the natural colour and feeling returned, and, by proper dressings to the wound and attention to the state of his bowels, he soon recovered and returned to his duty."

Mr. Ireland recites about four other examples, in which arsenic was exhibited with similar success.

It deserves particular notice, that the liquor arsenici employed by Mr. Ireland was prepared according to Dr. Fowler's prescription, which directs sixty-four grains of arsenic, and as many of the fixed vegetable alkali, to be dissolved in a sand heat, and the solution to be made an exact pint, so that two drachms contain one grain of arsenic in solution. (See *Medico-Chirurgical Transactions*, Vol. 2, p. 393, &c.)

The best doctrines, relative to wounds in general, are those contained in various

parts of *A Treatise on the Blood, Inflammation, &c.* by John Hunter.

WRY-NECK. (*Torticollis*.) An affection, in which the head becomes inclined to one side. The ancient writers have taken no notice of the disorder. Some of the modern ones have termed it *caput obstipum*; a word, indeed, which has been employed by the best Latin authors, to denote the affliction about to be considered. The wry-neck should be discriminated from the tension and stiffness of the neck, occasioned by a rheumatic affection of this part, and also from the faulty position of the head, arising from deformity in the cervical vertebræ.

Tulpius, who was a learned physician at Amsterdam, about the middle of the seventeenth century, gives an account of the cure of a boy, twelve years old, who, from his earliest infancy, had had his head drawn down towards the left shoulder, by a contraction of the scalenus muscle. Fomentations had been applied in vain, with a view of relaxing the parts, the stiffness and corrugated state of which seemed to produce the disorder. Steel-collars also proved ineffectual in bringing the head into a right posture. Tulpius had a consultation with two other skilful physicians, about the case, and it was decided to put the boy under the care of an eminent surgeon of the name of Minnius, who had performed several operations with success in similar instances. He first made a large eschar by applying caustic, and then with a knife divided the muscle, which drew the head to one side. Tulpius, who has left only a very confused account of the operation, observes, that it was performed with great slowness and circumspection, for fear of wounding the carotid artery, and jugular vein.

The author expresses his disapprobation of this manner of proceeding, and advises such persons, as will run the risk of doing so dangerous an operation, not to make any preliminary application of caustic. The latter measure only caused useless pain, and could not possibly be of any service. Tulpius also recommends the operation not to be done by little and little, at repeated times; but, to make a complete division of the muscle at once, with the necessary degree of caution.

Meckren, a surgeon at Amsterdam, who has published a valuable collection of medico-chirurgical cases, also treats of the operation applicable to the wry-neck. He states, that he had seen it performed on a boy, fourteen years old. The tendon of the sterno-cleido-mastoideus muscle was divided with one stroke of a sharp

pair of scissors, and in a very skilful manner, by a surgeon named Flurianus, and as soon as the incision was made, the head took its right position. The author has also noticed the remarks made by Tulpius, relative to the plan of operating.

On approaching nearer to modern days, we find, that the celebrated Mr. Samuel Sharp considered the wry-neck as mostly arising from a contraction of the sterno-cleido-mastoideus muscle. He has proposed dividing this muscle, whenever the disorder seems to proceed from the kind of cause, which we have just now mentioned. However, he makes an exception, in regard to those cases, in which the affliction has existed a considerable time, and, particularly, in instances, in which it has prevailed from infancy. He remarks, that it would be impossible to rectify the position of the head, if the cervical vertebræ should have grown in a distorted direction. The following is the operation, which this author recommends to be done in proper cases. After placing the patient on a table, a transverse incision is to be made through the skin and fat, of a size somewhat more extensive, than the breadth of the muscle, and about one-third of its length from the clavicle. A probed-razor is then to be passed underneath the muscle, and to be drawn out, so as to make the requisite division of the part. After the incision was made, Mr. Sharp recommended the wound to be filled with dry lint, and to be always dressed in a way, that would keep the extremities of the muscle from growing together again. For this purpose, he advised the cut ends to be separated from each other as much as possible, by the assistance of a bandage to support the head, during the whole time of the cure, which, he says, will generally be about a month. (See *Treatise on the Operations of Surgery*, chap. 35.)

According to Mr. Sharp's account, the operation above described, ought to be a very common one. However, if attention be paid to the nature and causes of the disease, and to the differences, resulting from whether the disorder be recent, or of long standing; constant, or periodical; idiopathic, or sympathetic; dependent on spasm, or merely on paralysis of the antagonist muscles; and, lastly, if it be recollected, that the affection may be produced by other muscles, besides the sterno-cleido-mastoideus; we shall find, that cases, in which the foregoing operation can be judiciously undertaken, are not so very frequent.

With regard to the manner in which

Mr. Sharp operated, Mr. B. Bell conceived, that it was attended with hazard of wounding the large blood-vessels. But, though it seems to me better to use a probe-pointed bistoury and a director, than the kind of razor, which Mr. Sharp employed, I do not coincide with Mr. B. Bell in thinking, that the latter surgeon's plan was at all objectionable on the score of danger, in respect to wounding the vessels. Perhaps, some might think Mr. B. Bell's method most likely to injure the large vessels; for, he advises the operator to cut the muscle from without gradually inward, as deeply as seems necessary.

The most prudent method of operating, in my opinion, is first to divide the clavicular portion of the contracted muscle, near the clavicle, and even to cut out a sufficient piece, to remove all chance of the two ends uniting again. This step would weaken the muscle considerably, and, perhaps, might answer every purpose. It could easily be accomplished, by means of a director, and curved bistoury, after making the requisite division of the skin with a common scalpel. Were this proceeding only to produce a partial amendment of the wry-neck, the operator might then venture to divide the sternal portion of the muscle. A director should be passed under it, and the division made with a probe-pointed curved knife.

Although the wry-neck may occasionally depend on a contraction of the sterno-cleido-mastoideus muscle, this case is far from being very frequent. The deformity is much oftener owing to some affection of the integuments. M. Louis often divided with success contractions of the skin, which had kept the head drawn to one side for many years, and had been occasioned by burns. He remarks, that he has met with contractions of this kind, which might have been mistaken for a part of the sterno-cleido-mastoideus itself.

Mr. Gooch has related a case of wry-neck, which was caused by a contraction of the platysma myoides muscle. The patient was a young gentleman, fourteen years of age, who appeared to have always enjoyed very good health in every other respect. He had had his head, for several months, strongly drawn to one side by a constant contraction of the platysma myoides muscle, which had become exceedingly rigid, especially just where it is inserted at the basis of the jaw, and it made the skin, from the angle of the os maxillare inferius to the chin, seem like the cicatrix of a burn. The same side of the face, quite from the point of the chin, was much shrunk, and distorted by the

contraction of the muscle, and the corner of the mouth, in particular, was so drawn to one side and downward, when the patient turned his head, that a vast deal of deformity was the consequence. From the inferior part of the eye-brow, at the internal angle of the eye, to near the top of the head, there was a kind of furrow upon the skin, about half an inch broad, having a shining, polished appearance, like the cicatrix of a wound, and destitute of hair, which had fallen off. From the corner of the eye downwards, there was the same kind of appearance in a less degree. The patient was subject to repeated attacks of spasms, which began at the insertion of the muscle, and terminated at the eye, attended with a great deal of pain. The ear, and, also, the temporal and frontal muscles, were sometimes affected in a similar manner. The parts, in the course of the insertion of the muscle into the jaw-bone, were considerably thickened, without being in the least inflamed externally, and they were only a little painful, when touched, except they were at the same time stretched. The subjacent muscles did not seem to be at all affected.

It appears from the account, given by Mr. Gooch, that, in the treatment of this affection, every known means had been tried, by the advice of the most eminent practitioners; but, without effect. Mr. Gooch determined to try what benefit would be produced by dividing the muscle in the situation of the disorder. He first divided the integuments a little below the jaw, and thus exposed the whole breadth of the platysma myoides muscle, the fibres of which seemed to be in a state of violent extension, especially, when the patient's head was inclined towards the opposite side. Mr. Gooch then divided the muscle completely across, by a very careful dissection, until he had brought into view the fasciæ of the muscles underneath. The patient was then directed to turn his head towards the opposite side, and Mr. Gooch had the satisfaction of observing,

that the patient could perform this motion, without his face, and corner of his mouth being affected, as they had been before. The wound was treated in the ordinary way, and no particular symptoms arose. As soon as the inflammation had subsided, the patient was directed to move his head about very frequently, in order to prevent any kind of stiffness, which might ensue, in consequence of the contraction of the muscular fibres, and inelasticity of the cicatrix.

The patient found himself perfectly relieved by the foregoing operation, and had no return of the painful spasms, to which he had been previously subject. The side of his face, however, never recovered the proper degree of plumpness.—(*Chirurgical Works of B. Gooch, Vol. 2, p. 81.*)

Whenever an attempt has been made to cure a wry-neck, by dividing any of the muscles, or merely the integuments, it becomes necessary to take some measures for keeping the head in a proper position, during the treatment of the wound, lest, in consequence of the head inclining in the direction, in which it was before the operation, the divided parts should immediately grow together again, and bring the patient almost into the same condition, as he was before any thing had been done. With a view of preventing this unpleasant circumstance, Mr. Sharp recommends filling the wound with lint, and making it suppurate. Mr. B. Bell, on the other hand, advises the employment of a proper machine for keeping the head in a due position. Some writers think the use of a bandage quite sufficient for the purpose. Perhaps, as prudent a plan as any, when the sternocleido-mastoideus is affected, is to cut out a certain portion of it. (See *Sharp's Treatise on the Operations of Surgery, chap. 35. Chirurgical Works of B. Gooch, Vol. 2, p. 81. B. Bell's System of Surgery. Encyclopédie Méthodique, Partie Chirurgicale, Tom. 2, Art. Torticollis.*)

THE END.

